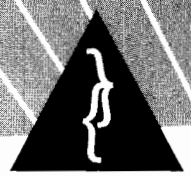

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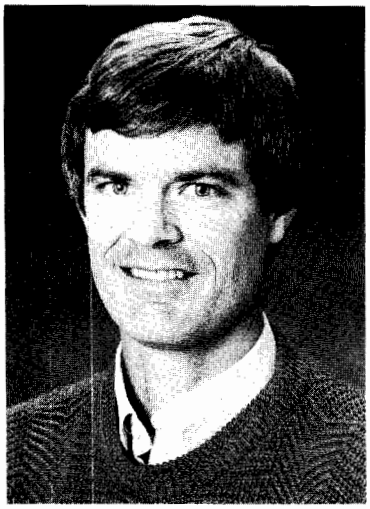
Algebra with Pizzazz!™

Practice in Algebra Skills

Steve Marcy, Ph.D.
Janis Marcy, M.A.

Creative Publications®

The Authors:



Steve Marcy
and
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Santa Monica-Malibu
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The authors wish to thank Mr. Bob Fine and Mr. Terry Green for their helpful suggestions, and especially all our former students in Santa Monica who worked with these puzzles as they were being developed.

Edited by Lyn Savage

Cover by Nimbus Design

© 1983, 1989, 1996 Creative Publications
Two Prudential Plaza, Suite 1175
Chicago, IL 60601
Printed in U.S.A.
ISBN: 0-88488-791-X
11 . 99

NOTES FROM THE AUTHORS

ALGEBRA WITH PIZZAZZ! in a Binder is designed to provide practice with skills and concepts taught in first-year algebra courses. The series is an extension and continuation of the *PRE-ALGEBRA WITH PIZZAZZ!* series, also published by Creative Publications.

We believe that mastery of algebra skills and concepts requires both good teaching and a great deal of practice. Our goal is to provide puzzle activities that make this practice more effective. We have tried to build into these activities three characteristics that increase the effectiveness of practice.

1. **KNOWLEDGE OF RESULTS**
   Various devices are used in the puzzles to tell students whether their answers are correct. Feedback occurs immediately after the student works each exercise. For example, if a particular answer is not in the code or scrambled answer list, the student knows it is incorrect. He or she can then try again or ask for help. Additional feedback and reinforcement occurs when the student finds a puzzle solution that is appropriate. We have found that students greatly appreciate and benefit from this immediate knowledge of results.

2. **CONTROL OF EXERCISE VARIATION AND DIFFICULTY**
   The puzzles within each major topic are carefully sequenced so that each one builds on skills and concepts previously covered. Each puzzle focuses on a specific objective. The sequence of exercises within each puzzle is designed to guide students in incremental, step-by-step fashion toward mastery of the objective. Exercises that depart substantially from this incremental development, or that require extraordinary insight, have not been included. On the other hand, the exercises provide enough variety and challenge to hold the students' interest and to represent the skill or concept fairly. Our goal is student success. That is, after a reasonable period of explanation and examples, students will be able to do the exercises and thereby achieve the objective at a respectable level.

3. **A MOTIVATING GOAL FOR THE STUDENT**
   The puzzles are designed so that students will construct a joke or unscramble the answer to a riddle in the process of checking their answers. The humor operates as an incentive, because the students don't get the punch line until they complete the exercises. While algebra students sometimes decry these jokes as "dumb" or even "very dumb," our experience has been that students usually look forward to solving the puzzles and that they do enjoy the jokes and riddles. In addition, the variety and novelty of procedures for solving the puzzles help capture student interest. By keeping scrambled answer lists short and procedures simple, we have tried to minimize the time spent on finding answers or doing other puzzle mechanics.

In addition to these efforts to make the puzzles effective, we have tried to make them easy to use. The objective for each puzzle is given both at the bottom of the puzzle page and in the table of contents. The major topic divisions and specific objectives correspond to those in widely-used algebra textbooks. Nearly every puzzle requires duplicating only one page. Finally, because the puzzles are self-correcting, they can eliminate the task of correcting assignments.

We hope that you will find the teaching of algebra, and your students the learning of algebra, less difficult and more fun with these puzzles.

Steve and Janis Marcy

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NOTES ABOUT USING THE PUZZLES

ALGEBRA WITH PIZZAZZ! in a Binder is designed to be used in conjunction with an algebra textbook. There are puzzles for most of the skills and concepts traditionally included in a first-year algebra course. The exercises are quite similar to those in standard textbooks, and have been organized with careful attention to sequencing and level of difficulty. After students have received instruction in a topic and have worked some sample exercises, you might assign a puzzle along with a selection of textbook exercises.

The series is not intended to offer "extra enrichment," in the sense of including topics beyond traditional course objectives, but rather to be an integral part of the basic algebra curriculum. Indeed, you may wish to use the series as your primary source of exercise sets for a complete algebra course.

If you are awarding credit for puzzle assignments, you may wish to have the students show all their work on a separate sheet of paper or on the back of the puzzle page. Setting standards regarding neatness, labeling of exercises, and so on, will promote legible and well-organized work. If the work for a particular puzzle can be done mentally, you may wish to have the students write a complete list of answers. Encourage them to write each answer *before* locating it in the answer list.

One advantage of using a puzzle as an assignment is that you can easily make a transparency of the page and display the exercises without having to recopy them on the board. You can then point to parts of a problem as you discuss it. It is often helpful to cut the transparency apart, so that you can display exercises on part of the screen and write solutions on the remaining area.

Other books by Steve and Janis Marcy
published by Creative Publications

***Middle School Math With Pizzazz!* Series**
Book A: Operations with whole numbers
Book B: Decimals and percent
Book C: Fractions; Number theory
Book D: Measurement; Geometry
Book E: Probability; Statistics; Integers; Equations

***Pre-Algebra With Pizzazz!* Series**
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Part BB: Exponents; Decimals; Scientific notation; irrational numbers; Ratio, proportion, and percent; Probability
Part CC: Geometric figures; Measurement; Square roots; Pythagorean property; Trigonometric ratios; Statistics
Part DD: Variables and expressions; Equations; Problem solving; Inequalities; Functions and graphing

DOUBLE CROSS

1. What do you get when you cross a porcupine with a gopher?

20	0	22	81	81	62	1	7	32	0	60	1	62	20	24	26

2. What do you get when you cross a pelican with a lightning bolt?

20	100	32	8	62	1	62	90	0	5	32	90	100	32	1	1

TO DECODE THE ANSWERS TO THESE TWO QUESTIONS:

Evaluate each expression below using the values

$a = 1$, $b = 2$, $c = 3$, $w = 0$, $x = 10$, and $y = 6$.

Each time your answer appears in the code, write the letter of that exercise above it.

(H) xy

(A) $b + (cy)$

(W) $x - (ac)$

(S) $(7b) + (4c)$

(E) $(8x) - (3y)$

(U) $(ax) + (by)$

(B) $(2x) \cdot (b + c)$

(G) $\dfrac{(x + y)}{(c - a)}$

(R) $\dfrac{(xy)}{(x + b)}$

(T) $\dfrac{(wa)}{b}$

(K) $(x - y) \cdot (y - w)$

(N) $c \cdot (y + c) \cdot (y - c)$

(C) $\dfrac{(3x)}{b} \cdot (abc)$

(I) $(8bc) - (w + x + y)$

(L) $\dfrac{(x - b)}{(y + b)}$

OBJECTIVE 1–a: To evaluate variable express ons.

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Why Should You Look Out for a Pig That Knows Karate?

Simplify or evaluate each expression below, as directed. Find your answer in the corresponding answer column. Write the letter of the exercise in the box that contains the number of the answer.

SIMPLIFY:

(I) $4 \cdot 9 + 1$

(T) $6 + 7 \cdot 10$

(U) $42 - 2 \cdot 7$

(O) $8 + 50 \div 2$

(E) $(10)(3) - 4$

(G) $2 \cdot 8 + 3 \cdot 5$

(A) $\frac{60}{3} - (2)(4)$

(T) $5 \cdot 12 + \frac{32}{16}$

(Y) $3 + 2 \cdot 5 \cdot 8$

(I) $(4)(6)(3) - 20 + 1$

(O) $18 \div 2 \times 3$

(R) $3 \cdot 3 + 4 \cdot 4 - 5 \cdot 5$

Answers:

(7) 62

(22) 27

(9) 37

(5) 31

(17) 33

(2) 76

(15) 12

(18) 0

(12) 83

(14) 28

(1) 53

(11) 26

EVALUATE if $a = 2$, $b = 3$, $x = 5$, $y = 8$, and $w = 20$:

(I) $4x + 7$

(C) $1 + 6y$

(H) $9 - 2b$

(O) $8x + 3y$

(M) $a + bw$

(V) $aw - by$

(P) $b + \frac{w}{x}$

(G) $\frac{bw}{x} - a + 7$

(K) $abxy - 5w$

(H) $36 - 4ab$

(P) $5 + 3x - \frac{w}{a}$

Answers:

(10) 16

(16) 10

(8) 17

(20) 49

(13) 64

(21) 12

(4) 27

(23) 7

(3) 62

(19) 140

(6) 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

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OBJECTIVE 1–b: To apply rules for order of operations; evaluate variable expressions.

Why Did Simeon Wrench Sleep Under His Car?

Simplify or evaluate each expression below, as directed. Find your answer at the bottom of the page and write the letter of that exercise below it.

SIMPLIFY:

(E) $8 + (9 \cdot 3)$

(I) $(8 + 9) \cdot 3$

(A) $14(10 \div 2)$

(Y) $(12 \cdot 3) - (9 \cdot 2)$

(T) $(4 \cdot 10) + (75 \div 25)$

(E) $\dfrac{80 - 3}{8 + 3}$

(P) $13 + [2(9 - 6)]$

SIMPLIFY:

(A) $\dfrac{12 + 8}{12 - 2} + \dfrac{8}{2}$

(O) $3[5(48 \div 12)]$

(T) $\dfrac{50 - [3(7 - 1)]}{2}$

(H) $[4(30 - 5)] \div \dfrac{10}{2}$

(E) $\dfrac{12(15 \div 3)}{(20 \cdot 5) - (20 \cdot 2)}$

(D) $5 + [4 \cdot 3(2 + 1)]$

(W) $\left[\dfrac{6 \cdot 2(8 - 3)}{11 + 4}\right] \cdot 6$

EVALUATE if

$a = 1$ $\quad m = 3$ $\quad x = 6$

$b = 2$ $\quad n = 10$ $\quad y = 0$

(K) $\dfrac{7m + 1}{b}$

(N) $(3n - 2m)(a + b)$

(L) $\dfrac{2(n + x)}{n - x}$

(U) $x[b(m + 1) - 3]$

(W) $\dfrac{mn - 5y}{a + b}$

(O) $(n - a)(n - b)(n - m)(n - n)$

20	7	24	6	72	16	35	41	43	60	10	70	11	1	30	19	0	51	8	18

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When Do Sky Divers Use Decimals?

For each exercise, select the axiom illustrated by the given equation. (Each variable represents any real number.) CIRCLE the letter in the appropriate column next to the equation. Write this letter in the box at the bottom of the page that contains the number of that exercise.

	commutative (addition) ↓	commutative (multiplication)	associative (addition) ↓	associative (multiplication)
(1) $6 \cdot 9 = 9 \cdot 6$	P	T	U	B
(2) $7 + 15 = 15 + 7$	I	A	S	R
(3) $69 + (31 + 23) = (69 + 31) + 23$	G	V	S	L
(4) $20 \cdot (5 \cdot 17) = (20 \cdot 5) \cdot 17$	X	O	P	A
(5) $x + 2.5 = 2.5 + x$	I	H	U	W
(6) $3(n \cdot 8) = 3(8n)$	C	E	I	L
(7) $3(8n) = (3 \cdot 8)n$	M	W	E	N
(8) $11 + (w + 2) = 11 + (2 + w)$	T	V	Y	B
(9) $11 + (2 + w) = (11 + 2) + w$	I	E	A	L
(10) $(5x) + 14 = 14 + (5x)$	N	T	F	S
(11) $(x \cdot 5) + 14 = (5x) + 14$	A	I	O	T
(12) $\frac{1}{3}(9t) = \left(\frac{1}{3} \cdot 9\right)t$	E	A	N	O
(13) $7x + (4x + 1) = (7x + 4x) + 1$	A	P	U	L
(14) $3(m + 10) = 3(10 + m)$	T	S	N	R
(15) $3 + (m \cdot 10) = 3 + (10m)$	E	H	I	A
(16) $8 + (5 + k) = (8 + 5) + k$	P	K	S	H
(17) $(12a)\frac{1}{6} = (a \cdot 12)\frac{1}{6}$	S	T	B	W
(18) $(a \cdot 12)\frac{1}{6} = a\left(12 \cdot \frac{1}{6}\right)$	B	Y	E	N

2	10	4	17	6	18	8	15	3	16	11	1	13	9	14	5	12	7

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Why Are Handcuffs Like Souvenirs?

Use the distributive property to complete each statement below. Find your answer in the corresponding answer column. Write the letter of that exercise in the box that contains the number of the answer.

(A) $7(a + b) = 7a +$ ____

(R) $4(5 + x) = 20 +$ ____

(Y) $3(2x + 9) = 6x +$ ____

(S) $8(3x + 1) =$ ____ $+ 8$

(O) $a(4 + b) =$ ____ $+ ab$

(E) $x(y + 10) =$ ____ $+ 10x$

(I) $2(7x + 4y) = 14x +$ ____

(D) $6(9 + 5x) = 54 +$ ____

(W) $x(a + 3b) =$ ____ $+ 3bx$

(E) $a(8x + 2y) = 8ax +$ ____

(T) $\frac{1}{2}(4a + 10) = 2a +$ ____

(R) $\frac{2}{3}(12 + 9y) = 8 +$ ____

Answers:

(18) ax

(17) $4a$

(9) $7b$

(1) 5

(14) $4x$

(23) $24x$

(10) $30x$

(6) $6y$

(3) xy

(4) 27

(7) $2ay$

(20) $8y$

(O) $5x + 5y = 5(x +$ ____ $)$

(T) $9a + 9b = 9($ ____ $+ b)$

(W) $4m + 4n =$ ____ $(m + n)$

(H) $ab + 3a = a(b +$ ____ $)$

(E) $xy + 15x =$ ____ $(y + 15)$

(A) $bu + uv =$ ____ $(b + v)$

(F) $\frac{2}{5}m + \frac{2}{5}n = \frac{2}{5}($ ____ $+ n)$

(M) $\frac{3}{4}a + \frac{3}{4}b + \frac{3}{4}c =$ ____ $(a + b + c)$

(S) $7ax + 2ay = a(7x +$ ____ $)$

(T) $4kx + 11ky =$ ____ $(4x + 11y)$

(R) $3ay + 8by = y($ ____ $+ 8b)$

Answers:

(16) 4

(5) u

(22) a

(11) x

(21) $2y$

(13) y

(19) $3a$

(2) 3

(12) m

(15) k

(8) $\frac{3}{4}$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

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What Happened to the Snowman During the Heat Wave?

Simplify each expression below and find your answer in the corresponding answer column. Write the letter of that exercise in the box that contains the number of the answer.

(E) $6x + 9 + 2x$	(9) $9x + 8$	(L) $4x + 2y + 7 + 4x + 3y$	(1) $12x + 17y$
(S) $7 + 3x + 4$	(4) $6x$	(E) $8y + 6 + 8x + y + 3$	(20) $10x + 7y + 13$
(O) $8 + 2x + 7x$	(6) $7x + 7$	(D) $7x + 4x + 6y + x + 9y$	(13) $8x + 9y + 9$
(L) $8x + 7 + 3x + 2$	(15) $8x + 9$	(O) $2x + 5 + 7y + 8x + 8$	(14) $x + 6y$
(A) $5x + x$	(19) $11x + 9$	(M) $3y + 7 + 5y + y + 1$	(5) $12x + 15y$
(F) $9x + 8 + x$	(25) $3x + 11$	(H) $6x + 6y + 6x + 7y + 4y$	(10) $9y + 8$
(E) $6 + 4x + 1 + 3x$	(28) $10x + 8$	(T) $\frac{1}{2}x + \frac{1}{2}x + 6y$	(27) $8x + 5y + 7$

(O) $3t + 4u + 6t$	(11) $7t + 13u$	(E) $\frac{1}{2}n + 3w + \frac{1}{2}n + w$	(18) $3n + 10w + 12$
(A) $9u + 4 + 8t + 3u$	(17) $9t + 4u$	(M) $n + 8w + 5w + 3 + 5w$	(26) $n + 4w$
(I) $7 + u + 9t + 5u$	(24) $16t + 4u$	(O) $4w + 5 + 3n + 6w + 7$	(22) $n + 10w + 6$
(P) $6t + 4u + t + 9u$	(7) $8t + 12u + 4$	(C) $2n + 4w + 5n + w + 9n$	(16) $7n + 2w$
(E) $2t + 4 + 8u + 2t$	(23) $9t + 6u + 7$	(H) $w + w + n + 8w + 6$	(3) $n + 18w + 3$
(M) $3u + 7t + 9t + u$	(21) $8t + u + 13$	(L) $6n + 2n + 7w + 2 + 3n$	(12) $11n + 7w + 2$
(F) $8t + 1 + u + 12$	(2) $4t + 8u + 4$	(P) $\frac{3}{2}w + 7n + \frac{1}{2}w$	(8) $16n + 5w$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

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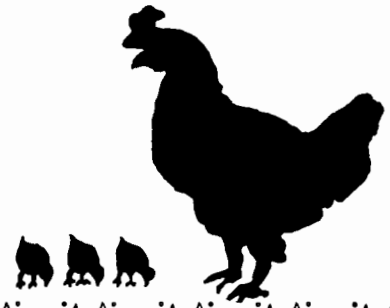
OBJECTIVE 1–f: To simplify expressions by combining like terms (all positive terms).

What Did the Spanish Farmer Say to His Chicken?



Simplify each expression below. Find your answer at the bottom of the page. Cross out the letter above it. When you finish, the answer to the title question will remain.

1. $3(4x + 6) + 7x$
2. $7(2 + 3x) + 8$
3. $9 + 5(4x + 4)$
4. $12 + 3(8 + x)$
5. $(7x + 2)3 + 8x$
6. $6(4x + 7) + x$
7. $3x + (2x + 6)5$
8. $4 + 6(7x + 7)$
9. $8 + 5(9 + 4x)$
10. $6m + 3(2m + 5) + 7$
11. $5(m + 9) + 4 + 8m$
12. $3m + 2(5 + m) + 5m$
13. $6m + 14 + 3(3m + 7)$
14. $4(2m + 6) + 3(3 + 5m)$
15. $5(8 + m) + 2(7 + 7m)$
16. $(2m + 1)9 + 5(5m + 3)$
17. $7(7 + 5m) + (m + 6)4$
18. $2(9m + 5) + 8(6m + 1)$

L	S	T	O	E	N	H	L	B	R	T	D	A	E	G	G	M	I	V	K	Y	T	E
$13m + 49$	$66m + 18$	$43m + 24$	$38m + 70$	$15m + 35$	$19x + 18$	$19x + 20$	$64m + 29$	$42x + 46$	$19m + 54$	$12m + 22$	$20x + 29$	$24x + 20$	$23m + 33$	$29x + 6$	$13x + 30$	$20x + 53$	$39m + 73$	$10m + 10$	$3x + 36$	$45m + 25$	$21x + 22$	$25x + 42$

OBJECTIVE 1–g: To simplify expressions containing parentheses (all positive terms).

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DID YOU HEAR ABOUT...

A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	R ?

Evaluate each expression below for the given value of the variable. Find your answer in the appropriate answer column and notice the word next to it. Write the word in the box above that contains the letter of that exercise. Keep working and you will hear about the "dairy" best name.

Answers A–I:

42	PEOPLE
18	COUPLE
48	THE
54	DAUGHTER
36	WHO
81	THE
900	THEIR
500	CLEVER
650	THAT
64	BABY
78	SAID
150	GAVE

(A) a^2 if $a = 9$

(B) $5m^2$ if $m = 10$

(C) $2x^2$ if $x = 3$

(D) $(2x)^2$ if $x = 3$

(E) $6u^2$ if $u = 5$

(F) $(6u)^2$ if $u = 5$

(G) y^3 if $y = 4$

(H) $2t^3$ if $t = 3$

(I) $3d^4$ if $d = 2$

(J) $7v^3$ if $v = 1$

(K) $(7v)^3$ if $v = 1$

(L) $(x + 1)^2$ if $x = 11$

(M) $4(n - 1)^2$ if $n = 10$

(N) $8(x - 3)^3$ if $x = 8$

(O) $(t + 1)^2(t - 1)$ if $t = 3$

(P) $(c + 2)(c - 2)^2$ if $c = 8$

(Q) $(2m + 1)^2$ if $m = 7$

(R) $2(3x - 1)^2$ if $x = 4$

Answers J–R:

32	HAVE
24	BEST
144	BECAUSE
242	HER
825	WANT
360	ANY
1000	DIDN'T
7	NAME
324	THEY
356	CREAM
225	BUT
343	MARGARINE

GET THE MESSAGE

DIRECTIONS:

For each exercise, determine whether or not the number in braces is a solution of the given open sentence. Indicate "yes" or "no" by circling the letter in the appropriate column next to the exercise. When you finish, print the circled letters in the row of boxes at the bottom of the page. FIRST print those from the column marked "Yes," THEN print those from the column marked "No."

A MESSAGE WILL APPEAR!

			Yes	No
(1)	$3x + 5 = 17$	{4}	P	S
(2)	$7y - 1 = 55$	{8}	A	T
(3)	$9 + 2x = 18$	{5}	R	A
(4)	$22 = 8m - 4$	{3}	T	R
(5)	$6x + 3 > 26$	{5}	I	A
(6)	$6x + 3 > 26$	{4}	N	I
(7)	$6x + 3 > 26$	{3}	S	N
(8)	$9n - 9 < 54$	{7}	O	E
(9)	$6 < 12 - 5u$	{1}	T	V
(10)	$7 < 12 - 5u$	{1}	E	D
(11)	$8k + 4 = 6k + 14$	{5}	I	E
(12)	$9x - 5 = 7 + 3x$	{2}	N	R
(13)	$15 - 4n > 8 + 2n$	{1}	G	S
(14)	$3w + 3 < 4w - 17$	{20}	W	E
(15)	$25 + a > 3a$	{15}	T	A
(16)	$3x - 3 = x + 20$	{12}	H	S
(17)	$5(p + 3) = 45$	{6}	I	T
(18)	$8(5 + 2y) = 88$	{3}	S	A
(19)	$2(6x - 1) > 47$	{4}	N	E
(20)	$50 > 7(1 + 7t)$	{1}	O	L
(21)	$2(3x + 4) = 5(6 - x)$	{2}	L	M
(22)	$4(4 + 2d) < 12d$	{8}	E	K
(23)	$5(x + 9) = 5x + 9$	{0}	T	Y

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Why Did the Cow Keep Jumping Over the Barrel?

Translate each phrase below into an algebraic expression and find your answer in the corresponding answer column. Write the letter of that exercise in the box that contains the number of the answer.

(E)	3 times a number	(18)	$x + 3$
(O)	3 more than a number	(15)	$3x - 8$
(S)	3 decreased by a number	(19)	$x - 3$
(R)	3 less than a number	(12)	$3x + 8$
(A)	one third of a number	(3)	$3x$
(I)	8 more than 3 times a number	(25)	$3 - x$
(N)	8 less than 3 times a number	(5)	$\frac{x}{3}$

(S)	5 times a number, increased by 8	(22)	$8(x + 5)$
(A)	5 times the sum of a number and 8	(4)	$8(2x + 5)$
(H)	5 more than 8 times a number	(2)	$8x + 5$
(O)	8 times the sum of a number and 5	(13)	$2(5x + 8)$
(C)	twice the sum of 5 times a number and 8	(6)	$5x + 8$
(T)	2 more than five eighths of a number	(20)	$5(x + 8)$
(W)	8 times the sum of twice a number and 5	(11)	$\frac{5}{8}x + 2$

(A)	7 less than 4 times a number	(1)	$7 - 4x$
(S)	7 decreased by 4 times a number	(16)	$2x - 9$
(G)	9 less than twice a number	(14)	$7x + 4$
(N)	9 decreased by twice a number	(9)	$4x - 7$
(O)	9 less than half a number	(8)	$7x + 4x$
(I)	7 times a number, increased by 4	(24)	$9 - 2x$
(R)	7 times a number, increased by 4 times the number	(27)	$\frac{x}{2} - 9$

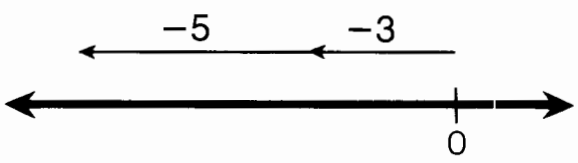
(T)	9 meters higher than altitude x	(7)	$x + 15$
(F)	15 meters per second slower than speed x	(28)	$x + 9$
(P)	15°C hotter than temperature x	(26)	$4x - 9$
(O)	9 meters shorter than twice length x	(23)	$2x - 9$
(C)	9 years older than twice age x	(10)	$2x + 9$
(H)	\$9 cheaper than 4 times price x	(17)	$x - 15$
(M)	9 centimeters less than three fourths of length x	(21)	$\frac{3}{4}x - 9$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

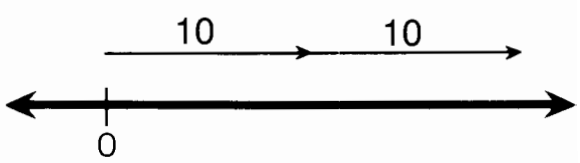
How Is a Fast Racehorse Like a Dessert?

For each exercise, identify the integer that results from combining the two arrows. Write the letter of each exercise below the corresponding integer at the bottom of the page. You'll learn the sweet truth!

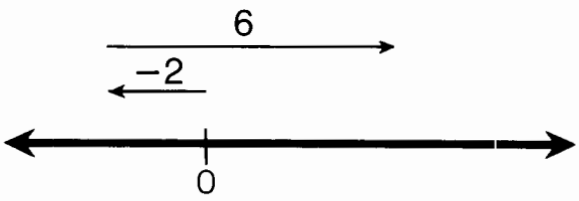
(U)



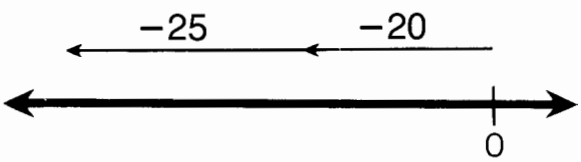
(S)



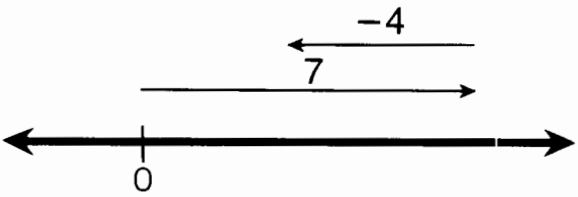
(E)



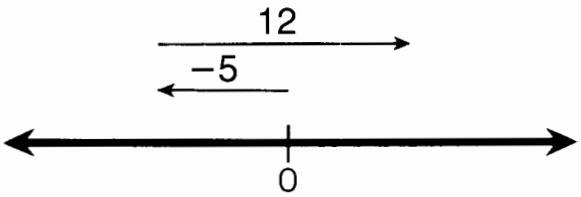
(T)



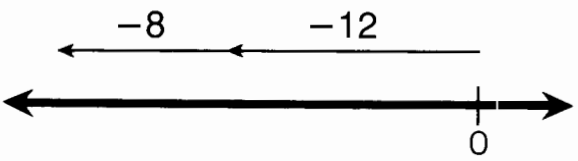
(H)



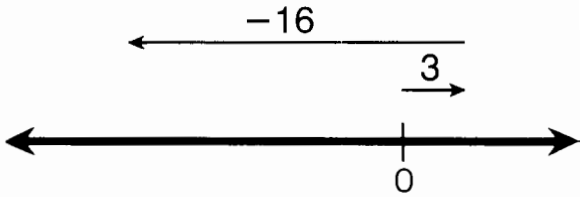
(E)



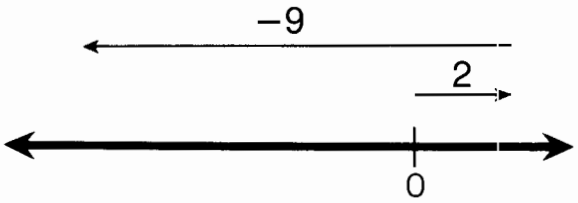
(A)



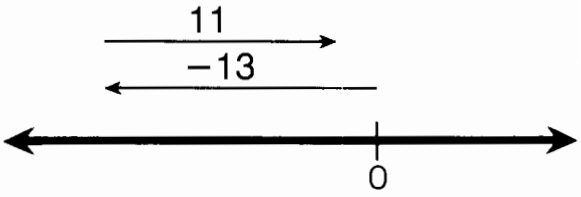
(R)



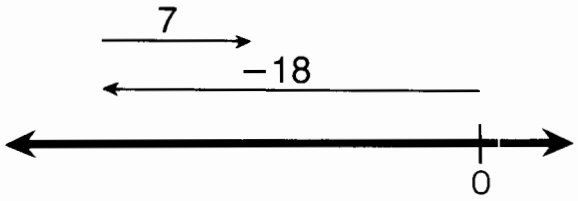
(I)



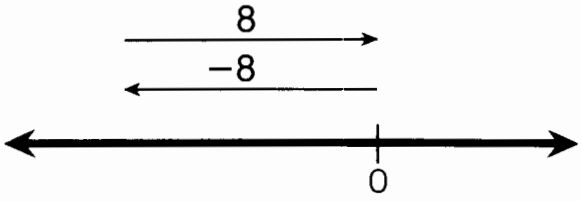
(B)



(E)



(S)



3	7	−7	20	−20	0	−8	−13	−11	−2	4	−45

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Why Did the Quiz Show Give Away $10,000 Plus One Banana?

Do each exercise below and find your answer in the Code Key. Notice the letter above it. Print this letter in the box at the bottom of the page that contains the number of the exercise.

CODE KEY	I	P	W	T	Z	E	O	V	D	H	R	A	Y	N	L
	−20	−15	−11	−8	−5	−3	−2	0	1	4	6	7	9	12	16

(1) $-6 + (-2) =$

(2) $-5 + 9 =$

(3) $10 + (-13) =$

(4) $-2 + 11 =$

(5) $-8 + (-3) =$

(6) $10 + (-3) =$

(7) $-8 + 20 =$

(8) $-4 + (-4) =$

(9) $-9 + 6 =$

(10) $21 + (-20) =$

(11) $-5 + (-6) + 3 =$

(12) $-2 + 9 + (-3) =$

(13) $6 + (-10) + 1 =$

(14) $-7 + (-1) + (-7) =$

(15) $-3 + 5 + 4 =$

(16) $-6 + (-10) + (-4) =$

(17) $7 + (-2) + (-10) =$

(18) $-6 + 5 + (-2) =$

(19) $4 + (-3) + (-9) =$

(20) $8 + (-12) + 2 =$

(21) $-3 + (-4) + 11 =$

(22) $12 + 3 + (-8) =$

(23) $-2 + 9 + (-7) =$

(24) $9 + (-8) + (-4) =$

(25) $18 + (-6) + (-5) =$

(26) $-10 + 1 + 2 + (-8) =$

(27) $-7 + 12 + (-11) + (-9) =$

(28) $-15 + 4 + 13 + (-5) =$

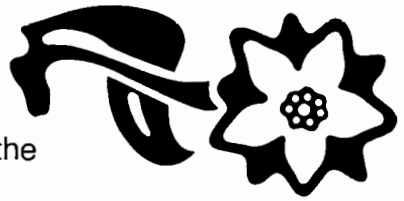
(29) $-8 + (-9) + 26 + (-2) =$

(30) $15 + (-6) + (-4) + 11 =$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

OBJECTIVE 2–b: To add integers.

Why Is Life Like a Shower?



Simplify or evaluate each expression below, as directed. Find your answer in the corresponding set of answer boxes. Print the letter of the exercise in that box.

SIMPLIFY:

(W) $-(-4)+10$

(A) $3+[-(-8)]$

(N) $-12+[-(-5)]$

(D) $-(7+9)$

(O) $-(-2+8)$

SIMPLIFY:

(N) $-(-11)+6$

(E) $-[4+(-7)]$

(U) $-[12+(-3)]$

(G) $-[-5+(-5)]$

(N) $-[-(-2)]$

SIMPLIFY:

(T) $6+|-1|$

(O) $|-3|+|30|$

(R) $|4+(-9)|+10$

(N) $|-5+12|+(-7)$

(R) $8+|1+(-15)|$

33	−7	3	−13	14	15	−6	0	10	20	7	−9	22	17	1	11	−2	−16

SIMPLIFY:

(I) $-|-11+6|$

(O) $-|10+(-4)|$

(E) $3|-2|+|-3|$

(R) $5|-9+13|+(-1)$

(E) $-[2|-7|+(-6)]$

EVALUATE:

(O) $-x$ if $x=-3$

(A) $-y$ if $y=1$

(Y) $-x+5$ if $x=-7$

(R) $-(-a)$ if $a=-20$

(U) $-x+(-9)$ if $x=2$

EVALUATE:

(N) $|-x|$ if $x=7$

(T) $|n+1|$ if $n=-18$

(H) $-|-w|$ if $w=-10$

(W) $-|x+(-8)|$ if $x=4$

(T) $-[3|-y|+|y|]$ if $y=-6$

12	3	−11	19	−8	15	−5	7	−2	−10	−6	−24	−22	−4	−1	17	9	−20

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What Goes Putt, Putt, Putt, Putt, Putt, Putt, Putt?

Do each exercise and find your answer in the rectangle below. Cross out the box containing that answer. When you finish, there will be five boxes not crossed out. Print the letters from these boxes in the spaces at the bottom of the page.

(1) $14 + (-30) + 23 + (-9)$

(2) $-19 + (-42) + 36 + (-12)$

(3) $48 + 3 + (-18) + (-10)$

(4) $-8 + (-60) + (-17) + 44$

(5) $27 + 6 + (-55) + 36$

(6) $245 + (-907)$

(7) $-523 + (-98) + 800$

(8) $303 + (-760) + 175$

(9) $-6 + (-7) + 8 + (-7) + 9 + (-1)$

(10) $6 + (-5) + 7 + 4 + (-9) + (-3)$

(11) $-8432 + (-1150) + 3760$

(12) The Vultures football team made the following gains on four plays: 14 yards, −32 yards, 3 yards, and −19 yards. What was the net change in position of the Vultures as a result of the four plays?

(13) Bongo had a balance of $345.28 in his checking account. During the week he wrote checks for $65.08, $24.50, and $118.95. He then made a deposit of $56.00. What was his balance after the deposit?

(14) The net profit for four months of T.N.T. Corporation is given in the table below:

Month	Net Profit
January	$16,800
February	− 4,500
March	39,900
April	− 12,000

What was the net profit for the four-month period?

(15) A cross country skier made the following changes in altitude during a 5-hour period: up 28 meters, down 124 meters, down 40 meters, up 75 meters, down 225 meters. What was the skier's net change in altitude?

(16) At its first stop, a bus picked up 17 people. At the next stop, 12 people got on and 7 got off. At the third stop, 21 people got on and 13 got off. At the fourth stop, 5 people got on and 18 got off. How many passengers were then on the bus?

CA $192.75	RS −662	AB $43,500	IG −286 m	IT −37	GL 0	AD −5632
SL −41	AP −4	OW −2	LO −34 yd	GO −257 m	NE 17	XT 23
LF $182.95	UN $40,200	TO 179	UP 14	TH −5822	ER 19 yd	ON −282

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OBJECTIVE 2–d: To add several integers; to solve word problems involving addition of integers.

Why Did the Snail Have an "S" Painted on His VW?

Do each exercise below and find your answer in the corresponding set of answer boxes. Print the letter of that exercise in the box containing the answer.

(Y) $(-4)(3)$
(E) $(-5)(-8)$
(O) $-9 \cdot 7$
(R) $-12(-4)$
(O) $16(-3)$

(E) $(-10)(4)$
(S) $-12(-1)$
(E) $(8)(-8)$
(N) $(-5)20$
(V) $(-50)(-2)$

(L) $-3 \cdot 4 \cdot 2$
(O) $(-3)(-4)(2)$
(U) $5(-1)(12)$
(D) $5(-1)(-12)$
(U) $(-3)(-3)(-3)$

(O) $(-4)(-5)(-6)$
(W) $(-9)(4)(-10)$
(S) $(5)(3)(-11)$
(T) $(-15)(-2)4$
(H) $(-90)(-90)(0)$

12	−48	−64	100	−40	48	−12	−63	−100	40	360	24	−27	−24	60	−165	0	−120	−60	120

(E) $(-40)(60)$
(T) $(-80)(-20)$
(O) $2(-360)$
(T) $(-4)(-4)(-4)$
(A) $(8)(-1)(12)$

(H) $(-7)(6)(-2)$
(L) $3(-25)(-2)$
(S) $(-2)(-4)8$
(O) $-4 \cdot 7 \cdot 3$
(K) $(10)(10)(-16)$

(A) $(-5)(3)(-4)(10)$
(O) $(6)(-2)(-10)(-5)$
(R) $(3)(3)(-4)(20)$
(C) $(-5)(-40)(-4)(-1)$
(G) $(-80)(3)(-1)(3)$

150	−84	−720	−1600	−96	1600	−64	84	−2400	64	800	600	−720	720	−600

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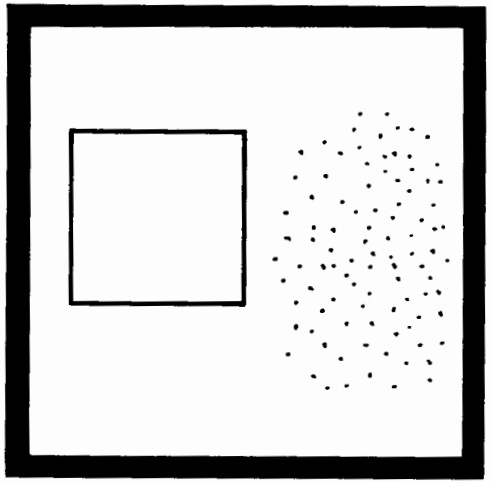
What Are the Titles of These Pictures?

Do each exercise below and find your answer in the coded title above that section of exercises. Each time the answer appears, write the letter of that exercise above it. Keep working and you will decode each title.



189	64	144	1500	1500	−480	−72	−360	−216	−480	−80

1500	144	64	−80	10,000	144	10,000	−480	−125

(D) $-8 \cdot 2 \cdot 5$

(U) $-3(9)(-7)$

(E) $(-4)(-20)(-6)$

(B) $18(-10)(2)$

(A) $(-12)^2$

(R) $(-5)^3$

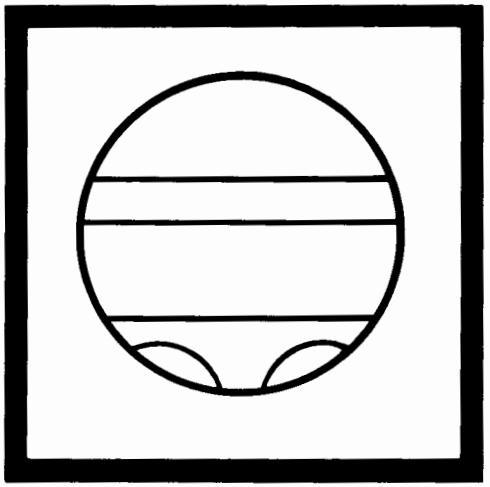
(L) $(-6)^3$

(N) $4(-4)^2$

(M) $(-1)^3(8)(9)$

(P) $(-4)(25)(-5)(20)$

(S) $(-5)(-15)(-2)(-10)$



−400	130,000	130,000	−648	−900	98	130,000	288

−729	−120	−32	−648	400	98	81	288	400	−900	400	98	400

(E) $(-2)(3)(-4)(-5)$

(G) $(-3)^4$

(O) $(-10)^4(13)$

(A) $(-2)^5$

(K) $(-1)^5(-30)^2$

(W) $(3)^3(-3)^3$

(B) $(-4)(-6)^2(-2)$

(D) $(-1)^3(-20)^2$

(I) $(-2)^4(-5)^2$

(R) $(-9)^2(-2)^3$

(N) $(-1)^7(-7)^2(-2)$

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IT'S FUN, SUM-TIMES

Do each exercise below and find your answer in the code above that column of exercises. Each time the answer appears, write the letter of the exercise above it. Keep working and you will discover two "punny" answers!

When Was the 300-lb Wrestler on Television?

−64	−61	24	4	10	−1	2	14	66	−1	4	−6	−1

24	−1	4	−22	−60	0	−1	−7	−20	−5

(H) $-9 + 3$

(A) $-5 \cdot 12$

(O) $20 + (-6)$

(S) $-3\,(-8)$

(I) $-7 + (-13)$

(R) $-2\,(3)(-11)$

(D) $-9 + (-5) + 7$

(J) $(-4)^3$

(C) $(-2)(5) + (-3)(4)$

(B) $(3)(-2) + (-4)(-4)$

(N) $(-1)(-9) + (2)(-7)$

(T) $(4)(5) + (-8)(2)$

(U) $(8)(-5) + (-7)(3)$

(E) $(-2)(-4) + (-3)(3)$

(F) $(-6)(9) + (-8)(-7)$

(V) $(-2)(-12) + (3)(8)$

Why Does a Lawn Mower Live Such a Hard Life?

16	−2	−9	−4	400	−9	−24	−28	−8	−18	−2	−28

50	7	−28	21	−18	−26	−9	15	250	7	−54	−26

(U) $-4 + 12 + (-7)$

(Y) $(2)(-3)(4)$

(E) $-6 + (-6) + (-6)$

(I) $(-2)^4$

(D) $(-3)^3 + (-1)^2$

(L) $20 + (-7) + (-17)$

(O) $(-5)^3\,(-2)$

(H) $30 + (-12) + 3$

(T) $-8 + 3 + (-8) + 11$

(W) $(-4)(5)(-10)(2)$

(N) $(-3)(2)(-1)(-9)$

(G) $-3 + (-7) + (-7) + 9$

(R) $(-5)(-7) + (10)(-2)$

(S) $(4)(-6) + (2)(-2)$

(P) $(-5)(-5) + (-5)(-5)$

(A) $(2)(-8) + (-1)(-7)$

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What Happened to the Dallas Sheep Rancher Who Claimed He Was Going to Start Selling Wool in 47 Different Colors?

Do each exercise below and find your answer in one of the boxes at the bottom of the page. Write the letter of the exercise in that box. (To help you locate your answer quickly, the answers are arranged in order from smallest to largest.)

(E) $-8-3=$
(A) $4-(-1)=$
(H) $2-11=$
(T) $-12-(-14)=$
(E) $30+(-8)=$
(B) $3-(-6)=$
(A) $-11-7=$
(I) $20-25=$
(E) $-36-(-6)=$
(N) $13-(-4)=$
(R) $-3+16=$

(E) $-5-16=$
(A) $30+(3-5)=$
(D) $2-(1-9)=$
(S) $(-22+33)-11=$
(E) $-10-(8-10)=$
(I) $(6-1)-(-12+2)=$
(H) $(-15-15)-(15-13)=$
(E) $(3-7)-(9-12)=$
(S) $(-25+50)-(-4-6)=$
(T) $-2-5-3=$
(B) $-18+14-2=$

(M) $5-12-7=$
(E) $100-97+9=$
(G) $10-4-4-4=$
(B) $-36-12+36-12=$
(T) $-3+40-10-8=$
(G) $-16+9-2+6=$
(C) $-5-5-5-5=$
(X) $(-3-12)-(-40)=$
(L) $2-(32-34)=$
(M) $10+(-6-1+4)=$
(Y) $(-3+8-5)-(-11)=$

−32	−30	−24	−21	−20	−18	−14	−11	−10	−9	−8	−6	−5	−3	−2	−1	0	2

4	5	7	9	10	11	12	13	15	17	19	22	25	28	35

Why Did Zelda Name Her Pet Fawn "Ninety-nine Cents"?

Do each exercise below and find your answer in the Code Key. Notice the letter above it. Print this letter in the box at the bottom of the page that contains the number of the exercise.

CODE KEY	K	Q	G	B	T	L	N	A	I	C	D	H	O	U	E	W	S
	−68	−19	−17	−12	−10	−8	−7	−6	−5	−3	−1	0	2	4	9	12	20

(1) $\frac{-20}{4} =$

(2) $\frac{20}{-2} =$

(3) $\frac{-60}{-5} =$

(4) $\frac{24}{-4} =$

(5) $\frac{-100}{-5} =$

(6) $\frac{-56}{8} =$

(7) $\frac{150}{-15} =$

(8) $-38 \div 2 =$

(9) $-80 \div (-20) =$

(10) $35 : (-7) =$

(11) $-1000 \div 100 =$

(12) $-36 \div (-4) =$

(13) $\frac{-9+5}{-2} =$

(14) $\frac{-20+(-20)}{5} =$

(15) $\frac{-7+20}{-13} =$

(16) $\frac{-30+3}{-3} =$

(17) $\frac{-24}{6} + \frac{-21}{7} =$

(18) $\frac{15}{-3} + \frac{-14}{-2} =$

(19) $\frac{60}{4} + \frac{-44}{4} =$

(20) $\frac{-45}{3} + \frac{2}{-1} =$

(21) $\frac{-430}{-10} + \frac{-430}{10} =$

(22) $\frac{-84}{7} + \frac{34}{17} =$

(23) $\frac{75}{-15} + \frac{-28}{-4} =$

(24) $\frac{-4 \cdot 6}{2} =$

(25) $\frac{(-6)^2}{4} =$

(26) $\frac{-3(4)}{6} + \frac{-2(10)}{5} =$

(27) $\frac{(-2)(3)(-16)}{-8} =$

(28) $\frac{(5)(2)+(-6)(3)}{-2} =$

(29) $\frac{(-2)(7)+(-1)(-5)}{3} =$

(30) $\frac{-680}{10} =$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

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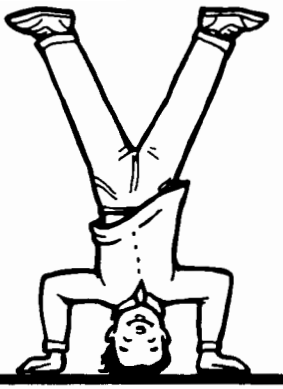
When Might You Think You're Built Upside Down?



Do each exercise below and find your answer in one of the boxes at the bottom of the page. Write the letter of the exercise in that box. (To help you locate each answer quickly, the answers are arranged in order from smallest to largest.)

(S) $-5(-1+6)$

(U) $\frac{8(-3)}{-6}$

(E) $\frac{-380}{38}+\frac{380}{-38}$

(M) $(2)(-2)+(5)(6)$

(E) $\frac{-15}{15}+\frac{150}{15}$

(U) $(-1)(-7)^2$

(L) $(-3)(7)(-2)(5)$

(E) $(-2)^4$

(N) $(-3)^2(-2)^3$

(D) $\frac{-6+(-3)+(-7)}{4}$

(W) $-5\cdot 2\cdot 53$

(R) $-8+17+(-3)$

(R) $\frac{-72}{8}+\frac{-56}{7}$

(O) $(-3\cdot 7)+(-2\cdot 4)$

(A) $\frac{170}{-10}+\frac{96}{12}$

(L) $(-30)^2$

(N) $(-3)(-12)(-1)$

(F) $\frac{-60}{-3}+\frac{-48}{4}$

(S) $-1(-6)+8(-2)$

(E) $(-9)^2(-1)^5$

(H) $(-8)(-1)(4)(-3)$

(T) $\frac{9(-4)}{-2}$

(N) $\frac{-32}{2}+\frac{-75}{-15}$

(O) $-7+8+(-9)+10$

(E) $(-7)(5)(-4)$

(U) $\frac{-9\cdot 5}{3}$

(Y) $(-2)(-3)+(-1)(7)$

(Y) $(-4)^3$

(S) $\frac{(-4)(-25)}{5}$

(N) $\frac{-19+(-11)}{6}$

(R) $80+(-50)+(-70)$

(O) $-2(-5)(-6)$

	−530	−96	−81	−72	−64	−60	−49	−40	−36	−29	−25	−20	−17	−15	−11	−10
	−9	−5	−4	−1	2	4	6	8	9	16	18	20	26	140	210	900

DAFFYNITION DECODER

1. Lumberjack:

−22	11	−2	−2	−34	−17	25	13	−22	25	−144	−22	1328	−17

2. Quartz watch:

336	−2	−2	1328	49	25	−12	−22	−29	18	49	336	1328

3. First aid instructor:

11	49	−45	−22	−5	−34	−2	−54	−12	−22	−360	−45	−17

TO DECODE THESE THREE DAFFYNITIONS:

Do each exercise below and find your answer in the code. Each time the answer appears in the code, write the letter of that exercise above it. Keep working and you will decode "define" print.

(D) $-12 + (-30) + 8$

(E) $28 - 45$

(F) $-36 - 18$

(I) $-7(-10 + 3)$

(R) $\frac{-3(20)}{12}$

(A) $(-4)(7) + (-2)(-3)$

(P) $\frac{14 - 40}{-2}$

(L) $(-6)(7)(-8)$

(T) $\frac{-48}{3} + \frac{-65}{5}$

(U) $(-4)(5)(-2)(-9)$

(G) $-24 - (-50) - 38$

(M) $\frac{-68 - 112}{-10}$

(Z) $(-1)(9) + (6)(-6)$

(K) $-4325 + 6128 - 475$

(C) $(36 - 24)(24 - 36)$

(O) $\frac{-6 - 3 + 15 - 2}{4 - 14 - 1 + 9}$

(N) $3(13) + (-7)(2)$

(W) $\frac{-38}{-2} + \frac{-96}{12}$

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How Does a Hawaiian Baritone Laugh?

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Simplify each expression below. Find your answer at the bottom of the page and cross out the letter above it. When you finish, the answer to the title question will remain.

1. $-3x + 9x$
2. $2y - 10y$
3. $-6x + x$
4. $12y - y$
5. $-4x - 5x$
6. $8y - (-8y)$
7. $-x - (-10x)$
8. $-2y + 7y + 4$
9. $5x + 7 + x - 9x$
10. $-8y - 2y - 4 + 4y$
11. $6x - (-3x) + x - 6$
12. $4x + 2y + 4x - 5y$
13. $6x + 8y - 3 - 7y$
14. $-6x - 2y + 8 + 5x - 1$
15. $9 - 3x - (-8y) + 9x - y$
16. $x - 4y - 12 - 5y + 8y$
17. $3x + 7 - 7y + 2x - 3y - 1$
18. $-9x - y + 1 + 5y + 5x - 10$
19. $-x + 8 + 6x - 4y - 8x + 3$
20. $4x - 7 + y - 7x - (-3y)$
21. $8x - 5y - x + 9 - y$

H	A	B	S	U	L	E	A	T	N	R	E	O	L	C	M	F	E	W	H	D	I	S	T	A	N	G
$7x - 6y + 9$	$7x - 8y + 7$	$8x - 3y$	$-3x + 4y - 7$	$5y + 4$	$-4x + 7y - 6$	$6x$	$10x - 6$	$6x + 7y + 9$	$-9x$	$-3x + 7$	$-3x - 4y + 11$	$-3x + 5y - 1$	$-8y$	$-x - 2y + 7$	$16y$	$11y$	$-6y - 4$	$x - 3y - 10$	$6x - 6$	$-5x$	$9x$	$6x + y - 3$	$5x - 10y + 6$	$5x - 5y + 4$	$x - y - 12$	$-4x + 4y - 9$

What Do You Call Two Railroad Trains After a Head-on Collision?

First, SIMPLIFY each expression below. Then EVALUATE the expression if

$$a = 3,\ b = -2,\ \text{and}\ c = -6$$

Find the simplified expression in the answer column and notice the letter next to it. Find the value of the expression at the bottom of the page and write this letter above it.

(1) $9a + 3 - 2a$

(2) $8 - 5b - 1$

(3) $-4b - 6 + 20b - 3$

(4) $2 - (-8c) + 24 - 7c$

(5) $5a - 9b + a - 6b$

(6) $3b + 11c - 4b - c$

(7) $9a - 1 + 8c - 8a + c$

(8) $12c + 5a + 7 + (-13c) + 4a$

(9) $-15 - 6c + 3b - 6c + 9 - 2b$

(10) $3a + 7b + 2c - a - 4b$

(11) $-8a - b - (-6c) - 2a - b - 5c$

(12) $b - 4c + 3a - c - 9b - 4a$

(13) $-3c + 7a + 5 + 17b + 2c + b + (-7a)$

(14) $2 - a - (-b) + c + (-a) - b - (-c)$

(B) $16b - 3c + 5$

(L) $c + 26$

(E) $7a + 3$

(N) $18b - c + 5$

(T) $b - 12c - 6$

(A) $-5b + 7$

(A) $-b + 10c$

(W) $16b - 9$

(E) $9a - c + 7$

(K) $-a - 8b - 5c$

(R) $-2a + 2c + 2$

(E) $6a - 15b$

(S) $b - 10c + 6$

(C) $2a + 3b + 2c$

(D) $a + 9c - 1$

(H) $-a - 10b - 8c$

(G) $-10a - 2b + c$

−58	−41	−16	24	−12	43	48	−52	64	17	−25	−32	20	40

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What Happened to Ray Floob After He Fell Off the Empire State Building?

Simplify each expression below. Circle the letter of each answer. Then rearrange the circled letters in each section to make a word. Write the words in order in the boxes at the bottom of the page. You will find the answer to the title question.

(1) $3x + 2(5x - 7)$ (2) $9 - 3(2x - 4)$ (3) $8x - 6(3 - 2x)$ (4) $-5 + 5(x + 4)$	S $20x - 3$ E $13x - 14$ T $5x + 15$	Y $20x - 18$ N $5x + 11$ H $-6x + 21$
(5) $4(6n + 9) - 10n$ (6) $14 - 3(4n - 1)$ (7) $-8n - 8(-4 - 2n)$	O $14n + 36$ E $-12n + 13$ W $8n + 32$	S $19n + 36$ N $-12n + 17$ T $8n - 1$
(8) $7k - 2(3k + 1) - 9$ (9) $-6 + 5(8 - k) - 8k$ (10) $k + 1 - 4(2k - 9)$ (11) $-10k - 3 + 2(5 + 6k)$	L $2k + 7$ A $-7k + 37$ K $2k - 4$	C $-13k + 34$ I $-7k + 30$ L $k - 11$
(12) $8 + 9x + 4(11 - 2x)$ (13) $-4(-2x - 7) + 6x - 7$ (14) $9 - 3(-4 + 3x) + 12x$	A $14x + 30$ H $3x + 21$ T $3x + 6$	R $6x + 52$ M $x + 52$ I $14x + 21$
(15) $5(2y - 4) + 2(y + 9)$	A $12y - 4$	X $12y - 2$
(16) $-4(3u - 1) + 7(3 - 2u)$ (17) $6(-5u + 1) - 3(4u - 12)$ (18) $3(-u - 5) + 8(2u + 1)$	W $-42u + 9$ S $13u - 12$ R $13u - 7$	Y $-42u + 42$ D $-5u + 25$ A $-26u + 25$

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What Should You **NOT** Do If You Want to Help Get Rid of Graffiti?

Simplify each expression below. Find your answer in the answer column and notice the letter next to it. Write this letter in the box at the bottom of the page that contains the number of that exercise.

(1) $6x + (5x - 8)$

(2) $2x - (9x - 4)$

(3) $-9 - (12 - 3x)$

(4) $-(5x + 5) - 4 + 8x$

(5) $7(2x - 4) - (10 - 3x)$

(6) $-6(5 + x) + (13x + 1)$

(7) $-(12 - 4x) + 8(10 - x)$

(8) $7(2x + 2) - 9(-1 + 6x)$

(9) $4(-3x - 5) - (10 + 4x)$

(10) $6x + (14x - 5) + (17 - 3x)$

(11) $-(2 - x) - 3(6 + 8x) - 12$

(12) $(4x - 9) + 8(2x + 3) - 7x$

(13) $11 - (3x - 6) + 2(4x + 5) - x$

(14) $(x + 2) - (x - 2) - 12x$

Answers:

(A) $-40x + 23$

(S) $3x - 21$

(L) $-12x - 9$

(I) $-16x - 30$

(N) $7x - 29$

(T) $-12x + 4$

(P) $-23x - 32$

(R) $4x + 27$

(A) $11x - 8$

(S) $4x + 13$

(O) $3x - 9$

(T) $-4x + 68$

(I) $-7x + 4$

(A) $13x + 3$

(N) $17x + 12$

(I) $13x + 15$

(G) $17x - 38$

3	12	5	10	8	11	1	13	7	9	14	2	4	6

OBJECTIVE 3–d: To simplify expressions that require adding or subtracting a binomial.

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How Does a Rodeo Star Get Around?

First, SIMPLIFY each expression below. Then EVALUATE the expression for the given value of the variable. Find the simplified expression in the answer column and notice the letter next to it. Find the value of the expression at the bottom of the page and write this letter below it.

(1) $8(2x-3)-6x$ if $x=3$

(2) $9-2(4x+5)$ if $x=-4$

(3) $-7x-3(9-7x)$ if $x=-1$

(4) $6(3x-1)-10x$ if $x=7$

(5) $7-4x+2(5x+8)$ if $x=-2$

(6) $7x-4(6-x)+12$ if $x=6$

(7) $-3(4x-1)+9x+8x$ if $x=-9$

(8) $10-(2y-6)-y$ if $y=8$

(9) $4(3+7y)+6(2-y)$ if $y=2$

(10) $9(2y-4)-2(7y-12)$ if $y=-9$

(11) $5(-3y-1)-(6-5y)$ if $y=-6$

(12) $2(7+6y)+15(-1+y)$ if $y=1$

(13) $(-9y+5)-8(-y-2)$ if $y=-3$

(14) $-(5y-6)+4(3+5y)$ if $y=2$

(A) $5x+3$

(T) $-10y-11$

(L) $-y+21$

(T) $14x-27$

(S) $13y+15$

(C) $27y-1$

(E) $10x-24$

(W) $22y+24$

(I) $6x+23$

(C) $15y+18$

(T) $-3y+16$

(A) $-8x-1$

(T) $11x-12$

(H) $4y-12$

(A) $8x-6$

68	11	54	−48	50	26	31	49	−8	24	6	−42	48	−41

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OBJECTIVE 3–e: To simplify and evaluate expressions containing parentheses.

What Is It Like to Live Under a Carpet?

Evaluate each formula below for the given values of the variables. Find each answer at the bottom of the page and cross out the letters above it. When you finish, the answer to the title question will remain.

(1) $d = rt$

where d is the distance traveled by an object moving at speed r in time t. Find d if

$r = 52$ m/sec, $t = 8$ sec. _____ m

(2) $V = \ell wh$

where V is the volume of a rectangular solid with length ℓ, width w, and height h. Find V if

$\ell = 12$ cm, $w = 5$ cm, $h = 3.5$ cm. _____ cm^3

(3) $P = 2\ell + 2w$

where P is the perimeter of a rectangle with length ℓ and width w. Find P if

$\ell = 16$ km, $w = 7.5$ km. _____ km

(4) $d = \frac{1}{2}n(n - 3)$

where d is the number of diagonals of a polygon with n sides. Find d if

$n = 20$. _____ diagonals

(5) $V = P(1 + rt)$

where V is the value of an investment of P dollars, invested at simple interest rate r for time t. Find V if

$P = \$500$, $r = .08$ per year, $t = 3$ years. $ _____

(6) $s = 4.9t^2$

where s is the distance in meters a free-falling object travels in t seconds. Find s if

$t = 4$ sec. _____ m

(7) $P = I^2R$

where P is the power in an electrical circuit with current I and resistance R. Find P if

$I = 12$ amperes, $R = 2$ ohms _____ watts

(8) $A = 2w^2 + 4hw$

where A is the surface area of a square prism with a square base of side w and with height h. Find A if

$w = 7$ cm, $h = 10$ cm _____ cm^2

LO	VE	ST	AR	RY	RU	DE	LE	GG	ET	ON	ED	UP
288	276	620	210	366	82.6	378	170	52	78.4	416	194	47

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MOVING WORDS

Solve each equation in the top block and find your solution in the bottom block. Transfer the word from the top box to the corresponding bottom box. Keep working and you will get an interesting question "write" away.

(1) $w + 8 = -3$ THAT	(6) $-1 + x = -10$ OUTER	(11) $100 = n + 20$ DOWN	(16) $-15 + t = 60$ PEN
(2) $x + 12 = 30$ AND	(7) $h + 13 = 7$ NEW	(12) $-14 = 3 + x$ ALSO	(17) $32 = n + 5$ UPSIDE
(3) $d + (-9) = -5$ YOU	(8) $w + (-4) = 8$ OF	(13) $28 = h + (-11)$ SEEN	(18) $w + (-7) = -20$ WORDS
(4) $12 + n = 7$ IN	(9) $2 + x = 24$ SPACE	(14) $-36 = -12 + n$ UNDERWATER	(19) $52 = -48 + x$ WRITES
(5) $-9 + x = 15$ THE	(10) $-16 + d = 30$ HAVE	(15) $w + 40 = -25$ LOTS	(20) $15 + n = -15$ OTHER

46	4	39	24	−6
75	−11	100	−24	27
80	−5	−9	22	18
−17	−65	12	−30	−13 ?

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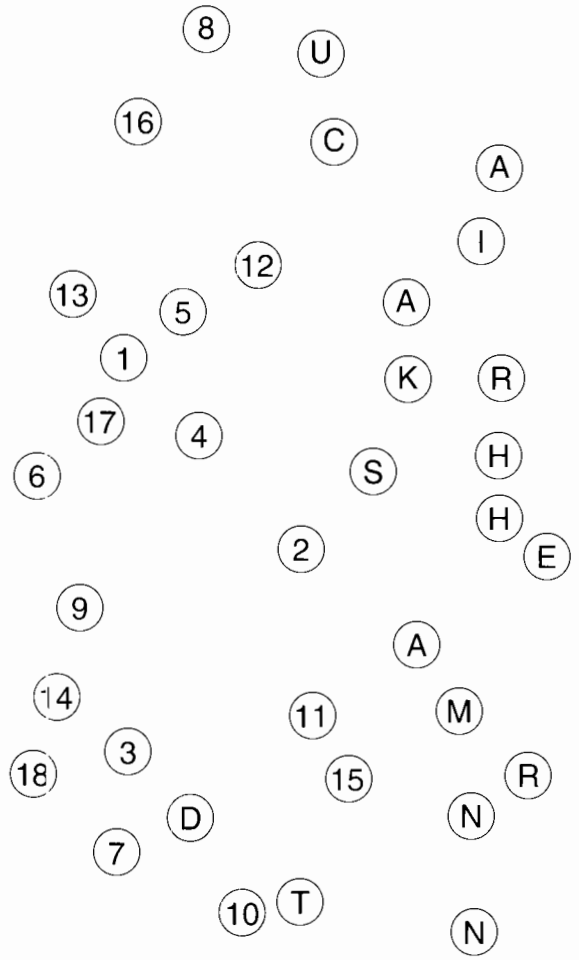
OBJECTIVE 4–a: To solve equations of the form $x + a = b$ (terms in each equation are added).

WHY DOES OSHGOSH JOG AROUND THE HIGH SCHOOL TRACK 98 TIMES EVERY DAY?

Solve each equation below. Draw a straight line connecting the dot by the equation to the dot by its solution. The line will cross a number and a letter. Put the letter in the matching numbered box at the bottom of the page.

(1) $x - 15 = -8$		-22
(2) $w - 3 = 24$		20
(3) $x - 9 = -20$		7
(4) $h - (-8) = 3$		62
(5) $x - (-12) = -7$		-50
(6) $15 = r - 6$		27
(7) $-5 = x - (-17)$		-5
(8) $x + 80 = 40$		35
(9) $-16 + t = 7$		21
(10) $x + 9 + 12 = -3$		-24
(11) $x + 5 - 11 = -1$		16
(12) $-24 + w + 8 = 4$		-11
(13) $18 - 13 + n = -9$		-40
(14) $40 = x + 6 - 28$		5
(15) $-7 = 8 - 50 + x$		-12
(16) $23 + h - 9 = 2$		-14
(17) $-10 = w - 32 + 6$		-19
(18) $x - (-75) = 25$		23



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

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What Do You Call It When Police Interrogate a Cow's Husband?

Solve each problem and find your solution in the rectangle below. Cross out the box containing that solution. When you finish, there will be six boxes not crossed out. Print the letters from these boxes in the spaces at the bottom of the page.

1. Eight more than a number is 20. Find the number.
2. Twelve less than a number is −3. Find the number.
3. Three more than a number is −5. Find the number.
4. Nine less than a number is −24. Find the number.
5. If 10 is subtracted from a number, the result is 23. Find the number.
6. If 32 is added to a number, the result is −4. Find the number.
7. If a number is increased by 6, the result is 50. Find the number.
8. If a number is decreased by 16, the result is −2. Find the number.
9. The length of a tennis court is 78 feet. This is 51 feet more than the width. What is the width?
10. Andy hit 14 homeruns this season. If this is 9 fewer than he hit last season, how many homeruns did he hit last season?
11. Jennifer added $120 to her savings account during July. If this brought her balance to $700, how much had she saved previously?
12. The temperature in Frostburg is −7°C. This is 18°C less than the temperature in Coldspot. Find the temperature in Coldspot.
13. After 9 new members joined the ski club, there were 38 members. How many members had been in the club previously?
14. The altitude of a submarine is −60 meters. If this is 25 meters less than its previous altitude, what was its previous altitude?

CO 14	IN 33	JA −35 m	WS $580	LK 12	QU −75 m	IT 29	SH −15	AM 9	ES $565
OO −36	TI 8°C	ME 27 ft	ON 31	ST −8	TO 11°C	AB 17	OP 44	ED 23	LE 32 ft

DID YOU HEAR ABOUT . . .

A	B	C	D	E
F	G	H	I	J
K	L	M	N	O
P	Q	R	S	T ?

Solve each equation below. Find the solution in the appropriate answer column and notice the word next to it. Write this word in the box containing the letter of that exercise. Keep working and you'll hear about something that is really "fur" out!

Answers A–J:

19	BIG
16	A
−18	WHO
−2	MORE
32	THE
7	THOUSAND
−25	ON
27	FUR
55	LADY
3	TEN
41	WAS
−70	SPENT
−11	DOLLARS

(A) $\frac{1}{8}x = 4$

(B) $\frac{1}{5}x = 11$

(C) $\frac{1}{9}y = -2$

(D) $\frac{1}{2}m = -35$

(E) $6p = 18$

(F) $12t = 84$

(G) $3x = -33$

(H) $-4n = 100$

(I) $-3u = -48$

(J) $54 = 2v$

(K) $-72 = 8x$

(L) $\frac{1}{4}w = 16$

(M) $13 = -\frac{1}{6}y$

(N) $-18 = -\frac{1}{2}y$

(O) $\frac{1}{2}r = \frac{5}{2}$

(P) $-\frac{1}{3}t = \frac{4}{3}$

(Q) $-\frac{3}{4} = -\frac{1}{8}x$

(R) $11u = -88$

(S) $400 = -20w$

(T) $58x = 580$

Answers K–T:

−78	SHE
−20	IN
−1	IT
−9	COAT
5	TO
6	THE
36	WANTED
−8	MISS
−4	BE
64	BECAUSE
30	WARM
10	LYNX
−14	MINK

OBJECTIVE 4–d: To solve equations of the form $ax = b$, where a is an integer or unit fraction (solutions are integers).

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Why Does Duffer McVolt Want Lights Strung Around the Golf Course ?

Solve each equation below and find your solution at the bottom of the page.
Write the letters next to the equation in the two boxes above the solution.

(EN) $3x = 17$

(NG) $6y = -15$

(AL) $\frac{1}{7}m = 9$

(BS) $45 = -\frac{1}{4}d$

(IN) $\frac{n}{3} = 16$

(GH) $-10u = -4$

(LY) $\frac{x}{2} = -\frac{13}{2}$

(HE) $\frac{7}{5} = -\frac{d}{5}$

(YS) $3e = \frac{9}{4}$

(RE) $5w = -\frac{1}{2}$

(TC) $10y + 8y = 15$

(JO) $-720 = x - 9x$

(SW) $\frac{5}{6} = \frac{1}{12}v$

(NI) $-4p = \frac{20}{3}$

(GI) $6x - 7x = 18$

(LU) $\frac{11}{30} = -\frac{a}{9}$

-7	$2\frac{2}{3}$	$-\frac{1}{10}$	63	-13	$-\frac{3}{8}$	$5\frac{2}{3}$	90	$\frac{3}{4}$	75	10	48	-18	$-2\frac{1}{2}$	6	$-1\frac{2}{3}$	$\frac{2}{5}$	$\frac{5}{6}$	$-3\frac{3}{10}$	-180

OBJECTIVE 4–e: To solve equations of the form $ax = b$, where a is an integer or unit fraction (solutions are not necessarily integers).

OBJECTIVE 4–f: To solve equations of the form $ax = b$, where a is an integer or fraction.

SIGN UP

1. Sign on a waterbed:

$8\frac{3}{4}$	-72	$\frac{2}{15}$	$-\frac{2}{3}$	$-10\frac{1}{2}$	-7	$-\frac{2}{7}$	$-2\frac{6}{7}$	$-6\frac{2}{3}$	-72	$\frac{2}{15}$	$4\frac{4}{9}$	$-1\frac{1}{10}$	$-10\frac{1}{2}$	18	$-8\frac{1}{3}$	$-\frac{2}{7}$

2. Sign on a chicken incubator:

$-8\frac{1}{3}$	$-7\frac{1}{2}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-1\frac{1}{10}$	$-\frac{2}{7}$	-7	$-2\frac{6}{7}$	$4\frac{1}{4}$	$-\frac{2}{3}$	$-6\frac{2}{3}$	$-7\frac{1}{2}$	$-\frac{2}{7}$	$-5\frac{1}{3}$	-45	$2\frac{1}{3}$	$-\frac{2}{7}$	$\frac{2}{15}$

TO DECODE THESE TWO SIGNS:
Solve each equation below and find your solution in the code. Each time the solution appears, write the letter of that exercise above it. Enjoy the "signery"!

(R) $-8x = 56$

(O) $\frac{1}{5}n = -9$

(I) $24 = -\frac{1}{3}t$

(B) $4r = 17$

(S) $-7u = 20$

(C) $8t - 5t = -25$

(G) $-40 = m - 10m$

(A) $\frac{2}{3}y = 12$

(T) $\frac{3}{5}x = -4$

(D) $-\frac{3}{2}d = 8$

(V) $5 = \frac{4}{7}w$

(H) $-3 = \frac{2}{5}v$

(L) $-4x = 42$

(Z) $-35 = -15p$

(Y) $\frac{3}{4}y = -\frac{1}{2}$

(N) $\frac{5}{3}u = \frac{2}{9}$

(E) $-\frac{7}{8}m = \frac{1}{4}$

(P) $4x - 9x = \frac{11}{2}$

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BOOKS NEVER WRITTEN

The Break-in by

___	___	___	___	___	___	___	___	___	___
10	−13	−7	−7	−25	8	72	6	5	−4

Origin of Man by

___	___	___	___	___	___	___	___	___	___
−1	−11	−2	72	17	−6	25	17	12	

Making Soap by

___	___	___	___	___	___	___	___	___	___
−9	25	−13	72	−8	25	−2	12	−6	

ABOVE ARE THE TITLES OF THREE "BOOKS NEVER WRITTEN."
TO DECODE THE NAMES OF THEIR AUTHORS:

Solve each equation below and find your solution in the code. Each time the solution appears, write the letter of that exercise above it.

(O) $4y - 9 = 15$

(A) $6x + 7 = -5$

(S) $-9t + 2 = 56$

(P) $-69 = 7v - 6$

(Y) $35 = -2x - 15$

(I) $4 - 3n = 43$

(N) $12 - 5u = -48$

(C) $-27 + 20w = 73$

(E) $13 = 5 - 8m$

(K) $11r + 60 = 16$

(U) $y - 24 = -7$

(J) $23 - x = 13$

(V) $-67 = 6x - 1$

(M) $-4e - 9 = 19$

(D) $-8 = 32 - 5q$

(H) $6 + 10k = 256$

(T) $-100 = 12t - 4$

(L) $36 - x = -36$

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OBJECTIVE 4–g: To solve equations of the form $ax + b = c$, where a is an integer (solutions are integers).

What Problem Did the Dumb Gangster Have When the Boss Told Him to Blow Up a Car?

Solve each equation below. Find your solution in the set of answers under the exercise and notice the letter next to it. Write this letter in each box that contains the number of that exercise.

(1) $3n + 5 = 6$	(6) $-22 = 11 - 6a$	(11) $3x - 7 + 2x = 9$
(2) $4 + 5x = 1$	(7) $8t + 23 = 17$	(12) $4 - 2y - y = 12$
(3) $4y - 15 = -10$	(8) $50 - 3u = 75$	(13) $-15 = 6p + 15 - 10p$
(4) $3 - 4d = 13$	(9) $21 = -10m - 3$	(14) $-n + 5 + 21n = 0$
(5) $8 = 9x - 7$	(10) $13x + 5x = 3$	(15) $4e - 3e - 2e = 1 - 9$

Answers:		Answers:		Answers:	
(A) $-2\frac{1}{2}$	(O) $\frac{1}{3}$	(E) $-2\frac{2}{5}$	(G) $-1\frac{7}{10}$	(S) $7\frac{1}{2}$	(R) $-2\frac{2}{3}$
(D) $-\frac{3}{5}$	(U) $1\frac{2}{3}$	(N) $-8\frac{1}{3}$	(T) $-\frac{3}{4}$	(M) $-6\frac{3}{4}$	(X) $3\frac{1}{5}$
(F) $1\frac{7}{9}$	(I) $1\frac{1}{4}$	(L) $5\frac{1}{2}$	(B) $\frac{1}{6}$	(P) 8	(H) $-\frac{1}{4}$

H	E	10	5	12	8	9	2	14	3	13	6	3	15	13	1	8	T	H	E	9	11	14	4	5	13	7	15	3	15	9

OBJECTIVE 4–h: To solve equations of the form $ax + b = c$, where a is an integer (solutions are not necessarily integers).

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Why Did Gonzo Walk Around Carrying Ice Cream and a Pair of Sparrows?

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Answers 1–8:

HI	$2\frac{1}{5}$
GA	-34
NT	-75
SC	-36
HE	12
IN	-14
WO	$-1\frac{2}{3}$
CK	$-1\frac{3}{4}$
LL	$-2\frac{1}{2}$
WA	56
GT	-55

Solve each equation below. Find your solution in the adjacent answer column and notice the two letters next to it. Print these letters in the two boxes at the bottom of the page that contain the number of that exercise.

(1) $\frac{1}{3}x + 5 = 9$

(2) $\frac{1}{8}a - 6 = 1$

(3) $\frac{x}{4} + 7 = -2$

(4) $5y - 4 = 7$

(5) $9 - 4m = 19$

(6) $\frac{x}{7} - 8 = -10$

(7) $1 - \frac{n}{5} = 12$

(8) $6t + 3 = -7$

(9) $15 = -15 - 8u$

(10) $0 = \frac{1}{6}y + 8$

(11) $11 - \frac{1}{10}x = 10$

(12) $50 = 8 + \frac{a}{2}$

(13) $-10b - 7 = 9$

(14) $18 = -\frac{w}{32} + 20$

(15) $\frac{x}{99} + 99 = 99$

(16) $-10 = 9k - 40$

Answers 9–16:

30	SB
10	SW
64	NE
$-2\frac{1}{8}$	SP
-48	RD
84	IT
$3\frac{1}{3}$	NE
$-3\frac{3}{4}$	BI
0	CO
$-2\frac{4}{5}$	OI
$-1\frac{3}{5}$	HO

1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16

OBJECTIVE 4–i: To solve equations of the form $ax + b = c$, where a is an integer or unit fraction.

What Did the Baby Buzzard Say When It Saw an Orange in the Nest?

Solve each problem below. Find your answer in the answer column and notice the letter next to it. Write this letter in each box that contains the number of that problem.

(1) Two more than 5 times a number is 77. Find the number. _____

(2) Five more than one third of a number is −2. Find the number. _____

(3) Nine less than one fourth of a number is 6. Find the number. _____

(4) Sixteen increased by twice a number is −56. Find the number. _____

(5) Twelve decreased by 8 times a number is 36. Find the number. _____

(6) One eighth of a number, increased by 20, is 32. Find the number. _____

(7) Twenty-five decreased by one fifth of a number is 18. Find the number. _____

(8) Nine times a number, diminished by 4, is 95. Find the number. _____

(9) The length of a rectangle is 50 meters. This is 6 meters more than twice the width. Find the width. _____ m

(10) Grandpa Schmidt is 75 years old. This is 9 years less than seven times the age of Junior Schmidt. How old is Junior? _____ yr

(11) Bill's weight is 48 kilograms. This is 10 kilograms more than one half of his father's weight. What is his father's weight? _____ kg

(12) A medium orange has 70 calories. This is 10 calories less than one fourth of the calories in a Sugar Krunchy. How many calories are in a Sugar Krunchy? _____ cal

(13) The length of a couch is 200 centimeters. This is 16 centimeters less than 3 times the width of a matching chair. How wide is the chair? _____ cm

G	22
D	60
M	72
I	96
H	15
S	74
T	35
L	320
N	−36
R	12
E	−21
F	13
K	11
C	342
O	−3
A	76

12	5	5	8	11	7	7	1	2	5	10	11	4	9	2	13	11	13	11	12	11	6	3

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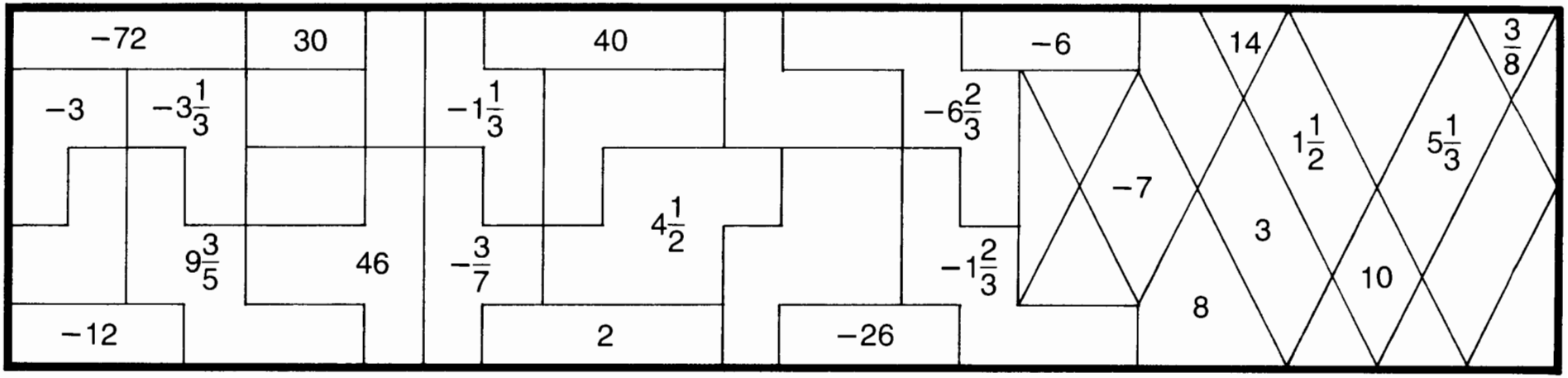
What Did Bonzo Say When He Saw the Ivy-covered Walls of the Ivy League College?



TO FIND THE WORDS OF BONZO: Solve each equation below and find your solution in the rectangle above. Shade in the area containing that solution.

(1) $3x + 9 = 5$

(2) $8z - 1 = 11$

(3) $\frac{1}{2}t + 6 = -7$

(4) $12 - \frac{1}{3}u = 2$

(5) $\frac{2}{5}n + 6 = 10$

(6) $-7 - 6y = 13$

(7) $4 = 7 + x + 6x$

(8) $-\frac{3}{4}m + 3 = 8$

(9) $-18 = \frac{5}{2}r + 12$

(10) $10 + v - 17v = 4$

(11) $40 = 5y - 8$

(12) $-\frac{3}{8}x + 2 = 0$

(13) $\frac{w}{3} - 6 = -8$

(14) $2t - 12 - 3t = 60$

(15) $6 + \frac{9}{7}n = 24$

(16) $-30 = q - 10 + 11q$

(17) $3 - \frac{x}{8} = -2$

(18) $-20y + 20 = -20$

OBJECTIVE 4–k: To solve equations of the form $ax + b = c$, where a is an integer or fraction.

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DID YOU HEAR ABOUT . . .

A	B	C	D	E
F	G	H	I	J ?

Solve each problem below. Find your solution in the answer column and notice the word next to it. Write the word in the box above that contains the letter of that exercise. Keep working and you will hear about some "punny" business!

Answers:

552 BOND
30 AND
$21\frac{1}{3}$ STOCK
65 WHO
69 MARKET
35 HIMSELF
$1\frac{1}{2}$ BROKER
37 COMPANY
32 BUSINESS
13.5 THE
81 DOW
13 LAUGHING
83 BECAME
43.6 A
44.7 JONES
540 COMEDIAN
23 FUNNY
$\frac{5}{6}$ INCORPORATED
15 JOKE

(A) The length of a rectangular field is 24 meters. This is 3 meters less than twice the width. Find the width. _____ m

(B) The price of a television set on sale is $360. This is two thirds of the regular price. Find the regular price. $ _____

(C) Three fifths of the members of a hiking club went on the last hiking trip. If 39 people went on the trip, how many are in the club? _____ people

(D) Matthew travels two and one-half miles to get to school. This is 3 times the distance that Jennifer travels. How far does Jennifer travel? _____ mi

(E) The diameter of a small pizza is 16 centimeters. This is 2 centimeters more than two fifths of the diameter of a large pizza. Find the diameter of the large pizza. _____ cm

(F) The width of a photograph is 4 centimeters more than three tenths of the length. If the width is 13 cm, find the length. _____ cm

(G) The heaviest human of all time weighed 486 kilograms. This is 12 kilograms less than 6 times Juan's weight. How much does Juan weigh? _____ kg

(H) The rainfall this year was 18.6 centimeters. This is 3.2 centimeters less than half of the rainfall last year. What was the rainfall last year? _____ cm

(I) The price of a brick today is 49¢. This is 3¢ less than 4 times the price 20 years ago. What was the price 20 years ago? _____ ¢

(J) Rolex Smudgepot owns 17 ounces of gold. This is one ounce more than three fourths of the amount he owned last year. How much did he own last year? _____ oz

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What Were the Headlines After a 3 Foot 10 Inch Fortuneteller Escaped From Jail?

Solve each equation and find your solution below. Cross out the box containing that solution. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

(1) $3(2x + 5) = 39$

(2) $2(6k - 1) = -38$

(3) $8(7 - y) = -24$

(4) $-4(8 + 5n) = 8$

(5) $6(3x - 5) - 7x = 25$

(6) $-2(5 + 6m) + 16 = -90$

(7) $15(t + 2) + 9t = 6$

(8) $7w - 3(4w + 8) = 11$

(9) $22 - 5(6v - 1) = -63$

(10) $18x - (8x - 7) = 67$

(11) $8(-2x - 4) + 12 = -52$

(12) $2(9n - 1) + 7(n + 6) = -60$

(13) $-3(3x + 15) - (10 + x) = 35$

(14) $11(4 - 6y) + 5(13y + 1) = 9$

MID 5	THE −9	GET −1	SMA 12	SHA 2	RTF 40	AWA −3	LLM 35	AKE −7	EDI 15
TOR −2	UMA −14	PRI 6	UNJ 4	TLA −20	SON 3	AIL 10	CHA −4	RGE −12	TLE 8

CRYPTIC QUIZ

1. Why does Beethoven now spend all his time erasing music?

16	6	−4	10	−3	6	−9	7	20	−5	7	10	−4	3	21

2. What is it called when a sea bird lands on a channel marker?

−36	9	7	−8	20	6	6	−2	10	21	9	11	11

3. How does a tree feel after a hard day at work?

−36	9	10	16	6	−3

TO DECODE THE ANSWERS TO THESE QUESTIONS:

Solve each equation below and find your answer in the code. Each time the solution appears, write the letter of that exercise above it.

(O) $8u = 3u + 35$

(N) $7y = 33 - 4y$

(E) $2x + 48 = 10x$

(T) $5t - 26 = 18t$

(I) $k = 8k + 28$

(G) $-30n = -27n - 63$

(H) $4x + 4 = 2x + 36$

(D) $9y - 1 = y - 25$

(P) $14p - 8 = 22 + 20p$

(L) $z + 81 = 9z - 7$

(Y) $39 - 12w = 7 - 16w$

(C) $-15v - 40 = 23 - 8v$

(M) $63 - x = 2x + 3$

(U) $3n + 46 = 1 + 8n$

(B) $12r - 18 = 13r + 18$

(S) $-x - 1 = x - 21$

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Why Do Girls Like Guys Who Wear Shirts With Eight Buttons?

Solve each equation below and find your solution at the bottom of the page.
Write the letter of that equation above the solution.

(E) $4(5n - 7) = 10n + 2$

(N) $9(x + 3) = 4x - 3$

(A) $2(12 - 8x) = x - 11x$

(H) $3t + 8(2t - 6) = 2 + 14t$

(E) $2v + 18 = 16 - 4(v + 7)$

(I) $4x - (9 - 3x) = 8x - 1$

(T) $12(3 + y) = 5(2y + 8)$

(A) $-7(1 - 4m) = 13(2m - 3)$

(Y) $9(11 - k) = 3(3k - 9)$

(S) $4x + 5(7x - 3) = 9(x - 5)$

(T) $2(6d + 3) = 18 - 3(16 - 3d)$

(F) $8(4u - 1) - 12u = 11(2u - 6)$

(C) $-5 - (15y - 1) = 2(7y - 16) - y$

2	10	3	7	9	29	4	−1	1	−8	−6	−16	−12	−5

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What Do They Call Bowling in Hawaii?

Solve each problem below. Then find your solution in the answer column and notice the letter next to it. Write this letter in each box that contains the number of that problem. Aloha-ha-ha!

(1) The second of two numbers is 4 times the first. Their sum is 50. Find the numbers.

(2) The larger of two numbers is 12 more than the smaller. Their sum is 84. Find the numbers.

(3) The sum of two numbers is 45. The first is 9 less than the second. Find the numbers.

(4) The second of two numbers is 5 more than twice the first. Their sum is 80. Find the numbers.

(5) The larger of two numbers is 1 less than 3 times the smaller. Their sum is 63. Find the numbers.

(6) Find two numbers whose sum is 92, if the first is 4 more than 7 times the second.

(7) The sum of two numbers is 172. The first is 8 less than 5 times the second. Find the *first* number.

(8) Together, a necklace and a bracelet cost $192. Find the price of each if the necklace costs 3 times as much as the bracelet.

(9) Grandpa's age is 6 years less than 6 times Junior's age. The sum of their ages is 78. Find each of their ages.

(10) The first of two films lasted 3 minutes less than twice as long as the second. Together the two films lasted 132 minutes. How long was the *first* film?

(A)	80, 12
(O)	25, 55
(L)	87 min
(G)	81, 11
(F)	$40, $152
(D)	30, 50
(T)	36, 48
(N)	12, 66
(I)	16, 47
(S)	18, 27
(B)	84 min
(E)	10, 40
(M)	139
(R)	$48, $144
(P)	19, 28
(H)	142

8	4	10	10	5	9	6	5	9	2	7	1	5	3	10	1	3

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What Happened to the Guy Who Lost His Left Side?

Solve each problem and find your solution below. Cross out the box containing that solution. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

(1) The second of two numbers is 6 times the first. Their sum is 77. Find the numbers.

(2) The second of two numbers is 3 less than twice the first. Their sum is 36. Find the numbers.

(3) The sum of two numbers is 84. The first is 9 more than 4 times the second. Find the first number.

(4) The larger of two numbers is 1 less than 8 times the smaller. Their sum is 179. Find the numbers.

(5) An 84-meter length of cable is cut so that one piece is 18 meters longer than the other. Find the length of each piece.

(6) A bottle filled with water weighs 9.6 kilograms. If the water by itself weighs 5 times as much as the bottle, what is the weight of the bottle?

(7) Andy's weight is 5 kilograms less than twice his brother's. Together they weigh 100 kilograms. What are their weights?

(8) The sum of three numbers is 61. The second number is 5 times the first, while the third is 2 less than the first. Find the numbers.

(9) The sum of three numbers is 84. The second number is twice the first, and the third is 4 more than the second. Find the numbers.

(10) Together a chair, a table, and a lamp cost $562. The chair costs 4 times as much as the lamp, and the table costs $23 less than the chair. Find the cost of the table.

(11) The sum of the angle measures of any triangle is 180°. Find the angle measures of a triangle if the second angle measures 10° less than twice the first, and the third angle measures 25° more than the second.

HI	HE	LP	LE	FT	SA	FT	FA	LL
35 kg, 65 kg	35 m, 49 m	11, 66	$237	69	$245	16, 32, 36	20, 159	35°, 55°, 90°
VE	RI	DE	GH	AD	TN	GR	ES	OW
35°, 60°, 85°	17, 34, 38	9, 45, 7	14, 22	1.6 kg	2.1 kg	33 m, 51 m	13, 23	37 kg, 63 kg

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OBJECTIVE 5–b: To solve word problems involving two or three numbers.

What's the Quickest Way for an Ant to Go From the Ground to the Tree Trunk?

Solve each problem below. Find your solution in the answer column and notice the letter next to it. Write this letter in each box that contains the number of that problem.

(1) The length of a rectangle is 3 times the width. The perimeter is 96 cm. Find the width and length.

(2) The length of a rectangle is 5 m greater than the width. The perimeter is 150 m. Find the width and length.

(3) The width of a rectangle is 12 cm less than the length. The perimeter is 156 cm. Find the width and length.

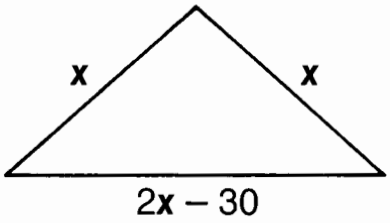
(4) The length of a rectangle is 2 cm less than 7 times the width. The perimeter is 60 cm. Find the width and length.

(5) The perimeter of a triangle is 76 cm. Side *a* of the triangle is twice as long as side *b*. Side *c* is 1 cm longer than side *a*. Find the length of each side.

(6) The first side of a triangle is 8 m shorter than the second side. The third side is 4 times as long as the first side. The perimeter is 26 m. Find the length of each side.

(7) A triangular sail has a perimeter of 25 m. Side *a* is 2 m shorter than twice side *b*, and side *c* is 3 m longer than side *b*. Find the length of each side.

(8) The triangle shown at the right is *isosceles*. That is, it has two sides of equal length. The third side is 30 m shorter than twice the length of each congruent side. The perimeter is 570 m. Find the length of each side.



(B)	37 m, 42 m
(O)	3 m, 11 m, 12 m
(A)	33 cm, 45 cm
(N)	8 m, 5 m, 11 m
(E)	12 cm, 36 cm
(S)	4 cm, 26 cm
(U)	31 cm, 43 cm
(M)	140 cm, 140 m, 250 m
(H)	35 m, 40 m
(C)	5 cm, 33 cm
(K)	30 cm, 15 cm, 31 cm
(T)	150 m, 150 m, 270 m
(L)	32 cm, 16 cm, 31 cm
(R)	10 m, 6 m, 9 m

8	3	5	1	8	2	1	4	2	6	7	8	1	4	8	7	6	6	8

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Why Did the Sore Tooth Take Up So Much Space?

Solve each problem below. Find your solution in the answer column and notice the two letters next to it. Write these letters in the two boxes at the bottom of the page that contain the number of that problem.

(1) The length of a rectangle is 3 times the width. If the length is decreased by 4 m and the width is increased by 1 m, the perimeter will be 66 m. Find the dimensions of the original rectangle.

(2) The length of a rectangle is 6 cm longer than the width. If the length is increased by 9 cm and the width by 5 cm, the perimeter will be 160 cm. Find the dimensions of the original rectangle.

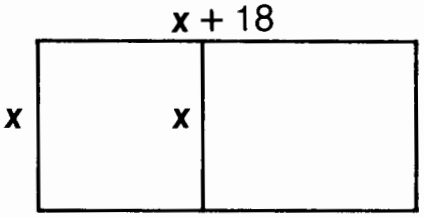
(3) The length of a rectangle is 7 m less than twice the width. If the length is decreased by 1 m and the width by 4 m, the perimeter will be 66 m. Find the dimensions of the original rectangle.

(4) The perimeter of a triangle is 69 cm. Side ***a*** is 5 cm shorter than side ***b***. Side ***c*** is twice as long as side ***a***. Find the length of each side.

(5) The first side of a triangle is 7 cm shorter than twice the second side. The third side is 4 cm longer than the first side. The perimeter is 80 cm. Find the length of each side.

(6) The length of a rectangular field is 18 m longer than the width. The field is enclosed with fencing and divided into two parts with a fence parallel to the shorter sides. If 216 m of fencing are required, what are the dimensions of the outside rectangle? (See diagram to the right.)

AN	32 cm by 38 cm
NA	16 cm, 21 cm, 32 cm
ND	15 cm, 20 cm, 30 cm
SA	9 m by 27 m
DO	25 cm, 16 cm, 29 cm
TO	11 m by 33 m
WA	29 cm, 18 cm, 33 cm
ER	30 cm by 36 cm
ST	40 m by 58 m
CH	36 m by 54 m
TH	20 m by 33 m
IT	15 m by 23 m



3	3	5	5	1	1	4	4	6	6	2	2

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Why Did They Arrest the Automobile Factory Worker?

Solve each problem below and find your solution at the bottom of the page. Write the letter of that problem in the box above the solution.

(E) Find two consecutive integers whose sum is 45.

(A) Find two consecutive integers whose sum is −29.

(B) Find three consecutive integers whose sum is 48.

(O) Find three consecutive integers whose sum is −147.

(E) Find two consecutive even integers whose sum is 66.

(A) Find three consecutive even integers whose sum is 72.

(K) Find two consecutive odd integers whose sum is −88.

(H) Find four consecutive odd integers whose sum is 56.

(O) Find two consecutive even integers such that the sum of the larger and twice the smaller is 62.

(T) Find three consecutive even integers such that the sum of the smallest and the largest is 36.

(K) Find three consecutive odd integers such that the sum of the smallest and 4 times the largest is 61.

(R) Find three consecutive integers such that the sum of twice the smallest and 3 times the largest is 126.

14, 15, 16 | 11, 13, 15, 17 | 22, 23 | −51, −52, −53 | 16, 18, 20 | −50, −49, −48 | 20, 22 | −45, −43 | 13, 15, 17, 19 | 22, 24, 26 | 24, 26, 28 | 15, 16, 17 | 24, 25, 26 | −15, −14 | 9, 11, 13 | 32, 34 | 11, 13, 15

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SOLVING PROBLEMS, ALGEBRAICALLY

1. "I love to go camping," Tom said

−9	12	10	−5	12	10	50	2

2. "I think I'm sick," Tom said

90	50	−1	−5	12	10	50	2

3. "Light the fuse," Tom said

−7	−9	8	20	−5	3	50	2

THESE ARE CALLED "TOM SWIFTY" JOKES. TO DECODE THE MISSING WORDS:

Solve each problem below and find your solution in the code. Each time the solution appears, write the letter of that problem above it. You will decode the missing words with your equations, invariably!

(D) Seven times a number is the same as 12 more than 3 times the number. Find the number.

(E) Six more than 5 times a number is the same as 9 less than twice the number. Find the number.

(U) Three less than 11 times a number is the same as the number decreased by 13. Find the number.

(C) One more than 3 times a number is the same as 5 times the number, decreased by 15. Find the number.

(Y) Twelve less than a number is the same as 6, decreased by 8 times the number. Find the number.

(W) Ten increased by 6 times a number is the same as 4 less than 4 times the number. Find the number.

(I) Eight times a number plus 3 times the number is the same as 9 more than 12 times the number. Find the number.

(K) The sum of two numbers is 35. Three times the larger number is the same as 4 times the smaller number. Find the larger number.
(HINT: Let x = larger number;
$35 - x$ = smaller number.)

(T) The sum of two numbers is 24. Seven times the smaller number is the same as 5 times the larger number. Find the smaller number.

(F) An orange has 20 fewer calories than a banana. If 7 bananas have the same number of calories as 9 oranges, how many calories are in a banana?

(L) Keith weighs 20 kg more than Beth, while Henry weighs 30 kg less than twice as much as Beth. If Keith and Henry weigh the same, how much does Beth weigh (in kg)?

(N) Cycle Paths, Inc. makes bicycles, tricycles, and unicycles. Last week they made 88 more bicycles than unicycles, and 5 times as many tricycles as unicycles. If they made 40 more bicycles than tricycles, how many unicycles did they make?

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What Did Mrs. Sternwhistle Say When Her Toddler Knocked Over the Coffee Pot?

Solve each problem below. Find your solution in the answer column and notice the two letters next to it. Write these letters in the two boxes at the bottom of the page that contain the number of that problem.

ST	14, 22, 37
RB	26, 22
IS	31, 62
AT	13, 21, 36
AD	80
TT	24, 20
NO	14, 9, 29
BR	29
EA	95
BL	17, 12, 37
TH	32
CA	28, 56

(1) The second of three numbers is 8 more than the first, and the third number is 3 less than 3 times the first. If the third number is 15 more than the second, find the three numbers.

1st _____, 2nd _____, 3rd _____

(2) In the championship game, Julius scored 5 points less than Kareem, and Wilt scored 1 point more than twice as many as Kareem. If Wilt scored 20 points more than Julius, how many points were scored by each player?

Kareem _____, Julius _____, Wilt _____

(3) Model Cars, Inc. makes red cars, white cars, and blue cars. The profit on a blue car is $10 more than the profit on a white car, and the profit on a red car is $7 less than the profit on a white car. If the profit on two red cars is $2 less than the profit on one blue car, what is the profit on a blue car?

$ _____

(4) Last year Grok's mother weighed 3 times as much as Grok. Since then Grok has gained 9 kg and his mother has lost 4 kg. Now his mother weighs only twice as much as Grok. Find their weights now.

Grok _____ kg, mother _____ kg

(5) A hamburger costs 30¢ more than a hot dog and 20¢ less than a cheeseburger. If 3 hamburgers cost 75¢ less than 2 hot dogs and 2 cheeseburgers, how much does a hamburger cost?

_____ ¢

(6) Smedly has just drawn two rectangles. The length of the first rectangle is 4 cm more than the length of the second. The width of the first is 9 cm; the width of the second is 6 cm. If the area of the first rectangle is 96 cm^2 greater than the area of the second, find the length of each.

1st _____ cm, 2nd _____ cm

3	3	1	1	4	4	2	2	6	6	5	5

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What Did They Call the Bug That the Astronauts Brought Back From the Moon?

Solve each problem below. Find your solution at the bottom of the page and cross out the letter above it. When you finish, the answer to the title question will remain.

(1) Andy is twice as old as Kate. In 6 years, their ages will total 60. How old is each now?

Kate _____, Andy _____

(2) Mrs. Wang is 23 years older than her daughter. In 5 years, their ages will total 63. How old are they now?

daughter _____, Mrs. Wang _____

(3) Matthew is 3 times as old as Jenny. In 7 years, he will be twice as old as she will be then. How old is each now?

Jenny _____, Matthew _____

(4) Juan is 8 years older than his sister. In 3 years, he will be twice as old as she will be then. How old are they now?

sister _____, Juan _____

(5) Melissa is 24 years younger than Joyce. In 2 years, Joyce will be 3 times as old as Melissa will be then. How old are they now?

Joyce _____, Melissa _____

(6) Tom is 4 years older than Jerry. Nine years ago, Tom was 5 times as old as Jerry was then. How old is each now?

Jerry _____, Tom _____

(7) Kathy is 6 years younger than Bill. Twelve years ago, Bill was twice as old as Kathy was then. How old are they now?

Bill _____, Kathy _____

(8) Dr. Garcia is twice as old as his son. Twenty years ago, he was 4 times as old as his son was then. How old are they now?

son _____, Dr. Garcia _____

B	A	F	L	E	Y	U	G	N	A	T	O	I	T	C	H	K
5, 13	7, 15	30, 60	14, 28	16, 32	10, 14	33, 66	7, 21	26, 20	9, 32	35, 11	24, 18	8, 24	34, 10	8, 12	15, 38	12, 16

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OBJECTIVE 5-h: To solve word problems involving ages.

What Happened When Sparky Crossed the Wires for His Electric Blanket and His Toaster?

Solve each problem below. Find your solution in the answer column and notice the three letters next to it. Write these letters in the three boxes at the bottom of the page that contain the number of that problem.

(1) Mr. Klinker is 35 and his daughter is 10. In how many years will Mr. Klinker be twice as old as his daughter?

(2) George is 7 and his mother is 37. In how many years will his mother be 3 times as old as he is?

(3) Pete is 14 and his grandfather is 54. How many years ago was his grandfather 6 times as old as Pete?

(4) Dorothy is 14 years younger than Rita. Ten years ago, Rita was 3 times as old as Dorothy was then. How old is each now?

(5) Ms. Ford is 48 and Ms. Lincoln is 35. How many years ago was Ms. Ford exactly twice as old as Ms. Lincoln?

(6) Steve is 5 times as old as Janis. In 12 years, he will be twice as old as she will be then. How old are they now?

(7) Mary is 4 years older than Toni. Sam is twice as old as Mary. The sum of their three ages is 8 times Toni's age. How old are they?

SLE	30, 16
PIN	6
ALO	24
EPT	15
STO	4, 8, 16
HEK	31, 17
BED	4, 20
TOF	8
HOT	10
POP	3, 7, 14
IRE	6, 24
GOU	22

4	4	4	1	1	1	7	7	7	3	3	3	5	5	5	2	2	2	6	6	6

OBJECTIVE 5–i: To solve word problems involving ages (more challenging problems).

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How Do Owners of Large Estates Spend Their Time?

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Solve each problem and find your solution below. Cross out the box containing that solution. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

1. Barbara is 142 cm tall. This is 2 cm less than 3 times her height at birth. Find her height at birth.

2. A bicycle is on sale at $12 more than half of the regular price. If the sale price is $75, find the regular price.

3. A set of children's blocks contains three shapes: longs, flats, and cubes. There are 3 times as many longs as cubes, and 30 fewer flats than longs. If there are 600 blocks in all, how many longs are there?

4. The length of a rectangular field is 7 m less than 4 times the width. The perimeter is 136 m. Find the width and length.

5. Find three consecutive odd integers such that the sum of the smallest and 7 times the largest is 68.

6. Mark is 11 years older than his sister. In 8 years he will be twice as old as she will be then. How old are they now?

7. A Sugar Dud has 30 less than twice as many calories as a Krunchy Krum. If 5 Sugar Duds have the same number of calories as 8 Krunchy Krums, how many calories are in each?

8. The perimeter of a triangle is 71 cm. The first side is 3 cm shorter than the second side, and the third side is twice as long as the first side. Find the length of the longest side.

9. In a week Mike ran 8 km farther than Bill, while Pete ran 1 km less than 3 times as far as Bill. If Pete ran 15 km farther than Mike, how many kilometers did Bill run?

10. The larger of two consecutive integers is 7 greater than twice the smaller. Find the integers.

11. A square and a rectangle have the same perimeter. The length of the rectangle is 4 cm less than twice the side of the square, and the width of the rectangle is 6 cm less than the side of the square. Find the perimeter of each figure.

AS	MI	LA	LE	ND	TT	SH	IN	GT	AX
$126	11	40 cm	12	38 cm	5, 7, 9	75, 120	5, 16	$132	3, 14
HE	RE	IR	LO	MA	TS	NO	CA	SH	RS
16 m, 55 m	48 cm	9, 11, 13	270	80, 130	15 m, 53 m	292	−6, −5	34 cm	−8, −7

Why Do People Say That Bertha Lummox Runs Like Lightning?

Do each exercise below. Find your answer in the corresponding answer column and notice the number next to it. Write the letter of the exercise in the box containing this number.

(S) $-19 + 15 + (-40)$

(N) $\dfrac{16 - 48}{-2}$

(I) $-6(-3 + 14)$

(S) $10(-64 - 36)$

(L) $(-2)(25)(-5)$

(E) $\dfrac{-27}{9} + \dfrac{-75}{-5}$

(A) $(6)(-2) + (-10)(-3)$

(S) $\dfrac{-6(20)}{15}$

(T) $-12 \cdot 2 \cdot 30$

(E) $(-70)^2$

(I) $1 - 9 - 7 - 5$

(S) $\dfrac{33 - 22}{22 - 33}$

Answers:

(20) -720

(19) 7

(24) -1000

(3) 4900

(11) -44

(9) 18

(7) 250

(18) 16

(5) -1

(1) -8

(15) -66

(17) -20

(23) 12

(A) $-25 - (-75) - 100$

(S) $(-3)(4)(-5)(6)$

(H) $\dfrac{-36}{2} + \dfrac{-72}{4}$

(R) $(-5)^3$

(Y) $(-1)(16) + (-2)(16)$

(G) $\dfrac{1 - 8 + 3 - 5}{-6 - 2 + 9 - 4}$

(I) $(6 - 18)(18 - 6)$

(E) $-3750 + 5999 - 1250$

(W) $\dfrac{(2)(-2)(2)(-2)(2)}{-16}$

(K) $-14 - (-14) - 14$

(T) $5(12) + 3(-9)$

(R) $\dfrac{-3(-7 + 2)}{21 - 6}$

Answers:

(22) 999

(13) 33

(14) -125

(12) 360

(13) 66

(4) -144

(10) -48

(21) 1

(6) -50

(8) -2

(19) 3

(16) -14

(2) -36

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

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Did You Hear About...

A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P ?

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Solve each equation below. Find the solution in one of the answer columns and notice the word next to it. Write this word in the box containing the letter of that exercise. You will hear about a creature who eats what "bugs" him.

$-1\frac{7}{8}$	THAT	$-4\frac{1}{2}$	JUST
$1\frac{1}{2}$	WHO	$3\frac{1}{5}$	MOVED
$1\frac{5}{6}$	A	$-\frac{1}{8}$	FRENCH
$\frac{2}{3}$	THE	$-1\frac{3}{5}$	ORDER
6	SO	$-3\frac{1}{3}$	WITH
$5\frac{1}{3}$	KETCHUP	$2\frac{2}{9}$	PARIS
-4	HAMBURGER	$2\frac{3}{4}$	COULD
$-\frac{4}{5}$	FROG	$4\frac{1}{9}$	ROLL
$\frac{1}{7}$	HE	0	FLIES
$-1\frac{1}{3}$	TO	$7\frac{1}{2}$	HAVE

(A) $3y + 5 = 7$

(B) $9 + 10d = 1$

(C) $8a - 15 = -3$

(D) $24 - 5v = 8$

(E) $-7 = 6x + 1$

(F) $12 = 32 - 9n$

(G) $4t - 3 = -21$

(H) $30 - x = 24$

(I) $20m + m = 3$

(J) $7w + 4 - 3w = 15$

(K) $-7 - 4u - u = 1$

(L) $3y + 22 - 15y = 0$

(M) $x + 8x + 2x = 6 - 50$

(N) $48 = -11t + 18 + 2t$

(O) $40p - 5 = -5 - 5$

(P) $100x + 99 - x = 99$

What Is the Famous Old Saying About Building a Fire in a Kayak?

Solve each equation below. Find the solution in the adjacent answer column and notice the two letters next to it. Print these letters in the two boxes above the exercise number at the bottom of the page.

(1) $5x + 9 = 2$	(PO) $1\frac{1}{2}$	(9) $\frac{m}{7} + 4 = -8$	(UW) 18
(2) $7 - 6d = 3$	(EA) 18		(AN) -84
(3) $\frac{1}{3}y - 2 = 4$	(AN) $-1\frac{2}{5}$	(10) $10x + 9 - x = 12$	(UC) 30
(4) $16 = 5 - \frac{1}{8}n$	(EN) -60	(11) $-22 - 3w - 5w = 0$	(OU) $-2\frac{3}{4}$
	(RK) -88	(12) $\frac{4}{3}y - 16 = 24$	(RY) 9
	(TH) $\frac{2}{3}$		(OO) $\frac{1}{3}$
(5) $\frac{2}{3}a + 1 = 11$	(AK) $3\frac{1}{2}$	(13) $x + 13x + 10x = 50 - 6$	(TI) $1\frac{5}{6}$
(6) $-10 + \frac{5}{2}t = -30$	(RT) 9	(14) $-1 - \frac{2}{7}v = 2$	(AD) 2
(7) $3 = 17 - 4x$	(EY) -8	(15) $4 - 8 = 3 - \frac{n}{5}$	(AY) $-10\frac{1}{2}$
(8) $-\frac{3}{5}u + 2 = 6$	(YO) $-6\frac{2}{3}$	(16) $-100p + 99 + 99p = 100$	(DH) -1
	(TT) 15		(AV) 35
	(BE) $-2\frac{1}{2}$		(TR) $-2\frac{2}{3}$

8	12	9	2	15	6	11	4	14	7	1	16	3	13	5	10

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What Is the Advantage of Buying a Magnetic Bulletin Board?

Solve each equation and find your solution below. Cross out the box containing that solution. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

(1) $3(5x - 4) = 8x + 2$

(2) $9(n + 3) = 7n - 3$

(3) $2(10 - 6x) = x - 8x$

(4) $5a + 4(3a - 8) = 4 + 13a$

(5) $2y + 18 = 12 - 6(y + 7)$

(6) $x - (5 - 3x) = 7x + 4$

(7) $8(m - 5) = 2(3m - 8)$

(8) $-4(3 - 6d) = 9(2d - 2)$

(9) $7(10 - 3w) = 5(15 - 4w)$

(10) $6t + 3(5t - 4) = 12(2t - 5)$

(11) $2(9x - 1) = 99 - 7(3 - 4x)$

(12) $6(5k - 8) - 20 = 11(2k - 3) + 3k$

(13) $-x - (13 + 4x) = -3(5 - 9x) + 2$

QU	IT	HA	I	NG	SA	IS	ST	IC	AC	AN	D	OC	KS	FR	OM	S	CO	EE	RK
4	−2	−5	−11	12	7	2	13	0	−18	−1	−6	16	25	50	−3	−8	−15	11	9

What Happened to the Boy Who Went to the Dentist With Only One Dollar?

Solve each problem below. Find your solution in the answer column and notice the letter next to it. Look for this letter in the string of letters near the bottom of the page and CROSS IT OUT each time it appears. When you finish, write the remaining letters in the rectangle at the bottom of the page.

1	The second of two numbers is 7 times the first. Their sum is 72. Find the numbers.
2	The larger of two numbers is 5 less than twice the smaller. Their sum is 43. Find the numbers.
3	The sum of two numbers is 75. The first is 9 more than 5 times the second. Find the first number.
4	Jack's bowling score is 20 less than 3 times Jill's score. The sum of their scores is 220. Find the score of each.
5	Jennifer cut a board 2 m long into two pieces. One piece is 24 cm shorter than the other. Find the length of each piece.
6	With optional equipment, an automobile cost $9120. If the cost of the basic car was $120 more than 4 times the price of the optional equipment, what was the cost of the basic car?
7	The sum of three numbers is 207. The second number is 8 times the first, while the third is 3 less than the first. Find the numbers.
8	The sum of three numbers is 161. The second number is 6 times the first, and the third is 5 more than the second. Find the numbers.
9	A group of backpackers hiked 38 km over three days. The first day, they hiked 1 km less than 3 times as far as the second day. The third day, they hiked 2 km less than the first day. How far did they hike the first day?
10	One week, Huey worked 7 hours less than Dewey, and Louie worked twice as long as Huey. Together they worked 87 hours. Find the number of hours worked by each.

(C) 14 km
(T) 23, 164, 20
(R) $7320
(G) 92 cm, 108 cm
(F) 9, 63
(I) 12, 72, 77
(L) 64
(A) 27, 20, 40
(B) 59
(D) 16, 27
(K) 13, 78, 83
(N) 21, 168, 18
(W) 112 cm, 88 cm
(E) 63, 157
(S) 17 km
(H) 25, 18, 50
(Y) 60, 160
(U) $6850

N H W E I G A S O F A T B I A N U S R L C I K T D A E F L W E T Y R S H

Answer:

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TEST OF GENIUS

1. Terry, Barry, Larry, Jerry, and Perry are lined up in these positions midway through a track meet:

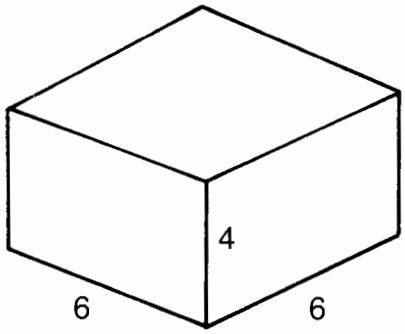
   Terry is 20 meters behind Barry.
   Barry is 50 meters ahead of Larry.
   Larry is 10 meters behind Perry.
   Jerry is 30 meters ahead of Terry.
   Perry is 50 meters behind Jerry.

   At this point in the race, who is winning? Who is second? Third?

2. What is the weight of a fish if it weighs 10 pounds, plus half its weight?

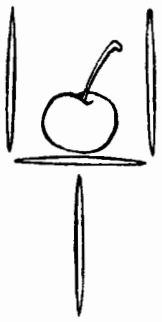
   $$\underset{\text{weight}}{\_\_\_\_} = \underset{\frac{1}{2}\text{ of weight}}{\_\_\_\_\_} + 10 \text{ pounds}$$

3. A square cake measures 6 units by 6 units by 4 units. The cake falls into a vat of frosting and comes out frosted on all six faces. The cake is then cut up into cubes, each measuring 1 unit on an edge. How many of these cubes will have exactly one face frosted?



4. Homer is giving some cookies to each of his three brothers. To the oldest, he gives half of the cookies and half a cookie. He then gives half of what is left and half a cookie to his second brother. Finally, he gives half of what is now left and half a cookie to his youngest brother. At no time is a cookie broken or cut. How many cookies did Homer have to begin with? (HINT: Work backwards.)

5. The toothpicks in the figure at the right represent a glass with a cherry inside. By moving just two toothpicks, reconstruct the glass so that the cherry, which may not be moved, winds up outside. The glass may be reconstructed on its side or even upside down, but must have the same shape.



6. When the time is 2:18, how many degrees are there in the acute angle between the minute hand and the hour hand on a clock?

7. Annabel Zonk has discovered something interesting about her first name. If the letters are arranged as they are below, it is possible to replace each different letter with a different digit and have the multiplication work out correctly. What digit should replace each letter?

$$\begin{array}{r} \text{ANN} \\ \times\,\text{A} \\ \hline \text{BEL} \end{array}$$

8. An algebra teacher drove past a farmyard that was full of chickens and pigs. The teacher happened to notice that there were a total of 70 heads and 200 legs. How many chickens and how many pigs where there?

SCORING KEY

7 or 8—*Megawatt Genius*
5 or 6—*Kilowatt Genius*
3 or 4—*Genius*
1 or 2—*What Genius?*

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Where Will Campers Sleep in 20 Years ?

Do each exercise below, following the directions given for each section. Select your answer from the two choices given and circle the letter next to it. Write this letter in the box at the bottom of the page that contains the number of that exercise.

Write each expression in exponential form.

(1)	$x \cdot x \cdot x \cdot x$	(A) x^3	(E) x^4
(2)	k cubed	(N) k^3	(R) k^6
(3)	$12 \cdot m \cdot n \cdot n$	(M) $12mn$	(S) $12mn^2$
(4)	$\frac{1}{3} \cdot u \cdot u \cdot u \cdot v \cdot v$	(O) uv^2	(T) $\frac{1}{3}u^3v^2$
(5)	$(a+b)(a+b)(a+b)$	(E) $(a+b)^3$	(L) a^3+b^3
(6)	$(c+d)(c+d)(c-d)$	(A) $(c-d)^3$	(U) $(c+d)^2(c-d)$
(7)	$-7 \cdot x \cdot (x+3)(x+3)$	(A) $-21x^3$	(R) $-7x(x+3)^2$
(8)	$(x+y)$ squared	(E) $(x+y)^2$	(I) x^2+y^2
(9)	the fifth power of the product of p and q	(I) $(pq)^5$	(O) $(p+5)q$

Evaluate each expression for the given values of the variables.

(10)	x^2-3xy	if $x=5$, $y=2$	(T) -5	(R) 10
(11)	x^2-y^2	if $x=-7$, $y=-1$	(H) 48	(R) 52
(12)	$(x-y)^3$	if $x=2$, $y=-4$	(A) 256	(U) 216
(13)	xy^2-2x^3	if $x=3$, $y=2$	(F) -42	(P) -56
(14)	$\frac{-5a^2}{a-b}$	if $a=-4$, $b=6$	(R) 12	(T) 8
(15)	$\frac{3ab^3}{(2a)^2}$	if $a=1$, $b=-2$	(P) 4	(T) -6
(16)	$\frac{(a+b)^4}{9-a^2}$	if $a=-5$, $b=3$	(R) 2	(N) -1

9	2	4	11	1	13	6	15	12	7	5	14	8	16	10	3

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Why Did the Donkey Get a Passport ?

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Simplify each expression below. Find your answer in the answer column and notice the letter next to it. Write this letter in each box at the bottom of the page that contains the number of that exercise.

(1) $8x^2 + 2x - 5x + 7$

(2) $4 - 3x^2 - 9x - 7 + x^2$

(3) $-5x + 8 - 4x^2 - 4x + 2x^2$

(4) $x^2 - (-3x) + 4 + 7x^2 - 8x - 6$

(5) $-x - 5x + (-3x^2) - 9 - 2x + 7$

(6) $-7 + x^3 - 5x^2 + 4x - 5x + 3$

(7) $4x^3 + 6x^2 + 6x - 1 + 5x^3 - x^2 - (-9)$

(8) $-7x + 5x^2 - 5x^3 + 8x + 3x^2 - 7x^3 + x^3$

(9) $6x^3 + (-2) - (-2x) - 5x^3 - 4x^2 + x + 4x^2 + 15$

(10) $6x^5 - 2x^4 + 6x^3 - 12x^5 - 6x^4 + 9x^3$

(11) $8ab - 3b^2 + 2a^2 - 4ab + 4b^2$

(12) $5a^2b + 9ab^2 - 2a^2b - 13ab^2$

(13) $3a^3 + b^3 - 6a^2b - a^3 + 6ab^2 + a^2b$

(14) $a^2b^2 + a^2b - a^3 - ab^2 + a^2b - b^3 - a^2b^2 - b^3$

(C) $-11x^3 + 8x^2 + x$

(N) $-6x^5 - 7x^4 + 9x^3$

(E) $8x^2 - 5x - 2$

(V) $3a^2b - 4ab^2$

(L) $8x^2 - 3x + 7$

(K) $2a^3 - 5a^2b - ab^2 - 2b^3$

(H) $x^3 + 3x + 13$

(U) $x^3 - 5x^2 - x - 4$

(B) $2a^2 + 4ab + b^2$

(A) $-2x^2 - 9x - 3$

(O) $2a^3 - 5a^2b + 6ab^2 + b^3$

(M) $9x^3 + 5x^2 + 6x + 8$

(S) $-2x^2 - 9x + 8$

(T) $-6x^5 - 8x^4 + 15x^3$

(R) $-a^3 + 2a^2b - ab^2 - 2b^3$

(D) $-3x^2 - 8x - 2$

3	13	9	4	8	13	6	1	5	11	4	8	13	7	4	2	10	14	2	12	4	1	11	6	14	14	13

Why is an Idea Like the Pacific?

For each exercise below, add the polynomials. Find your answer at the bottom of the page and write the letter of that exercise above it.

(T) $6x + 9$
$\underline{x - 1}$

(I) $3x - 4$
$\underline{5x - 7}$

(O) $8x^2 + 2x + 1$
$\underline{x^2 - 4x + 7}$

(S) $-5x^2 - 5x + 3$
$\underline{6x^2 - x}$

(N) $(7x^2 + 3x + 9) + (2x^2 + 5x - 2)$

(U) $(-3x^2 + x - 7) + (8x^2 - 4x - 4)$

(I) $(6x^3 + 2x^2 - 3x) + (3x^3 - 10x^2 - x)$

(T) $(-4x^3 + 6x + 1) + (5x^2 - x - 12)$

(O) $(9x^3 - x^2 + 8) + (-9x^3 + 2x^2 + 3x)$

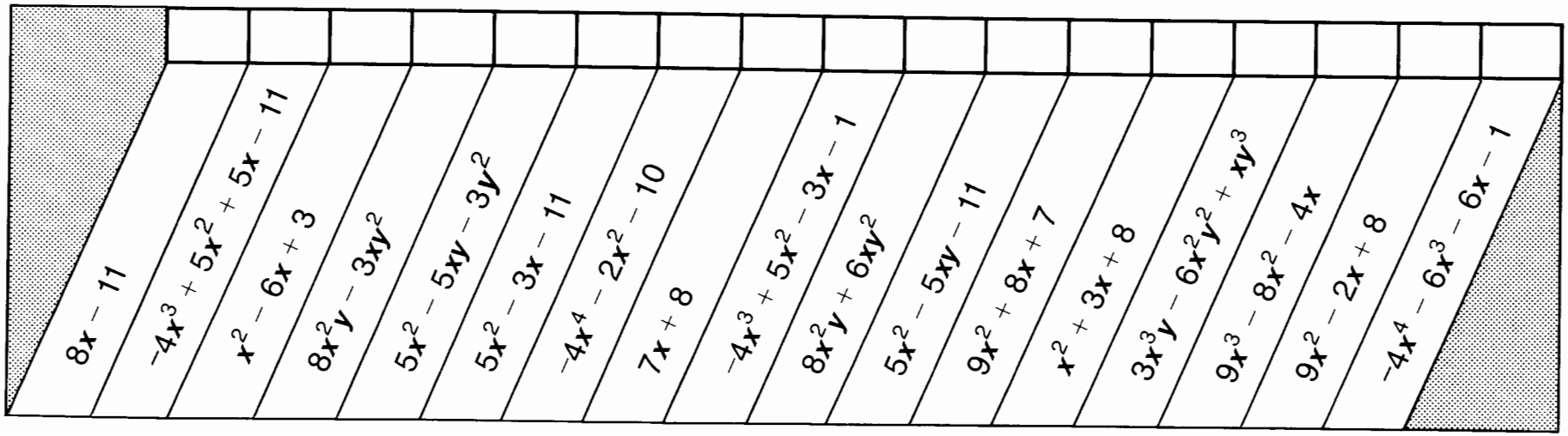
(S) $(2x^4 + 5x^2 - 11) + (-6x^4 - 7x^2 + 1)$

(N) $(-4x^4 + 3x^3 - 7x^2 - x) + (-9x^3 + 7x^2 - 5x - 1)$

(J) $(4x^2 + 3xy - y^2) + (x^2 - 8xy - 2y^2)$

(A) $(2x^2y - xy^2) + (6x^2y + 7xy^2)$

(T) $(x^3y + 3x^2y^2 + 2xy^3) + (2x^3y - 9x^2y^2 - xy^3)$



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Daffynition Decoder

1. Romantic: _____

11	13	8	12	11	1	8	11	13	8	13	10	3	5	12

2. American: _____

11	2	11	9	9	6	5	7	13	12	11	8	13	3	4

For each exercise below, subtract the second polynomial from the first. Find your answer in the answer column and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it. Keep working and you will decode the "de-fun-itions."

(1) $(7x + 4) - (2x + 9)$

(2) $(3x + 12) - (5x - 6)$

(3) $(-4x^2 + 10) - (6x^2 - 9)$

(4) $(2x^2 + 3x + 8) - (x^2 + 5x - 1)$

(5) $(-x^2 + 9x - 2) - (9x^2 - 4x + 4)$

(6) $(3x^2 + 7x + 1) - (8 + 5x + x^2)$

(7) $(4x^3 + 6x^2 - 8x) - (x^3 - 2x^2 + 12x)$

(8) $(x^3 + 2x^2 + 5x) - (3x^2 - x - 7)$

(9) $(x^4 + 8x^2 - 1) - (x^2 - 3x^3 + x^4)$

(10) $(5x^4 - 2x^2) - (3x - 2x^2 - 4x^3 + 6x^4)$

(11) $(3x^2 + 7xy - 2y^2) - (x^2 - 6xy + 2y^2)$

(12) $(-x^2 - 9xy + 5y^2) - (4x^2 - 2xy - y^2)$

(13) $(4x^2y - 3xy^2) - (3x^2y - 8xy^2)$

Answers:

(M) $-x^4 + 4x^3 - 7x^2$

(S) $-x^4 + 4x^3 - 3x$

(U) $3x^3 + 5x^2 + 7$

(L) $5x - 5$

(E) $-10x^2 + 19$

(F) $2x^2 + 2x - 19$

(C) $-10x^2 + 13x - 6$

(H) $-2x + 18$

(T) $-5x^2 - 7xy + 6y^2$

(O) $3x^3 + 8x^2 - 20x$

(P) $3x^3 + 7x^2 - 1$

(R) $x^2 - 2x + 9$

(A) $2x^2 + 13xy - 4y^2$

(N) $x^2y + 5xy^2$

(Y) $2x^2 + 2x - 7$

(B) $-5x^2 - 6xy + 7y^2$

(I) $x^3 - x^2 + 6x + 7$

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WHY ARE MR. AND MRS. NUMBER SO HAPPY?

Find the simplest form for each expression below in the adjacent answer column. The letter of the exercise goes in the box that contains the number of the corresponding answer.

(E) $x^3 \cdot x^4$	(19) $-3x^6$	(T) $(u^2v)(-6uv^2)$	(21) $-8u^6v^4$
(O) $3x^2 \cdot x$	(14) $3x^3$	(E) $v(uv^2)(u^3v)$	(3) u^4v^4
(T) $2x^2 \cdot 3x$	(25) x^9	(I) $(4uv)(-u)(2u^4v)$	(12) $-8u^6v^2$
(I) $x \cdot x^2 \cdot x^3$	(7) x^7	(A) $(-3u^2)(-u^2v^2)(2uv)$	(17) u^3v^7
(A) $x^4(-3x^2)$	(10) x^6	(L) $(-u^2)(-6u^2v^3)(-u^3v^4)$	(5) $6u^5v^3$
(H) $(-2x^2)(-2x)$	(2) $4x^3$	(G) $(-2u)(u^2v)(4u^3v^3)$	(13) $-6u^3v^3$
(E) $x(-x^4)(-x^4)$	(23) $6x^3$	(V) $(\frac{1}{2}u^2v^3)(2uv^4)$	(24) $-6u^7v^7$
(R) $(ab^2)(a^2b)$	(18) $5a^6b^4$	(L) $(-b^2)(9a^2b^3)$	(22) $-a^3b^5c^2$
(A) $(3ab)(2a^3b)$	(6) a^3b^3	(Y) $(3a^2c)(-3bc^2)$	(27) $-ab^3c^2$
(G) $ab(-4ab^3)$	(26) $12a^2b^8$	(E) $c(-ab)(a^2b^2c^2)$	(28) $-a^3b^3c^3$
(E) $(-a^4b)(-5a^2b^3)$	(8) $-4a^2b^4$	(O) $(-3a^2c)(-3b^2c)$	(15) $9a^3b^3c^5$
(T) $(-2a^3b)(2ab^3)$	(11) $-12a^3b^7$	(T) $(-ab)(-b^2c^2)(-a^2b^2)$	(4) $-9a^2bc^3$
(N) $(6a^2b^2)(-2ab^5)$	(1) $-4a^4b^4$	(H) $(a^2bc^2)(b^2c^3)(9a)$	(20) $-9a^2b^5$
(O) $(-4ab^4)(-3ab^4)$	(16) $6a^4b^2$	(N) $(3b^2)(\frac{1}{3}abc)(-c)$	(9) $9a^2b^2c^2$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

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What Happens to a Dog Who Eats Table Scraps ?

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Simplify each expression below. Find your answer in the corresponding answer column and notice the letter next to it. Write this letter in the box that contains the number of that exercise.

(1) $(x^3)^2$	(L) $81x^2$	(14) $(4a^2b^3)^2$	(H) $-a^6b^6$
(2) $(x^4)^3$	(T) $125x^{11}$	(15) $(2a^4b)^3$	(E) $-a^{10}b^8$
(3) $(2x^2)^3$	(S) $-32x^{15}$	(16) $(-5a^3b^3)^2$	(R) $16a^4b^6$
(4) $(-4x^3)^2$	(G) $8x^6$	(17) $(ab^5)^3$	(N) a^8b^9
(5) $(-3x^4)^3$	(E) $-64x^4$	(18) $(-a^2b^2)^3$	(I) $25a^6b^6$
(6) $(8x^5)^2$	(H) x^6	(19) $(-8ab^4)^2$	(S) $18a^5b^2$
(7) $(-2x^3)^5$	(N) $-12x^3$	(20) $2a(3a^2b)^2$	(U) $27a^3b^4$
(8) $(4x)^3$	(S) $64x^{10}$	(21) $-b(5a^3b)^3$	(N) a^3b^{15}
(9) $(-9x)^2$	(E) x^{12}	(22) $3ab(2ab^2)^4$	(I) $64a^2b^8$
(10) $x(2x^2)^3$	(P) $64x^3$	(23) $(ab^3)^2(a^2b)^3$	(O) $48a^5b^9$
(11) $-3x(2x)^2$	(E) $16x^6$	(24) $(-2ab^2)^2(-ab)^3$	(S) $8a^{12}b^3$
(12) $x^2(5x^3)^3$	(I) $8x^7$	(25) $(3ab^2)(3ab)^2$	(G) $-4a^5b^7$
(13) $-4x^2(-4x)^2$	(T) $-27x^{12}$	(26) $(-a^2b)^4(-a^2b^4)$	(T) $-125a^9b^4$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

OBJECTIVE 1–f: To find powers of a monomial.

What Did the Martian Say When He Accidentally Landed on Venus ?

Find the simplest form for each expression in the corresponding answer column. (Some of the expressions cannot be simplified.) Write the letter of the exercise in the box containing the number of your answer.

(T)	$5x^2 + 2x^2 - 3x^2$	(19)	$5xy^2$
(N)	$(5x^2)(2x^2)(-3x^2)$	(1)	$16x^6$
(S)	$4x^3 + x^2 + 4x$	(11)	$3x + 2y$
(I)	$(4x^3)(x^2)(4x)$	(15)	$7x^2y - 2xy^2$
(L)	$-3x^3 + 5x^2 - 3x^3$	(13)	$4x^2$
(A)	$(-3x^3)(5x^2)(-3x^3)$	(16)	$4x^3 + x^2 + 4x$
(E)	$3x + 2y$	(18)	$45x^8$
(T)	$(3x)(2y)$	(9)	$-14x^3y^3$
(Y)	$7xy^2 - 2xy^2$	(5)	$-30x^6$
(D)	$(7xy^2)(-2xy^2)$	(2)	$-14x^2y^4$
(I)	$7x^2y - 2xy^2$	(6)	$6xy$
(A)	$(7x^2y)(-2xy^2)$	(8)	$-6x^3 + 5x^2$

(I)	$(3a)(a^2)(a^3) + (2a^2)(a^4)$	(10)	$-2a^5b^5$
(T)	$(a^4)(5a)(a^2) + (-4a^3)(2a^3)(a)$	(4)	$13a^3b$
(W)	$(2a^3)(a^2)(3a^2) + (8a^2)(-a^2)(a)$	(12)	$-3a^7$
(D)	$(5a^2)(2ab) + (a^2b)(3a)$	(7)	0
(H)	$(2ab^2)(-2a^2b^2) - (ab^3)(6a^2b)$	(14)	$-10a^3b^4$
(N)	$(-a^2b)(ab^2)(a^2b^2) + (a^3b^2)(-a^2b^3)$	(3)	$5a^6$
(P)	$(4a^2b^2)(-3b^3) - (2ab^2)(-6ab^3)$	(17)	$6a^7 - 8a^5$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

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Why Couldn't the Chicken Find Her Egg?

Simplify each expression and find your answer below. Cross out the box containing your answer. When you finish, there will be six boxes not crossed out. Print the letters from these boxes in the squares at the bottom of the page.

1. $(4x^2y)(2xy^2)$
2. $x^2(3xy)(xy^4)$
3. $(-4x^3y)(x^2y^2)(y)$
4. $(5xy^3)^2$
5. $(-3x^2y)^3$
6. $(6x^2)(2x)^3$
7. $(4xy^2)(x^3y)^2$
8. $(-x^4y)(3xy^3)^2$
9. $(5x^2y)^2(2xy^3)$
10. $(-xy)^2(-xy^2)$
11. $3(x^2y)^2(xy^2)^4$
12. $(-2x^2)^3(-y)^5$
13. $(-1)^3(5x^2y)^3$
14. $(2x)^4(-x^2)(-y)^2$
15. $(-3x^2y^2)(-3xy)^2$
16. $(7x^6y^4)(x^3y^2)^2$
17. $7x^6y^4 + (x^3y^2)^2$
18. $x^2(xy^3)^2 + y^2(x^2y^2)^2$

IT $-4x^5y^4$	TH $7x^{12}y^8$	SH $7x^{10}y^9$	EL $-x^3y^4$	EE $2x^4y^6$	OW $8x^3y^3$	EM $16x^4y^3$	IX $3x^8y^{10}$
GG $8x^6y^4$	IS $-4x^6y^3$	OS $50x^5y^5$	YO $48x^5$	AT $8x^6y^5$	LK $4x^7y^4$	LA $4x^6y^6$	TE $-125x^6y^3$
SD $25x^2y^6$	TH $-9x^6y^7$	ID $-x^5y^8$	LO $-27x^4y^4$	QU $3x^4y^5$	IT $3x^7y^{12}$	ST $-16x^6y^2$	EN $-27x^6y^3$

OBJECTIVE 1–i: To add, subtract, multiply, or find powers of monomials (review).

What Happened to the Man Who Invested in a Paper Towel Company and a Revolving Door Factory?

Simplify each expression. Find the answer below and notice the two letters next to it. Write these letters in the two boxes above the exercise number at the bottom of the page.

(1) $7x^2 + 3x - x^2$

(2) $(7x^2)(3x)(-x^2)$

(3) $(-2x^3)(5x)(-8x^4)$

(4) $x(3x^2)^3$

(5) $-4x(-5x)^2$

(6) $(2x^4)(-6x^3) + (9x)(3x^6)$

(7) $a^2 + b + a^2 + b^2 + b$

(8) $(-2a^3b)^4$

(9) $a^2(6a^3b)(ab^5)$

(10) $(4ab^3)(-5b^6)(2a^2)$

(11) $(3a^4b)(5ab^2) - (a^5b^2)(9b)$

(12) $(7a^2b^2)^2 + (ab)^4 - 50$

(13) $(8x^2y)(x^4y^3)^2$

(14) $2x(-5y^6)^3$

(15) $(xy^2)^3(x^2y)^2 + (x^3y^4)(x^2y^2)^2$

(16) $(-x^2)^5(-2x^2y^3)^3$

(17) $(4xy^7)(2x^4y) - (5x^3y^3)(-8x^2y^5)$

(18) $(3x^2)(3y^2) + 3x^2y - (3xy)^2 - 3xy^2$

Answers:

IN	$80x^{11}$	OR	$-100x^3$
SW	$27x^7$	ED	$6x^2 + 3x$
EC	$-21x^5$	LA	$36x^7$
HE	$15x^7$	OU	$80x^8$

Answers:

OU	$6a^6b^6$	LD	$2a^2 + b^2 + 2b$
ER	$6a^7b^4$	RN	$-40a^3b^9$
TB	$16a^{12}b^4$	ND	$50a^4b^4 - 50$
EH	$6a^5b^3$	TO	$-40a^4b^6$

Answers:

SO	$18x^6y^9$	TU	$48x^5y^8$
WA	$8x^{10}y^7$	EF	$-250xy^{18}$
HA	$8x^{12}y^8$	IP	$3x^2y - 3xy^2$
AR	$2x^7y^8$	OU	$8x^{16}y^9$

6	13	4	18	1	16	8	14	5	11	2	9	7	17	10	15	3	12

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What Did the Girl Mushroom Say About the Boy Mushroom After Their First Date ?

For each exercise below, multiply the polynomial by the monomial. Find your answer in the set of answers under the exercise and notice the letter next to it. Write this letter in the box that contains the number of that exercise.

(1) $5(2n^2 + n)$
(2) $3n(8n^2 - 2n)$
(3) $n^2(4n - 3)$
(4) $-2n(4 + 5n^3)$
(5) $-6n^2(4n^2 - 9)$

Answers:

(B) $-24n^4 - 54n$
(T) $24n^3 - 4n$
(R) $-24n^4 + 54n^2$
(U) $4n^3 - 3n^2$
(S) $10n^2 + 5n$
(L) $24n^3 - 6n^2$
(O) $-8n - 6n^3$
(A) $-8n - 10n^4$

(6) $4a(a^2 - 2a + 3)$
(7) $-2a^2(9 - a - 4a^2)$
(8) $a^2b(a^2 - b^2)$
(9) $-3ab^2(a^3b^2 - 2a^2b)$
(10) $2ab(a^2 + 4ab - 3b^2)$

Answers:

(M) $4a^3 - 8a^2 + 10$
(H) $-18a^2 + 2a^3 + 8a^4$
(E) $2a^3b + 8a^2b^2 - 6ab^3$
(I) $2a^3b + 8ab^2 - 4ab$
(A) $a^4b - a^2b^3$
(G) $4a^3 - 8a^2 + 12a$
(W) $-18a^2 + 2a^3 + 6a^5$
(L) $-3a^4b^4 + 6a^3b^3$

(11) $x^2y(2x^2 - 4xy + y^2)$
(12) $-2xy^2(2x^4 - 5x^2y^2 - 3y^4)$
(13) $4x^3y(-x^2y + 2xy - 5xy^2)$
(14) $-x^2y^3(7xy^3 - x^2y^2 + 3x^3y)$
(15) $3x^2y^2(2x^4y^2 - 3x^2y - 1)$

Answers:

(N) $-4x^5y^2 + 10x^3y^4 + 6xy^6$
(S) $2x^4y - 4x^2y^3 + x^2y^4$
(E) $-4x^5y^2 + 8x^4y^2 - 20x^4y^3$
(U) $-4x^5y^2 + 10x^2y^4 - 20x^2y^3$
(Y) $2x^4y - 4x^3y^2 + x^2y^3$
(F) $6x^6y^4 - 9x^4y^3 - 3x^2y^2$
(T) $-7x^3y^6 + x^5y^4 - 3x^3y^4$
(I) $-7x^3y^6 + x^4y^5 - 3x^5y^4$

7	10	1	5	13	4	9	2	11	8	15	3	12	6	14

OBJECTIVE 1–j: To multiply a polynomial by a monomial.

Why Is a Stick of Gum Like a Sneeze?

For each exercise, multiply the two polynomials. Find your answer in the set of answers under the exercise. Cross out the letter above your answer. When you finish, the answer to the title question will remain!

1. $(x + 3)(x + 5)$
2. $(x + 2)(x + 9)$
3. $(x - 8)(x + 1)$
4. $(x - 3)(x - 6)$
5. $(2x + 9)(x - 2)$
6. $(3x + 1)(2x + 4)$
7. $(4a - 7)(3a - 2)$
8. $(2a + 5)(2a - 5)$
9. $(6a - 1)(2a + 4)$
10. $(a + 2b)(4a + b)$
11. $(5a + 3b)(a - 4b)$
12. $(3a - 8b)(2a - b)$
13. $(n + 2)(n^2 + 5n - 3)$
14. $(3n - 1)(2n^2 + 4n + 4)$
15. $(2n + 3)(6n^2 - 2n + 1)$
16. $(4n - 5)(n^2 - 7n - 2)$
17. $(3n - 4)(4n^2 + 2n + 3)$
18. $(n + 8)(6n^2 - n - 4)$

B	E	S	I	A	U	T	N	T	I	S	E	R	A	N	O	T	C	R	I	H	E	A	N	W	D
$x^2 - 7x - 8$	$x^2 + 8x + 15$	$6x^2 + 14x + 4$	$6x^2 + 7x + 4$	$x^2 - 9x + 18$	$x^2 + 11x + 18$	$x^2 - 13x + 18$	$2x^2 + 5x - 18$	$4a^2 + 9ab + 2b^2$	$6a^2 - 19ab + 8b^2$	$5a^2 - 11ab - 12b^2$	$12a^2 + 22a - 4$	$4a^2 - 25$	$4a^2 + 4ab + 3b^2$	$5a^2 - 17ab - 12b^2$	$12a^2 - 29a + 14$	$6n^3 + 47n^2 - 12n - 32$	$6n^3 + 44n^2 - 9n - 32$	$4n^3 - 33n^2 + 27n + 10$	$6n^3 + 10n^2 + 8n - 4$	$n^3 + 6n^2 + 9n - 6$	$12n^3 - 9n^2 - 2n - 12$	$12n^3 - 10n^2 + n - 12$	$n^3 + 7n^2 + 7n - 6$	$4n^3 - 30n^2 + 21n + 10$	$12n^3 + 14n^2 - 4n + 3$

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What Happened When a Ship Carrying Purple Paint Collided With a Ship Carrying Red Paint ?

Solve each problem below. Cross out the box that contains your solution. When you finish, write the letters from the remaining boxes in the squares at the bottom of the page.

(1) $x(x + 3) + 34 = (x + 5)(x + 2)$

(2) $n(n + 4) + 28 = (n - 1)(n + 8)$

(3) $(d + 2)(d + 6) - d(d + 3) = 37$

(4) $(y + 12)(y - 3) - y(y + 5) = 24$

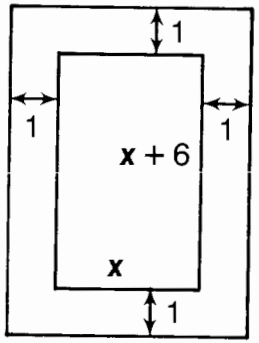
(5) The length of a rectangle is 3 cm greater than the width. If each dimension is increased by 2 cm, the area is increased by 26 cm^2. Find the original dimensions of the rectangle.

(6) The length of a rectangle is 2 cm greater than the width. If the width is increased by 3 cm, and the length is increased by 4 cm, the area is increased by 88 cm^2. Find the original dimensions of the rectangle.

(7) A rectangular garden is 4 m longer than it is wide. If the width is decreased by 1 m, and the length is increased by 5 m, the area is increased by 15 m^2. Find the original dimensions of the garden.

(8) A rectangular swimming pool is 2 m longer than it is wide. If the width is decreased by 3 m, and the length is increased by 4 m, the area remains the same as the original area. Find the original dimensions of the pool.

(9) A rectangular picture is 6 cm longer than it is wide. A frame 1 cm wide is placed around the picture. The area covered by the picture and frame together is 48 cm^2 greater than the area of the picture alone. Find the dimensions of the picture.



THE 4 cm by 7 cm	RED 8 cm by 14 cm	BOT 10 m by 16 m	TOM 12	BAS 15	HCR 9 cm by 11 cm	ASH 18 m by 20 m	EWS 9 m by 13 m
WER 2 m by 5 m	EDS 10 cm by 12 cm	EMA 15 cm by 17 cm	DES 6	ROO 9	INK 6 m by 10 m	RED 5	NED 11 cm by 17 cm

Where Can You See the World's Biggest Rock Group?

Evaluate each formula below for the given values of the variables. Find each answer at the bottom of the page and cross out the letters above it. When you finish, the answer to the title question will remain.

① $V = hw^2$

where V is the volume of a square prism with a square base of side w and with height h. Find V if

$h = 8$ cm, $w = 6$ cm. _____ cm^3

② $A = \frac{1}{2}h(a + b)$

where A is the area of a trapezoid with height h, and bases of lengths a and b. Find A if

$h = 12$ cm, $a = 24$ cm, $b = 18$ cm. _____ cm^2

③ $V = C\left(1 - \frac{n}{N}\right)$

where V is the value of an asset, depreciated over N years, at the end of n years; C is the original cost of the asset. Find V if

$C = \$800$, $n = 5$ years, $N = 20$ years. $ _____

④ $h = rt - 4.9t^2$

where h is the height in meters that an object will reach in t seconds when it is projected upward with an initial speed of r meters per second. Find h if

$r = 75$ m/sec, $t = 10$ sec. _____ m

⑤ $w = 0.8e^3$

where w is the approximate weight in grams of an ice cube with edges of length e centimeters. Find w if

$e = 5$ cm. _____ g

⑥ $R = \frac{rst}{rs + st + rt}$

where R is the total resistance of three resistances r, s, and t, in parallel. Find R if

$r = 4$ ohms, $s = 10$ ohms, $t = 15$ ohms. _____ ohms

⑦ $V = \frac{1}{3}\pi r^2 h$

where V is the volume of a right circular cone with a base of radius r and with height h. Find V if

$r = 6$ cm, $h = 10$ cm.
Use 3.14 as the value of π. _____ cm^3

GE	MT	TA	OP	RU	ST	IN	SH	MO	FI	VE	RE
260	4.5	288	376.8	112	600	2.4	341.5	275	252	100	628

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What Should You Do If Your Lawn Is Always Dry ?

Solve each formula below for the indicated letter. Circle the letter next to your answer. Write this letter in the box at the bottom of the page that contains the number of that exercise.

$A = \ell w$, for ℓ (O) $\ell = \frac{A}{w}$ (1) (K) $\ell = \frac{w}{A}$	$S = 2\pi rh$, for h (I) $h = \frac{S}{2\pi r}$ (5) (O) $h = \frac{2\pi r}{S}$	$E = mc^2$, for m (K) $m = Ec^2$ (9) (T) $m = \frac{E}{c^2}$	$S = 2B + F$, for B (S) $B = \frac{S - F}{2}$ (13) (N) $B = 2SF$	$T = \frac{rhdg}{2}$, for d (R) $d = \frac{rhg}{2T}$ (17) (L) $d = \frac{2T}{rhg}$
$E = IR$, for R (V) $R = EI$ (2) (I) $R = \frac{E}{I}$	$V = T - F$, for T (R) $T = \frac{F}{V}$ (6) (E) $T = V + F$	$S = \frac{1}{2}at^2$, for a (S) $a = \frac{t^2}{2S}$ (10) (B) $a = \frac{2S}{t^2}$	$A = p + prt$, for t (T) $t = \frac{A - p}{pr}$ (14) (M) $t = \frac{p + r}{Ap}$	$y = mx + b$, for m (K) $m = \frac{y - b}{x}$ (18) (B) $m = \frac{y - x}{b}$
$I = prt$, for r (X) $r = \frac{Ip}{t}$ (3) (U) $r = \frac{I}{pt}$	$A = \frac{1}{2}bh$, for h (F) $h = \frac{2A}{b}$ (7) (T) $h = \frac{Ab}{2}$	$A = \pi r^2$, for r^2 (U) $r^2 = \frac{A}{\pi}$ (11) (E) $r^2 = A\pi$	$p = 2\ell + 2w$, for w (Y) $w = \frac{p - 2\ell}{2}$ (15) (P) $w = \frac{p + \ell}{2}$	$F = \frac{9}{5}C + 32$, for C (N) $C = \frac{5}{9}F + 32$ (19) (R) $C = \frac{5}{9}(F - 32)$
$V = \ell wh$, for ℓ (A) $\ell = \frac{Vw}{h}$ (4) (E) $\ell = \frac{V}{wh}$	$V = \frac{1}{3}Bh$, for B (A) $B = \frac{3V}{h}$ (8) (I) $B = 3Vh$	$E = \frac{1}{2}mv^2$, for v^2 (Y) $v^2 = \frac{2E}{m}$ (12) (G) $v^2 = \frac{2m}{E}$	$V = \frac{1}{3}\pi r^2 h$, for h (T) $h = \frac{3r^2}{\pi V}$ (16) (W) $h = \frac{3V}{\pi r^2}$	$V = \frac{4}{3}\pi r^3$, for r^3 (N) $r^3 = \frac{4V\pi}{3}$ (20) (D) $r^3 = \frac{3V}{4\pi}$

10	3	12	8	20	6	16	5	9	15	1	11	19	13	4	17	7	18	2	14

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✱How Did the Doe Win the Big Animal Race?✱

Solve each problem below. Cross out the box that contains your answer. When you finish, write the letters from the remaining boxes in the squares at the bottom of the page.

1. Mr. Merrill has 3 times as many nickels as dimes. The coins have a total value of $1.50. How many of each coin does he have? _____ nickels, _____ dimes

2. Ms. Lynch has 21 coins in nickels and dimes. Their total value is $1.65. How many of each coin does she have? _____ nickels, _____ dimes

3. A vending machine that takes only dimes and quarters contains 30 coins, with a total value of $4.20. How many of each coin are there? _____ dimes, _____ quarters

4. The total value of the $1 bills and $5 bills in a cash box is $124. There are 8 more $5 bills than $1 bills. How many of each are there? _____ $1 bills, _____ $5 bills

5. A collection of nickels and quarters amounts to $2.60. There are 16 coins in all. How many of each coin are there? _____ nickels, _____ quarters

6. Joe Lick bought some 20-cent and 25-cent stamps. He bought 32 stamps in all, and paid $7.40 for them. How many stamps of each kind did he buy? _____ 20-cent, _____ 25-cent

7. For a school play, 340 tickets valued at $810 were sold. Some cost $2 and some cost $3. How many tickets of each kind were sold? _____ $2 tickets, _____ $3 tickets

8. Romeo bought a mixture of 20-cent, 35-cent, and 50-cent valentines. The number of 20-cent valentines was 1 more than twice the number of 35-cent valentines, and the number of 50-cent valentines was 2 less than the number of 35-cent ones. If he spent $4.20 all together, how many valentines of each kind did he buy?
_____ 20-cent,
_____ 35-cent,
_____ 50-cent

IT	SH	ER	EW	EP	ON	AN	AS
22, 8	6, 10	7, 9	9, 4, 2	13, 6, 4	18, 6	14, 22	240, 100
SE	DT	EN	HE	BU	KI	CK	LL
19, 11	13, 21	210, 130	8, 13	200, 140	12, 20	11, 21	9, 12

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What Kind of Car Does a Rich Baker Drive ?

Solve each problem below. Cross out the box that contains your answer. When you finish, write the letters from the remaining boxes in the squares at the bottom of the page.

1. Harry and Kerry started from the same point at the same time. They traveled in opposite directions on their bicycles. Harry traveled at the rate of 9 km/h, and Kerry traveled at 11 km/h. After how many hours were they 60 km apart?

2. Two trains leave Trackville at the same time. One travels north at 90 km/h. The other travels south at 110 km/h. After how many hours will the trains be 900 km apart?

3. Two steamships sailing in opposite directions pass each other. One ship is sailing at 32 knots (nautical miles per hour). The other ship is sailing at 28 knots. After how many hours will the ships be 150 nautical miles apart?

4. Two jets are traveling toward each other and are 3400 km apart. One jet is flying at 875 km/h. The other jet is flying at 825 km/h. In how many hours will the jets pass each other?

5. A train left Podunk and traveled west at 70 km/h. Two hours later, another train left Podunk and traveled east at 90 km/h. How many hours had the first train traveled when they were 1420 km apart?

6. A train left Podunk and traveled north at 75 km/h. Two hours later, another train left Podunk and traveled in the same direction at 100 km/h. How many hours had the first train traveled when the second train overtook it?

7. Joe Spout left a campsite on a trip down the river in a canoe, traveling at 6 km/h. Four hours later, Joe's father set out after him in a motorboat. The motorboat traveled at 30 km/h. How long after Joe's father started did he overtake the canoe?

8. In Exercise 7, how far had Joe traveled down the river when his father overtook him?

AB	AN	IG	ON	IT	OP	IO
30 km	44 km	8 h	$5\frac{1}{3}$ h	2 h	3 h	14 h
NR	BR	OL	WH	EE	LS	AD
$7\frac{1}{2}$ h	1 h	13 h	$4\frac{1}{2}$ h	10 h	22 km	$2\frac{1}{2}$ h

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What Do the Fans Sing at University of California Football Games?

Solve each problem below and find your solution at the bottom of the page. Write the letter of that exercise above the solution.

(A) Two trucks left Buck's Trucks traveling in opposite directions. One truck traveled at a rate of 70 km/h, the other at 80 km/h. After how many hours were the trucks 900 km apart?

(O) A truck left Huck's Trucks and traveled north at 80 km/h. One hour later, another truck left Huck's Trucks and traveled south at 60 km/h. How many hours had the first truck traveled when they were 150 km apart?

(N) Steve McSpoke left home on his bicycle at 8:00 A.M., traveling at 18 km/h. At 10:00 A.M., Steve's brother set out after him on a motorcycle, following the same route. The motorcycle traveled at 54 km/h. How long had Steve traveled when his brother overtook him?

(C) In Exercise N, how far had Steve traveled when his brother overtook him?

(A) Dr. Pepper left Oakville at 9:00 A.M. and drove to Central City at 60 km/h. H. Salt left Oakville at 11:00 A.M. and traveled the same route to Central City. If both men arrived in Central City at 4:00 P.M., at what rate did H. Salt travel?

(Y) Two jets are traveling toward each other and are 4000 km apart. The rate of one jet is 100 km/h faster than the rate of the other. If the jets pass each other after 2.5 hours, what is the rate of the faster jet?

(S) Ms. Driva Reck drove from her home to a service station at 48 km/h. She returned home by bicycle at 16 km/h. The entire trip took 4 hours. How far was the service station from Ms. Reck's home?

(U) A plane on a search mission flew east from an airport, turned, and flew west back to the airport. The plane cruised at 300 km/h when flying east, and 400 km/h when flying west. The plane was in the air for 7 hours. How far from the airport did the plane travel?

(C) A motorboat can travel upstream on a river at 18 km/h and downstream at 30 km/h. How far upstream can the boat travel if it leaves at 8:00 A.M. and must return by noon?

1.5 h	74 km	48 km	6 h	850 km/h	4.5 h	45 km	84 km/h	3 h	610 km/h	1200 km	54 km

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Why Are Babies Like Hinges ?

Simplify each expression below and find your answer in the set of answers to the right of that exercise. Write the letter of your answer in the box that contains the number of that exercise.

(1) $\frac{n^9}{n^5}$	(3) $\frac{2n^4}{n}$	(A) $2n^6$	(E) $2n^3$
(2) $\frac{n^{12}}{n^3}$	(4) $\frac{6n^2}{3n^5}$	(H) n^9	(T) n^4
		(R) $\frac{2}{n^6}$	(Y) $\frac{2}{n^3}$

(5) $\frac{x^3y^4}{x^2y}$	(7) $\frac{8xy^2}{12x^3y^5}$	(R) $-4x^3$	(A) xy^3
(6) $\frac{-8x^6y^2}{2x^3y^2}$	(8) $\frac{20x^3y^8}{-5x^3y}$	(S) $-4y^4$	(T) $-4y^7$
		(E) $\frac{2}{3x^2y^3}$	(U) $\frac{2}{3xy^4}$

(9) $\frac{3a^5b^2}{9a^2b^5}$	(11) $\frac{-24a^2b}{18ab^5}$	(I) $5ab^8$	(A) $15a^2$
(10) $\frac{-15a^2b^9}{-3ab}$	(12) $\frac{30a^9b^2}{2a^6b^2}$	(L) $5ab^6$	(G) $15a^3$
		(N) $-\frac{4a}{3b^4}$	(H) $\frac{a^3}{3b^3}$

(13) $\frac{8u^4v^{10}}{-2u^2v^8}$	(15) $\frac{-7u^2v^6}{uv^3}$	(B) $-7uv^5$	(S) $-4u^2v^2$
(14) $\frac{13u^7v^7}{26u^7v}$	(16) $\frac{-9u^8v^2}{-6u^2v^6}$	(O) $-7uv^3$	(E) $-4u^7v^2$
		(T) $\frac{v^6}{2}$	(A) $\frac{3u^6}{2v^4}$

(17) $\frac{14k^9m^3}{2km^3}$	(19) $\frac{-3k^5m^6}{k^4m^3}$	(E) $-3k$	(L) $7k^6m$
(18) $\frac{4k^2m^2}{16k^5m^3}$	(20) $\frac{12km^3}{-4m^3}$	(D) $7k^8$	(R) $-3km^3$
		(O) $\frac{1}{4k^3m}$	(N) $\frac{1}{4km^2}$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

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What Did the Carpenters Call Their Bass Quartet?

Simplify each expression. Assume that no divisor equals zero. Find your answer in the set of answers under the exercise and cross out the box above it. When you finish, the answer to the title question will remain.

① $\dfrac{6x+9}{3}$

② $\dfrac{18x^2-50}{2}$

③ $\dfrac{12x^2+20x}{4x}$

④ $\dfrac{20x^3+5x^2}{5x}$

⑤ $\dfrac{2x^3-7x^2}{x^2}$

⑥ $\dfrac{12v^5-27v^4}{3v^2}$

⑦ $\dfrac{30u^4-6u}{-6u}$

⑧ $\dfrac{u^2v+uv^2}{uv}$

⑨ $\dfrac{8uv^4-14u^2v^3}{2uv}$

⑩ $\dfrac{-10u^3v^2+5u^2v^5}{-5u^2v}$

⑪ $\dfrac{8a^3+4a^2-24a}{4a}$

⑫ $\dfrac{21ab^3+14a^2b+35a^4}{7a}$

⑬ $\dfrac{2a^3b-6a^2b^2+16ab^3}{-2ab}$

⑭ $\dfrac{45a^2b^4-60a^3b^2-15a^2b}{15a^2b}$

⑮ $\dfrac{15a^5b^4+3a^4b^5-6a^3b^6}{3a^2b^3}$

A	4	T	O	S	H	2	N	E	B	8	T	A	L	U	R	O	B	E	A	S	4	N
$2x-7$	$3x+5$	$4x^2+5$	$2x+3$	$4x^2+x$	$3x-25$	$9x^2-25$	$4v^3-7uv^2$	$2uv-5v$	$4v^3-9v^2$	$u+v$	$4v^3+2v$	$2uv-v^4$	$-5u^3+1$	$2a^2-a-1$	$3b^3-4ab-1$	$3b^3+2ab+5a^3$	$-a^2-4ab+1$	$2a^2+a-6$	$3b^3-3ab-8b^2$	$5a^3b+a^2b^2-2ab^3$	$5a^3b+a^2b^3-4ab^2$	$-a^2+3ab-8b^2$

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Why Was the Engineer Driving the Train Backwards?

Find the missing factor in each exercise below. Find your answer in the set of answers to the right of that exercise. Write the letter next to your answer in the box containing the number of that exercise.

---

(1)	$x^8 = (x^5)(\_\_\_\_)$	(T)	$4x^5$	(N)	x^6
(2)	$24x^5 = (6x^2)(\_\_\_\_)$	(A)	$-5x^5$	(O)	$4x^3$
(3)	$-12x^4 = (3x^3)(\_\_\_\_)$	(H)	x^3	(R)	$-4x^8$
(4)	$20x^7 = (-4x^2)(\_\_\_\_)$	(E)	$-5x^3$	(I)	$-4x$

---

(5)	$a^5b^8 = (a^2b^3)(\_\_\_\_)$	(P)	a^2b^2	(E)	a^3b^5
(6)	$4a^2b^6 = (2ab^2)(\_\_\_\_)$	(V)	$5a^3b^3$	(A)	$-12a^2b^4$
(7)	$-15a^7b^4 = (-3a^4b)(\_\_\_\_)$	(L)	$2ab^7$	(H)	$-12a^5b$
(8)	$72a^{10}b^3 = (-6a^5b^2)(\_\_\_\_)$	(O)	$2ab^4$	(K)	$5a^5b^3$

---

(9)	$x^5y^3 = (x^2)(\_\_\_\_)$	(V)	$-3y^4$	(O)	$3x^2y^6$
(10)	$-6x^2y^7 = (-2y)(\_\_\_\_)$	(L)	$-2x^7$	(T)	$3x^2y^3$
(11)	$14x^9y^6 = (-7x^2y^6)(\_\_\_\_)$	(S)	$-2x^6y$	(A)	x^3y^3
(12)	$27x^4y^3 = (9x^4y)(\_\_\_\_)$	(B)	x^2y^4	(E)	$3y^2$

---

(13)	$-3u^4v^2 = (u^2v)(\_\_\_\_)$	(R)	$-2uv^6$	(R)	$-3u^2v^4$
(14)	$32uv^5 = (-16v^2)(\_\_\_\_)$	(M)	$11v^2$	(C)	$-3u^2v^{11}$
(15)	$121u^2v^3 = (11u^2v)(\_\_\_\_)$	(P)	$11uv^3$	(E)	$3u^2v^6$
(16)	$-6u^3v^{12} = (2uv)(\_\_\_\_)$	(T)	$-3u^2v$	(D)	$-2uv^3$

8	12	1	9	14	4	11	2	16	6	15	10	13	3	7	5

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Why Did Everybody Go to the Boat Show?

Each row across has five boxes. Only two of them contain FACTORS of the given monomial. Circle these two factors in each row. Notice the number and letter above each circled factor. Put the letter in the matching numbered box at the bottom of the page.

1 $8n^4$	14-J	10-H	18-P	15-F	4-C
	$4n^5$	$2n$	$16n$	$-4n^3$	$-8n^8$
2 $6x^2y^3$	2-B	4-A	18-S	8-N	14-O
	$2x^3y$	$-6xy$	$-2y^4$	$12x^2y$	$3x^2y^2$
3 $24a^4b$	5-E	13-V	2-T	18-R	8-L
	$-2ab^2$	$18a^2b$	$-12ab$	a^3b	$8a^8b$
4 $-4u^2v^4$	8-A	1-R	17-L	6-M	5-D
	$2u^2v^4$	$-2u^4v$	$4uv^8$	$12uv$	$-4uv^3$
5 $10pq^5$	9-U	17-B	13-O	12-S	1-I
	$20q$	$5p^2q$	pq^2	$-10pq^7$	$-2pq^3$
6 $-72k^2w^2$	3-D	6-A	17-E	12-L	9-V
	kw^4	$24k^2w^2$	$-8w^2$	$-4k^4$	$32kw$
7 $-30mn^{10}$	3-P	12-T	16-P	9-C	11-E
	$-10m^5$	$30m$	$-3m^2n^2$	$-6mn^5$	$4mn$
8 $9xy^2z^6$	16-F	7-P	16-T	11-S	3-H
	$-3xyz$	$x^2y^2z^2$	$-3yz^{12}$	$3xy^4z$	$9xy^2z^3$
9 $-18a^3bc^3$	11-S	7-W	11-T	10-E	7-Y
	$12abc$	$2ab^2c$	$-abc^3$	$-3a^6bc$	$9bc^2$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

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Where Do Tadpoles in the Pawn Shop Come From ?

Factor each polynomial below as the product of its greatest monomial factor and another polynomial. Find your answer and notice the letter next to it. Write this letter in each box that contains the number of that exercise.

(1) $3x^2 + 18x + 9$
(2) $2x^2 + 10x + 12$
(3) $7x^2 + 14x + 35$
(4) $5x^2 - 20x + 10$
(5) $6x^2 + 9x - 21$

Answers:

(D) $3(2x^2 + 3x - 7)$
(L) $3(2x^2 + 4x - 5)$
(A) $3(x^2 + 6x + 3)$
(P) $5(x^2 - 2x + 5)$
(F) $5(x^2 - 4x + 2)$
(O) $2(x^2 + 5x + 6)$
(B) $7(x^2 + x + 6)$
(E) $7(x^2 + 2x + 5)$

(6) $n^3 + n^2 + n$
(7) $n^4 - n^3 + n^2$
(8) $2n^3 - n^2 - 5n$
(9) $3n^2 + 9n$
(10) $7n^2 - 28n$

Answers:

(S) $n(2n^2 - 2n - 6)$
(O) $n^2(n^2 - n + 1)$
(I) $7n(n + 5)$
(F) $3n(n + 3)$
(E) $n^2(n^2 - 2n + 3)$
(A) $n(n^2 + n + 1)$
(M) $n(2n^2 - n - 5)$
(R) $7n(n - 4)$

(11) $4k^3 - 32k$
(12) $6k^3 + 10k^2$
(13) $5k^3 + 15k^2 + 10k$
(14) $4k^3 - 20k^2 + 4$
(15) $4k^4 + 18k^3 - 6k^2$

Answers:

(P) $4(k^3 - 5k^2 + 1)$
(R) $5k(k^2 + 3k + 2)$
(S) $4(k^3 - 8k^2 + 2)$
(G) $4k(k^2 - 8)$
(L) $5k(k^2 + 4k + 1)$
(W) $2k^2(2k^2 + 9k - 3)$
(T) $2k^2(3k - 9)$
(N) $2k^2(3k + 5)$

4	10	2	8	1	9	13	7	11	14	6	15	12	3	5

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OBJECTIVE 3–e: To factor a polynomial as the product of its greatest monomial factor and another polynomial (polynomials in one variable).

DOUBLE CROSS

1. What do you get when you cross a chicken with a centipede?

___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
5	8	11	14	12	2	14	1	10	13	11	6	7	4	13

2. What do you get when you cross a mink with an octopus?

___	___	___	___	___	___	___	___	___	___	___
12	7	3	12	11	3	9	12	14	10	13

Factor each polynomial below as the product of its greatest monomial factor and another polynomial. Find your answer and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it. Keep working and you will find out what you get from these "double crosses."

(1) $6x^2 + 9x + 27$

(2) $5x^3 + 30x^2 - 15x$

(3) $14x^3 - 7x^2 - 35x$

(4) $25x^3 - 40x^2 + 10x$

(5) $4x^4 + 20x^3 + 12x^2$

(6) $3x^4 + 12x^2 - 33$

(7) $49x^4 - 14x^3 - 28x$

Answers:

(E) $4x^2(x^2 + 5x + 3)$

(L) $3(x^4 + 6x^2 + 11)$

(O) $7x(2x^2 - x - 5)$

(U) $3(2x^2 + 3x + 9)$

(C) $7x(7x^3 - 2x^2 - 4)$

(K) $5x(5x^2 - 8x + 2)$

(B) $7x(7x^3 + 2x^2 - 3)$

(D) $5x(x^2 + 6x - 3)$

(I) $3(x^4 + 4x^2 - 11)$

(8) $2a^2 + 12ab + 6b^2$

(9) $6a^3 - 18ab$

(10) $3a^2b^2 + 15ab^3$

(11) $8a^4b^4 - 28a^3b^3 + 4a^2b^2$

(12) $6a^4b - 10a^3b^2 - 6a^2b^3$

(13) $7ab^5 - 56ab$

(14) $24ab^4 + 12ab^3 - 18ab^2$

Answers:

(H) $6ab^2(4b^2 - 3b - 2)$

(X) $2(a^2 + 6ab + 3b^2)$

(S) $7ab(b^4 - 8)$

(M) $3ab^2(a + 5b)$

(R) $6ab^2(4b^2 + 2b - 3)$

(N) $4a^2b^2(2a^2b^2 - 9ab + 2)$

(A) $2a^2b(3a^2 - 5ab - 3b^2)$

(F) $6a(a^2 - 3b)$

(T) $4a^2b^2(2a^2b^2 - 7ab + 1)$

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What Did They Say About the Man Who Drank Shellac?

Do each exercise below and find your answer in the set of answers to the right of that exercise. Write the letter of your answer in the box containing the number of that exercise.

(1) $(x + 4)(x + 2)$
(2) $(x + 7)(x + 1)$
(3) $(x - 6)(x - 3)$
(4) $(x + 8)(x - 2)$
(5) $(x - 7)(x + 4)$
(6) $(x - 2)(x - 9)$

(H) $x^2 - 9x + 18$
(A) $x^2 - 11x + 18$
(S) $x^2 - 5x - 28$
(H) $x^2 + 6x + 8$
(A) $x^2 + 6x - 16$

(N) $x^2 + 4x + 7$
(E) $x^2 + 8x + 7$
(D) $x^2 - 3x - 28$
(R) $x^2 - 2x + 18$
(L) $x^2 + 3x - 16$

(7) $(2u + 4)(u + 1)$
(8) $(3u + 7)(u - 3)$
(9) $(4u - 2)(5u - 1)$
(10) $(2u + 1)(9u - 5)$
(11) $(7u - 4)(3u + 6)$
(12) $(5u - 8)(4u - 4)$

(L) $21u^2 + 30u - 24$
(V) $20u^2 - 14u + 2$
(U) $3u^2 + u - 21$
(O) $3u^2 - 2u - 21$
(T) $18u^2 + 2u - 5$

(L) $2u^2 + 6u + 4$
(S) $21u^2 + 23u - 24$
(Y) $20u^2 - 52u + 32$
(E) $18u^2 - u - 5$
(N) $20u^2 - 41u + 32$

(13) $(2x + y)(x + 3y)$
(14) $(3x - y)(8x - y)$
(15) $(2x + y)(4x - 3y)$
(16) $(5x - 2y)(3x + 4y)$
(17) $(7x + 3y)(x + 2y)$
(18) $(6x + 6y)(2x - 4y)$

(E) $8x^2 + xy - 3y^2$
(N) $8x^2 - 2xy - 3y^2$
(F) $2x^2 + 7xy + 3y^2$
(R) $7x^2 + 8xy + 6y^2$
(I) $24x^2 - 11xy + y^2$

(T) $12x^2 - 9xy - 24y^2$
(H) $12x^2 - 12xy - 24y^2$
(A) $15x^2 + 9xy - 8y^2$
(S) $7x^2 + 17xy + 6y^2$
(I) $15x^2 + 14xy - 8y^2$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

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What Did the Girl Melon Say When the Boy Melon Proposed Marriage?

Circle the number-letter pair next to each TRUE statement below. Write the letter in the matching numbered box at the bottom of the page. (Hint: You should circle eight number-letter pairs in each column.)

3-S	$(x + 5)(x + 2) = x^2 + 7x + 10$
9-A	$(t - 7)(t - 1) = t^2 - 8t + 7$
6-L	$(n - 9)(n - 3) = n^2 - 6n + 27$
16-E	$(u - 3)(u + 6) = u^2 + 3u - 18$
6-T	$(a + 9)(a - 8) = a^2 + a - 72$
7-R	$(x + 4)(x - 10) = x^2 - 14x - 40$
14-O	$(3m + 1)(m + 5) = 3m^2 + 16m + 5$
5-N	$(8d + 3)(2d + 1) = 16d^2 + 14d + 4$
7-I	$(2k - 4)(3k - 2) = 6k^2 - 16k + 8$
12-E	$(x + 8)(2x - 6) = 2x^2 + 10x - 48$
2-A	$(4n - 2)(n + 5) = 4n^2 + 22n - 10$
1-Y	$(3v - 2)(5v + 4) = 15v^2 + 2v - 8$
11-I	$(2y + 9)(3y - 1) = 5y^2 + 25y - 9$

5-U	$(2w - 6)(5w + 4) = 10w^2 - 22w - 24$
8-D	$(8x - 1)(4x + 3) = 32x^2 + 24x - 3$
11-T	$(3x + 2)(3x - 2) = 9x^2 - 4$
4-B	$(a + b)(2a + b) = 2a^2 + 3ab + b^2$
15-A	$(2c + 6d)(c - d) = 2c^2 + 8cd - 6d^2$
2-E	$(4x - y)(3x + 2y) = 12x^2 + 5xy - 2y^2$
8-C	$(2u - 5v)(2u - 8v) = 4u^2 - 26uv + 40v^2$
10-P	$(9a + b)(2a + 5b) = 18a^2 + 47ab - 5b^2$
13-R	$(2a - 2b)(a + 10b) = 2a^2 - 8ab - 20b^2$
15-P	$(7m + n)(m - 3n) = 7m^2 - 20mn - 3n^2$
10-N	$(x^2 - 4)(x^2 - 9) = x^4 - 13x^2 + 36$
3-D	$(k^2 - 6)(k^2 + 3) = k^4 - 9k^2 - 18$
13-L	$(x^2 + 2y)(x^2 - 2y) = x^4 - 4y^2$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

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Why Didn't Klutz Do Any Homework on Saturday?

Either multiply or factor, as directed, and find your answer in the adjacent answer column. Write the letter of that exercise in the box that contains the number of the answer.

Multiply:

(I)	$(a + 5)(a - 5)$	(4)	$16a^2 - b^2$
(D)	$(2 + 3a)(2 - 3a)$	(13)	$49a^2 - 1$
(E)	$(7a - 1)(7a + 1)$	(6)	$a^2 - 25$
(N)	$(a^2 - 6)(a^2 + 6)$	(17)	$4a^4 - 25b^2$
(A)	$(4a + b)(4a - b)$	(15)	$4 - 9a^2$
(O)	$(2a^2 - 5b)(2a^2 + 5b)$	(12)	$4a^4 - 36$
		(24)	$a^4 - 36$

Factor:

(S)	$x^2 - y^2$	(3)	$(9x + 10y)(9x - 10y)$
(I)	$4x^2 - 49y^2$	(5)	$(x + y)(x - y)$
(W)	$81x^2 - 100y^2$	(7)	$(x^2 + 20)(x^2 - 20)$
(E)	$36x^2 - 121y^2$	(11)	$(6x + 11y)(6x - 11y)$
(O)	$9x^2 - 64y^2$	(16)	$(3x + 7y)(3x - 7y)$
(N)	$x^4 - 400$	(22)	$(2x + 7y)(2x - 7y)$
		(23)	$(3x + 8y)(3x - 8y)$

Factor:

(E)	$n^2 - 49$	(1)	$(2n + 3)(2n - 3)$
(A)	$n^2 - 1$	(10)	$(12 + 5n)(12 - 5n)$
(N)	$81 - n^2$	(8)	$(n + 1)(n - 1)$
(H)	$4n^2 - 9$	(5)	$(7n + 3)(7n - 3)$
(I)	$49n^2 - 16$	(2)	$(n + 7)(n - 7)$
(E)	$144 - 25n^2$	(18)	$(9 + n)(9 - n)$
		(20)	$(7n + 4)(7n - 4)$

Factor:

(T)	$a^6 - b^4$	(19)	$(4 + a^2b^3)(4 - a^2b^3)$
(C)	$25a^8 - 9b^4$	(14)	$(2a^8 + 15)(2a^8 - 15)$
(W)	$a^2b^2 - 36$	(21)	$(a^3 + b^2)(a^3 - b^2)$
(D)	$16 - a^4b^6$	(12)	$(ab^2 + c^4)(ab^2 - c^4)$
(K)	$a^2b^4 - c^8$	(9)	$(ab + 6)(ab - 6)$
(N)	$4a^{16} - 225$	(16)	$(5a^4 + 3b^2)(5a^4 - 3b^2)$
		(10)	$(4 + ab^4)(4 - ab^4)$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

OBJECTIVE 3–h: To simplify products of the form $(a + b)(a - b)$; to factor differences of squares.

Why Did King Kong Eat a Truck?

Circle the appropriate number-letter pairs in each column. Write the letter in the matching numbered box at the bottom of the page. (Hint: You should circle 11 number-letter pairs in each column.)

Circle the number-letter of each TRUE STATEMENT:

8-S	$(x + 2)^2 = x^2 + 4x + 4$
13-E	$(a - 5)^2 = a^2 - 10a + 25$
10-A	$(u + 8)^2 = u^2 + 16u + 64$
2-H	$(m - 4)^2 = m^2 - 16m + 16$
18-G	$(3x + 1)^2 = 9x^2 + 6x + 1$
14-D	$(5t - 2)^2 = 25t^2 - 20t + 4$
4-P	$(2b + 3)^2 = 4b^2 + 12b + 6$
20-A	$(2n + 7)^2 = 4n^2 + 28n + 49$
2-E	$(10d - 4)^2 = 100d^2 - 80d + 16$
5-K	$(8x - 1)^2 = 16x^2 - 16x + 1$
7-R	$(4w + 5)^2 = 16w^2 + 20w + 25$
4-L	$(x^2 - 3)^2 = x^4 - 6x^2 + 9$
11-T	$(k^2 + 9)^2 = k^4 - 18k^2 + 81$
5-W	$(2a + b)^2 = 4a^2 + 4ab + b^2$
15-A	$(3u - 2v)^2 = 9u^2 - 12uv + 4v^2$
6-E	$(8a + b)^2 = 64a^2 + 8ab + b^2$
1-H	$(c^2 - 6d^2)^2 = c^4 - 12c^2d^2 + 36d^4$
21-I	$(2xy - 5)^2 = 4x^2y^2 - 20xy + 10$

Circle the number-letter of each TRINOMIAL SQUARE:

6-A	$n^2 + 6n + 9$
11-N	$x^2 - 14x + 49$
3-R	$a^2 + 2a + 4$
7-Y	$c^2 + 2c + 1$
12-B	$k^2 - 5k + 25$
21-C	$x^2 - 12x + 36$
3-A	$4t^2 + 12t + 9$
12-T	$81x^2 - 18x + 1$
17-L	$4m^2 + 8m + 16$
16-B	$9w^2 - 24w + 16$
9-F	$25t^2 - 45t + 9$
22-D	$4x^4 + 8x^2 + 1$
9-W	$a^2 + 2ab + b^2$
22-K	$4m^2 + 20mn + 25n^2$
19-L	$9a^2 - 27ab + 9b^2$
17-I	$100u^2 - 60uv + 9v^2$
8-E	$100a^2 + 20ab + 4b^2$
19-M	$9x^4 + 6x^2y^2 + y^4$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

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What Happens If the Jolly Green Giant Steps on Your House?

For exercises in the first column, express each square as a trinomial. For the remaining exercises, factor each trinomial as the square of a binomial, if possible. (If this is not possible, the correct answer is "not possible.") Find your answer below. Write the letter of the exercise in the box containing the number of its answer.

Express as a trinomial:

(E) $(u + 3)^2$

(O) $(u - 8)^2$

(S) $(2u + 5)^2$

(L) $(1 - 4u)^2$

(T) $(u + 2v)^2$

(U) $(7u - 3v)^2$

(O) $(uv + 6)^2$

Answers:

(13) $4u^2 + 20u + 25$

(3) $4u^2 + 16u + 25$

(9) $u^2 + 6u + 9$

(10) $u^2 + 4uv + 4v^2$

(14) $49u^2 - 31uv + 9v^2$

(6) $1 - 8u + 16u^2$

(2) $u^2 - 16u + 64$

(18) $u^2v^2 + 12uv + 36$

(5) $u^2 + 7uv + 4v^2$

(12) $49u^2 - 42uv + 9v^2$

Factor:

(E) $t^2 + 4t + 4$

(U) $t^2 - 12t + 36$

(L) $t^2 - 18t + 81$

(Y) $25 + 10t + t^2$

(W) $4t^2 + 20t + 25$

(S) $9t^2 - 12t + 4$

(I) $t^2 + 10t + 20$

Answers:

(5) not possible

(7) $(t - 9)^2$

(19) $(t - 12)^2$

(4) $(2t + 5)^2$

(15) $(t + 2)^2$

(21) $(3t - 2)^2$

(16) $(2t - 9)^2$

(3) $(t - 6)^2$

(1) $(5 + t)^2$

(8) $(3t - 5)^2$

Factor:

(D) $49a^2 + 14a + 1$

(O) $16a^2 - 24a + 9$

(G) $a^2 - 8a + 64$

(M) $a^2 + 2ab + b^2$

(H) $a^2 + 10ab + 25b^2$

(R) $4a^2 - 12ab + 9b^2$

(M) $100a^2 - 20ab + b^2$

Answers:

(8) not possible

(11) $(10a - 3b)^2$

(16) $(7a + 1)^2$

(11) $(10a - b)^2$

(20) $(a + b)^2$

(17) $(2a - 3b)^2$

(19) $(4a - 3)^2$

(20) $(a + 3b)^2$

(14) $(a + 5b)^2$

(19) $(4a - 8)^2$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

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Why Does Gyro Never, Never, Ever Bet on Even Numbers?

Factor completely each polynomial below. Find your answer and notice the two letters next to it. Write these letters in the two boxes at the bottom of the page that contain the number of that exercise.

(1) $3x^2 - 75$	(LO) $5(x-4)^2$	(SF) $5(x+3)^2$
(2) $5x^2 + 30x + 45$	(EL) $2(x-12)^2$	(NT) $2(x-6)^2$
(3) $x^3 - 49x$	(HE) $3(x+5)(x-5)$	(CH) $3(x+2)(x-2)$
(4) $2x^2 - 24x + 72$	(EA) $x(x+8)(x-8)$	(ST) $x(x+7)(x-7)$
(5) $2k^3 - 8k$	(HI) $5k(k+10)^2$	(HE) $2k(k+2)(k-2)$
(6) $54k^2 - 24$	(EN) $3(k-2)^2$	(LS) $6(3k+1)(3k-1)$
(7) $5k^3 + 100k^2 + 500k$	(SO) $2k(k+4)(k-4)$	(OR) $3(2k-3)^2$
(8) $12k^2 - 36k + 27$	(DS) $6(3k+2)(3k-2)$	(TE) $5k(k+8)^2$
(9) $7a^3b - 7ab^3$	(MI) $7ab(a+2b)^2$	(AT) $2b^2(2a+4)^2$
(10) $32a^2b^2 + 16ab^2 + 2b^2$	(LA) $4ab(a-3b)^2$	(AV) $4ab(a-5b)^2$
(11) $4a^3b - 40a^2b^2 + 100ab^3$	(OD) $a^2b(2ab+1)(2ab-1)$	(MA) $a^2b(ab+2)(ab-2)$
(12) $4a^4b^3 - a^2b$	(WA) $7ab(a+b)(a-b)$	(IN) $2b^2(4a+1)^2$

5	5	9	9	4	4	3	3	1	1	12	12	6	6	10	10	7	7	2	2	11	11	8	8

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ALGEBRA WITH PIZZAZZ!
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A DRASTIC WAY TO DIET

AN EXTREME BUT EFFECTIVE WAY TO DIET IS HIDDEN IN THE LETTERS BELOW.
TO FIND IT:

Factor each trinomial below. Find the factored form in the set of answers under the exercise and cross out the letter above it. When you finish, the diet will remain. You might call it the "Algebra diet."

(1) $m^2 + 8m + 7$	(7) $d^2 - 8d + 15$	(13) $x^2 + 5xy + 4y^2$
(2) $m^2 + 5m + 6$	(8) $d^2 - 12d + 20$	(14) $x^2 - 18xy + 32y^2$
(3) $m^2 + 10m + 9$	(9) $d^2 + 14d + 13$	(15) $x^2 - 13xy + 40y^2$
(4) $m^2 - 6m + 8$	(10) $d^2 - 13d + 36$	(16) $x^2 + 7xy + 12y^2$
(5) $m^2 - 8m + 12$	(11) $d^2 + 17d + 30$	(17) $x^2 - 27xy + 26y^2$
(6) $m^2 + 11m + 24$	(12) $d^2 + 9d + 18$	(18) $x^2 + 19xy + 60y^2$

G	E	B	A	S	U	T	O	Y	F	N	U	L	E	O	M	A	T	O	R	E	G	I	A	N	L	T
$(m-2)(m-4)$	$(m+9)(m+1)$	$(m+8)(m+1)$	$(m-2)(m-6)$	$(m+7)(m+1)$	$(m+3)(m+4)$	$(m+2)(m+3)$	$(m+8)(m+3)$	$(m-2)(m-8)$	$(d+1)(d+13)$	$(d+2)(d+9)$	$(d+2)(d+15)$	$(d-5)(d-3)$	$(d-10)(d-2)$	$(d-2)(d-18)$	$(d-5)(d-4)$	$(d-4)(d-9)$	$(d+6)(d+3)$	$(x-16y)(x-2y)$	$(x+4y)(x+15y)$	$(x+2y)(x+4y)$	$(x+y)(x+4y)$	$(x+4y)(x+3y)$	$(x+20y)(x+3y)$	$(x-5y)(x-8y)$	$(x-2y)(x-13y)$	$(x-26y)(x-y)$

OBJECTIVE 3–I: To factor trinomials of the form $x^2 + bx + c$, where c is positive.

Did You Hear About...

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P ?

Factor each trinomial below. Find the factored form in the answer column nearest the exercise, and notice the word beneath it. Write this word in the box containing the letter of that exercise. Keep working and you will hear about a kitty cat.

(A) $t^2 + 3t - 10$

(B) $t^2 + 4t - 21$

(C) $t^2 + 5t - 6$

(D) $t^2 - 2t - 8$

(E) $t^2 - 10t - 11$

(F) $t^2 + 4t - 12$

(G) $t^2 - 8t - 20$

(H) $t^2 - t - 72$

(I) $x^2 + 3x - 18$

(J) $x^2 - 17x - 18$

(K) $x^2 + 5x - 24$

(L) $x^2 - 10x - 24$

(M) $x^2 + 2xy - 15y^2$

(N) $x^2 - 5xy - 50y^2$

(O) $x^2 - 9xy - 36y^2$

(P) $x^2 + 5xy - 36y^2$

$(t + 3)(t - 2)$	STARTED
$(t + 6)(t - 1)$	WHO
$(t + 6)(t - 2)$	RED
$(t + 5)(t - 2)$	THE
$(t - 9)(t + 8)$	BECAUSE
$(t - 4)(t + 2)$	JOINED
$(t - 4)(t + 5)$	ARMY
$(t - 10)(t + 2)$	CROSS
$(t + 7)(t - 3)$	CAT
$(t + 4)(t - 3)$	AFTER
$(t - 11)(t + 1)$	THE

$(x - 18)(x + 1)$	WANTED
$(x + 9y)(x - 4y)$	KIT
$(x - 18y)(x + 2y)$	BAND
$(x - 12y)(x + 3y)$	AID
$(x + 5y)(x - 3y)$	A
$(x + 8)(x - 3)$	TO
$(x + 6)(x - 4)$	HELP
$(x + 6)(x - 3)$	IT
$(x - 25y)(x + 2y)$	LION
$(x - 12)(x + 2)$	BE
$(x - 10y)(x + 5y)$	FIRST

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When Is a Wrestler "King of the Ring"?

Factor each trinomial below. Find your answer and notice the letter next to it. Write this letter in the box containing the number of that exercise. Keep working and you will get the gripping answer to the title question.

(1) $n^2 + 6n + 5$
(2) $n^2 + 7n + 10$
(3) $n^2 - 7n + 12$
(4) $n^2 - 11n + 28$
(5) $n^2 + 2n - 15$
(6) $n^2 - 5n - 24$
(7) $n^2 + n - 56$

Answers:

(L) $(n + 2)(n + 6)$
(H) $(n + 5)(n - 3)$
(W) $(n + 5)(n + 1)$
(E) $(n - 3)(n - 4)$
(B) $(n - 1)(n + 15)$
(S) $(n + 8)(n - 7)$
(H) $(n + 2)(n + 5)$
(E) $(n - 8)(n + 3)$
(R) $(n - 12)(n - 2)$
(N) $(n - 7)(n - 4)$

(8) $t^2 + 10t + 16$
(9) $t^2 - 15t + 50$
(10) $t^2 + 8t - 9$
(11) $t^2 - 7t - 30$
(12) $t^2 - t - 30$
(13) $t^2 + 14t + 48$
(14) $t^2 + 8t - 48$

Answers:

(N) $(t - 6)(t + 5)$
(V) $(t - 25)(t + 2)$
(T) $(t - 5)(t - 10)$
(T) $(t + 6)(t + 8)$
(O) $(t - 10)(t + 3)$
(B) $(t + 15)(t - 2)$
(I) $(t + 8)(t + 2)$
(H) $(t - 4)(t + 12)$
(S) $(t + 9)(t - 1)$
(A) $(t - 24)(t + 2)$

(15) $a^2 + 5ab + 6b^2$
(16) $a^2 - 4ab - 21b^2$
(17) $a^2 + 6ab - 7b^2$
(18) $a^2 - 14ab - 32b^2$
(19) $a^2 - 29ab + 100b^2$
(20) $a^2 + 7ab - 18b^2$
(21) $a^2 + 2ab + b^2$

Answers:

(K) $(a - 8b)(a + 4b)$
(H) $(a + 7b)(a - b)$
(A) $(a - 20b)(a + 5b)$
(E) $(a + 2b)(a + 3b)$
(W) $(a + 9b)(a - 2b)$
(T) $(a - 7b)(a + 3b)$
(O) $(a - 25b)(a - 4b)$
(S) $(a + 6b)(a + 3b)$
(N) $(a + b)(a + b)$
(R) $(a - 16b)(a + 2b)$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

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What Happened When the Boarding House Blew Up?

Factor each trinomial below. Find one of the factors in **each** column of binomials. Notice the letter next to one factor and the number next to the other. Write the letter in the box at the bottom of the page that contains the matching number.

(1) $3x^2 + 7x + 2$
(2) $2x^2 + 5x + 3$
(3) $3x^2 - 16x + 5$
(4) $7x^2 - 9x + 2$
(5) $6u^2 + 5u + 1$
(6) $8u^2 - 9u + 1$
(7) $10u^2 + 17u + 3$
(8) $9u^2 - 9u + 2$
(9) $5u^2 + 11u + 6$

(5) $(5u + 3)$
(3) $(x - 1)$
(8) $(3x + 1)$
(14) $(3u - 1)$
(6) $(2u + 3)$
(15) $(x + 1)$
(9) $(5u + 6)$
(7) $(2u + 1)$
(11) $(3x - 1)$
(17) $(u - 1)$

(Y) $(3u - 2)$
(E) $(x - 5)$
(G) $(8u - 1)$
(O) $(7x - 2)$
(R) $(5u + 1)$
(W) $(x + 2)$
(L) $(7x + 2)$
(I) $(2x + 3)$
(E) $(u + 1)$
(S) $(3u + 1)$

(10) $3n^2 + 2n - 1$
(11) $5n^2 - 4n - 1$
(12) $2n^2 + 5n - 3$
(13) $7n^2 - 13n - 2$
(14) $3t^2 + 14t - 5$
(15) $4t^2 - 11t + 7$
(16) $6t^2 + 5t - 1$
(17) $3t^2 - 20t - 7$

(12) $(3t - 1)$
(5) $(n - 1)$
(4) $(3t + 1)$
(10) $(n - 2)$
(13) $(t + 1)$
(2) $(3n - 1)$
(16) $(2n - 1)$
(4) $(3t - 7)$
(1) $(4t - 7)$

(N) $(n + 3)$
(R) $(t - 1)$
(P) $(2t + 1)$
(O) $(n + 1)$
(F) $(t + 5)$
(E) $(5n + 1)$
(M) $(t - 7)$
(R) $(7n + 1)$
(L) $(6t - 1)$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

OBJECTIVE 3–o: To factor trinomials of the form $ax^2 + bx + c$, where a is a positive integer greater than 1.

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WHAT DID MRS. ZLING SAY WHEN MR. ZLING SAID HE WAS GOING MOUNTAIN CLIMBING IN THE HIMALAYAS?

Factor each trinomial below. Find both factors in the rectangle below and cross out each box containing a factor. You will cross out **two** boxes for each exercise. When you finish, print the letters from the remaining boxes in the squares at the bottom of the page.

(1) $6x^2 + 19x + 3$

(2) $5x^2 - 9x - 2$

(3) $9x^2 + 15x + 4$

(4) $7x^2 + x - 8$

(5) $2x^2 - 21x + 40$

(6) $15m^2 + 19m + 6$

(7) $8m^2 - 5m - 3$

(8) $4m^2 - 17m + 18$

(9) $14m^2 + 17m - 22$

(10) $3m^2 - m - 30$

TH $(4m - 9)$	**AT** $(3x + 1)$	**PA** $(m - 2)$	**DO** $(m - 3)$	**NE** $(2x - 5)$	**XT** $(3m - 10)$	**CK** $(14m - 11)$	**YO** $(2m - 3)$	**UR** $(5x + 1)$
UP $(6x + 1)$	**UW** $(15m + 1)$	**IN** $(x + 3)$	**PL** $(m + 2)$	**AN** $(x + 4)$	**DA** $(5m + 3)$	**RE** $(x - 2)$	**MA** $(3m + 2)$	**TT** $(9x + 2)$
CO $(7x + 8)$	**LD** $(3x + 4)$	**IB** $(7x + 2)$	**ER** $(8m + 3)$	**AJ** $(m + 3)$	**ET** $(7m + 2)$	**ON** $(x - 8)$	**HI** $(m - 1)$	**GH** $(x - 1)$

How Can Fishermen Save Gas ?

Factor each polynomial below. Find one of the factors in **each** column of binomials. Notice the letter next to one factor and the number next to the other. Write the letter in the box at the bottom of the page that contains the matching number.

(1) $4n^2 - 49$
(2) $n^2 + 8n + 12$
(3) $n^2 - 9n + 20$
(4) $n^2 + 16n + 64$
(5) $n^2 + 2n - 15$
(6) $3n^2 - 8n + 5$

(3) $(n + 1)$
(11) $(n + 2)$
(2) $(n + 8)$
(9) $(2n + 7)$
(4) $(n + 5)$
(18) $(n - 1)$
(14) $(n - 4)$

(O) $(n - 3)$
(G) $(2n - 7)$
(P) $(n - 5)$
(S) $(3n - 5)$
(Y) $(n + 8)$
(K) $(3n - 1)$
(A) $(n + 6)$

(7) $a^2 + 4a - 21$
(8) $5a^2 + 9a - 2$
(9) $2a^2 + 11a + 15$
(10) $1 - 9a^4$
(11) $a^2 - 11a + 30$
(12) $10a^2 - 3a - 1$

(1) $(a - 5)$
(13) $(a + 7)$
(5) $(5a + 1)$
(7) $(a + 2)$
(15) $(a - 1)$
(8) $(1 - 3a^2)$
(16) $(2a + 5)$

(G) $(2a + 1)$
(B) $(a - 6)$
(P) $(a - 3)$
(O) $(a + 3)$
(I) $(5a - 1)$
(R) $(2a - 1)$
(N) $(1 + 3a^2)$

(13) $8u^2 + 19u + 6$
(14) $25u^2 - 20u + 4$
(15) $3u^2 - 11u - 14$
(16) $u^2 - 4u - 21$
(17) $6u^2 + 17u - 10$
(18) $2u^2 + 5u - 18$

(10) $(u + 3)$
(12) $(2u + 9)$
(17) $(u - 3)$
(3) $(5u - 2)$
(6) $(3u - 14)$
(15) $(u + 2)$
(17) $(3u + 10)$

(M) $(u + 1)$
(B) $(2u + 1)$
(O) $(8u + 3)$
(L) $(2u - 1)$
(C) $(u - 7)$
(R) $(u - 2)$
(F) $(5u - 2)$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

OBJECTIVE 3–p: To factor polynomials using the methods on preceding pages (review).

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What Do You Call a Sore on a Police Officer's Foot ?

Factor completely each polynomial below. Find your answer and notice the letter next to it. Write this letter in the box containing the number of that exercise.

(1) $3x^2 - 15x + 18$

(2) $x^3 + 11x^2 + 10x$

(3) $8x^3 - 18x$

(4) $5x^3 - 40x^2 + 60x$

(5) $4x^2 + 8x - 60$

(6) $2x^3 - 20x^2 - 48x$

Answers:

(I) $5x(x + 3)(x - 4)$

(N) $2x(2x + 3)(2x - 3)$

(L) $2x(x + 6)(x - 4)$

(O) $3(x - 2)(x - 3)$

(C) $4(x + 5)(x - 3)$

(A) $x(x + 5)(x + 3)$

(S) $4(x + 5)(x - 1)$

(E) $x(x + 10)(x + 1)$

(H) $2x(x - 12)(x + 2)$

(O) $5x(x - 2)(x - 6)$

(R) $2x(4x + 9)(x + 1)$

(7) $4m^2 - 18m + 14$

(8) $15m^3 + 24m^2 + 9m$

(9) $15m^2 - 10m - 25$

(10) $50m^3 - 2m$

(11) $3m^2 - 10m + 8$

(12) $60m^3 + 54m^2 - 6m$

Answers:

(O) $3m(5m + 3)(m + 1)$

(S) $5(3m + 1)(m - 5)$

(R) $(3m - 4)(m - 2)$

(F) $2(2m + 1)(m + 7)$

(T) $5(3m - 5)(m + 1)$

(M) $6m(5m - 1)(2m - 1)$

(H) $3m(5m + 2)(m - 1)$

(N) $2(2m - 7)(m - 1)$

(P) $2m(5m + 1)(5m - 1)$

(C) $6m(10m - 1)(m + 1)$

(L) $(3m - 2)(m + 4)$

5	8	11	7	1	3	9	6	2	12	4	10

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OBJECTIVE 3–q: To factor polynomials completely (excludes factoring by grouping).

Old Lawyers Never Die, They Just

14	12	5	4	1	10	4	7	9	2	13	13	4	2	14

Old Skiers Never Die, They Just

8	12	3	12	6	11	10	7	14	14

YOU MAY HAVE HEARD THAT OLD MATH TEACHERS NEVER DIE, THEY JUST REDUCE TO LOWEST TERMS. TO FIND OUT WHAT HAPPENS TO OLD LAWYERS AND SKIERS, FOLLOW THESE DIRECTIONS:

Factor completely each polynomial below. Find your answer in the appropriate answer column and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it.

Answers for 1–7:

(C) $(3x + 5)(x - 2)$

(I) $5x(2x - 7)(x + 1)$

(T) $2(x + 2)(x + 9)$

(Y) $a(x + 6)(x + 2)$

(S) $x^2(x + 10)(x - 2)$

(D) $2x(3x + 7)(3x - 7)$

(M) $x^2(x + 4)(x - 5)$

(B) $2(x + 3)(x + 6)$

(A) $5x(x - 4)(x + 2)$

(F) $2x(9x - 7)(x + 7)$

(W) $(3x + 10)(x + 1)$

(K) $5x(2x - 1)(x + 7)$

(E) $a(x - 3)(x - 4)$

(1) $2x^2 + 22x + 36$

(2) $5x^3 - 10x^2 - 40x$

(3) $18x^3 - 98x$

(4) $ax^2 - 7ax + 12a$

(5) $x^4 + 8x^3 - 20x^2$

(6) $3x^2 + 13x + 10$

(7) $10x^3 - 25x^2 - 35x$

(8) $12u^2 - 28u - 24$

(9) $u^4 - 3u^2 - 4$

(10) $15u^4 + 2u^3 - u^2$

(11) $2u^2v - 18uv + 28v$

(12) $12u^3 + 36u^2 + 27u$

(13) $40u^2 + 15u - 55$

(14) $u^4 - 10u^2 + 9$

Answers for 8–14:

(H) $u^2(5u - 1)(3u + 1)$

(V) $3u(4u + 3)(u + 3)$

(L) $(u + 1)(u - 1)(u + 3)(u - 3)$

(N) $2v(u - 7)(u - 2)$

(K) $4(3u + 6)(u - 1)$

(B) $(u^2 + 9)(u + 1)(u - 2)$

(G) $4(3u + 2)(u - 3)$

(M) $u^2(15u + 1)(u - 1)$

(P) $5(8u + 11)(u - 1)$

(U) $2v(u + 14)(u + 1)$

(R) $(u^2 + 1)(u + 2)(u - 2)$

(F) $5(4u + 11)(2u + 1)$

(O) $3u(2u + 3)^2$

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Did You Hear About...

A	B	C	D	E
F	G	H	I	J
K	L	M	N	???

Factor each expression below. Find your answer in the appropriate answer column and notice the word beneath it. Write this word in the box containing the letter of that exercise. Keep working and you'll hear what's "bruin."

Ⓐ $x(x-2)+3(x-2)$

Ⓑ $a(2a+5)+2(2a+5)$

Ⓒ $n(3n-1)-5(3n-1)$

Ⓓ $2b(r+4)-3(r+4)$

Ⓔ $(x^2+1)k+(x^2+1)4$

Ⓕ $(5c-d)(2c)+(5c-d)(4d)$

Ⓖ $k^2(x+3)-7(x+3)$

Ⓗ $w^2(3w-1)+(3w-1)$

Ⓘ $2d(5-n^2)+(5-n^2)$

Ⓙ $5t^2(t+7)-(t+7)$

Ⓚ $3u^2(u^2+v^2)-v^2(u^2+v^2)$

Ⓛ $(a-2b)3a-(a-2b)5b$

Ⓜ $6h(x^3-4)-(x^3-4)$

Ⓝ $(y^2+3)y^2+3(y^2+3)$

Answers for A–G:

$(2b-3)(r+4)$ HUNTED
$(5c-d)(2c-d)$ WHEN
$(x+3)(x-2)$ THE
$(a+2)(5a-2)$ HE
$(x^2+1)(k+4)$ BEAR
$(k^2-7)(x+3)$ THE
$(a+2)(2a+5)$ MAN
$(k-2)(x+3)$ DEER
$(n-5)(3n-1)$ WHO
$(2b+4)(r-3)$ SHOT
$(5c-d)(2c+4d)$ UNTIL

Answers for H–N:

$(6-h)(x^3-4)$ MISS
$(5t^2-1)(t+7)$ MADE
$(6h-1)(x^3-4)$ ON
$(a-2b)(5a+3b)$ BEAR
$(2d+1)(5-n^2)$ RANGER
$(a-2b)(3a-5b)$ PUT
$(w^2+1)(3w-1)$ FOREST
$(2d-5)(5-n^2)$ SHOOT
$(3u^2-v^2)(u^2+v^2)$ HIM
$(y^2+3)^2$ CLOTHES
$(u^2+3v^2)(u^2+v^2)$ A

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OBJECTIVE 3–r: To factor a polynomial whose terms contain a common binomial factor.

How Did Snidely Spellbinder Write a Four-Letter Word That Begins and Ends With "E"?

Write each expression below in factored form. Find your answer in the set of answers under the exercise and cross out the box above it. When you finish, the answer to the title question will remain.

1. $x^2 + 3x + xk + 3k$
2. $a^2 - 2a + ad - 2d$
3. $uv + 5u + v^2 + 5v$
4. $x^2 - xk + 4x - 4k$
5. $ad + 3a - d^2 - 3d$
6. $y^3 + y^2 + 2y + 2$
7. $m^3 + m^2n + mn^2 + n^3$
8. $u^3 - u^2v + uv^2 - v^3$
9. $t^2 + 2t + 3kt + 6k$
10. $2ab + 14a + b + 7$
11. $m^2 + mn - 3m - 3n$
12. $5x^2y - x^2 + 5y - 1$

B	W	E	A	I	N	T	R	H	4
$(a-d)(d+3)$	$(u+2)(v+5)$	$(x+4)(x-k)$	$(a+d)(a-2)$	$(2y^2+1)(y+1)$	$(x+k)(x+3)$	$(a-d)(d-2)$	$(y^2+2)(y+1)$	$(x+k)(4x+3)$	$(u+v)(v+5)$

L	G	E	T	I	A	S	P	E	N
$(u^2+v^2)(u-v)$	$(x^2+1)(5y-1)$	$(7a+2)(b+7)$	$(t+3k)(t+2)$	$(m^2+n^2)(m+n)$	$(3t-k)(t+2)$	$(m^2-2)(m+n)$	$(2a+1)(b+7)$	$(2x+5)(5y-1)$	$(m-3)(m+n)$

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What Happens to People Who Don't Know Toothpaste From Putty?

Factor completely each polynomial. Find your answer below and notice the letter next to it. Write this letter in each box containing the number of that exercise.

(1) $3x^3 + 21x^2 + 30x$

(2) $x^4 + x^3 - 56x^2$

(3) $x^2 + 5x + xy + 5y$

(4) $36x^3 - 64x$

(5) $x^2 - xd + 7x - 7d$

(6) $35x^2 - 100x - 15$

(7) $xy + 8x - y^2 - 8y$

(8) $2ax^2 - 22ax + 60a$

(9) $x^4 - y^4$

(10) $x^3 - 9x + 5x^2 - 45$

(11) $2ax^2 + 8ax + x + 4$

(12) $x^4 - 29x^2 + 100$

(13) $x^2y^2 - y^2 - 15x^2 + 15$

(14) $8x^4 + 56x^3 + 98x^2$

Answers:

(V) $x^2(x + 28)(x + 2)$

(N) $(x + y)(x + 5)$

(F) $(x - y)(y + 8)$

(R) $3x(x + 5)(x + 2)$

(S) $(x + 7)(x - d)$

(M) $(x - 2y)(y + 4)$

(A) $x^2(x + 8)(x - 7)$

(E) $5(7x + 1)(x - 3)$

(K) $(x - 7)(x^2 + d)$

(T) $4x(3x + 4)(3x - 4)$

(Y) $5(7x - 1)(2x + 3)$

Answers:

(D) $(2ax + 1)(x + 4)$

(B) $(x + 5)(x - 5)(x^2 + 3)$

(W) $2x^2(2x + 7)^2$

(U) $(x^2 + y^2)(x + y)(x - y)$

(L) $(x + 2)(x - 2)(x + 5)(x - 5)$

(H) $2a(x - 6)(x - 5)$

(P) $(2ax - 4)(x + 1)$

(O) $(y^2 - 15)(x + 1)(x - 1)$

(I) $(x + 5)(x + 3)(x - 3)$

(G) $(y^2 - 15)(x + 5)(x - 2)$

(C) $2a(x + 15)(x - 2)$

4	8	6	10	1	14	10	3	11	13	14	5	7	2	12	12	13	9	4

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OBJECTIVE 3–t: To factor polynomials completely (includes factoring by grouping).

Why Are Small Balloons Cheaper Than Large Balloons?

Factor completely each polynomial below. Find your answer below the exercise and notice the letter next to it. Write this letter in each box containing the number of that exercise.

(1) $a^2 - 9ab + 20b^2$

(2) $3a^2 + 6ab - 24b^2$

(3) $7a^2 - 28b^2$

(4) $4a^2 + 14ab + 12b^2$

(5) $a^3 - 4a^2b - 21ab^2$

(6) $a^3b - ab^3$

Answers:

(E) $7(a + 4b)(a + b)$

(A) $a(a - 7b)(a + 3b)$

(O) $7(a + 2b)(a - 2b)$

(R) $(a - 4b)(a - 5b)$

(T) $a(a + 21)(a - 1)$

(H) $ab(a + b)(a - b)$

(M) $3(a - 8b)(a - b)$

(C) $2(2a - 6b)(a + b)$

(N) $3(a + 4b)(a - 2b)$

(V) $ab(a + 3b)(a - 2b)$

(S) $2(2a + 3b)(a + 2b)$

(7) $2x^3 - 12x^2y - 14xy^2$

(8) $9x^3 - 6x^2y + xy^2$

(9) $15x^2 + 35xy - 50y^2$

(10) $x^4 + 12x^3y + 35x^2y^2$

(11) $15x^4 - 27x^3y - 6x^2y^2$

(12) $8x^3y - 50xy^3$

Answers:

(F) $5(3x + 10y)(x - y)$

(K) $2x(x + 7y)(x + 2y)$

(L) $2xy(2x + 5y)(2x - 5y)$

(D) $5(3x - 2y)(x - 5y)$

(T) $x^2(x + 5y)(x + 7y)$

(B) $x(3x - y)^2$

(U) $3x^2(5x - 2y)(x - y)$

(I) $2x(x - 7y)(x + y)$

(P) $x^2(x + 5y)(x - 9y)$

(E) $3x^2(5x + y)(x - 2y)$

(W) $x(9x + y)(x - y)$

10	6	11	1	11	4	8	11	11	2	12	11	4	4	7	2	9	12	5	10	7	3	2

OBJECTIVE 3–u: To factor polynomials completely (polynomials with factors of the form $ax^2 + bxy + cy^2$).

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What Should You Say If You See a Tall, Wrought-Iron Tower in Paris, France?

Factor completely each polynomial. Find your answer below and notice the two letters next to it. Write these letters in the two boxes above the exercise number at the bottom of the page.

(1) $3n^2 - 17n + 24$

(2) $4x^3y - 49xy^3$

(3) $5x^2 + 20xy - 60y^2$

(4) $3x^3 - x^2y + 12x - 4y$

(5) $2x^4y - 3x^3y - 20x^2y$

(6) $9x^3y + 33x^2y^2 + 30xy^3$

(7) $16a^3b^4 + 40a^2b^5 + 8ab^3$

(8) $t^4 - 37t^2 + 36$

(9) $2a^7b^3 - 288ab$

(10) $35a^2b - 5a - 7ab^2 + b$

(11) $6a^4b^2 - 11a^3b^3 + 4a^2b^4$

(12) $t^2(t + 3) + 6t(t + 3) + 9(t + 3)$

Answers:

(AD) $5(x + 4y)(x + 3y)$

(AN) $x^2y(2x + 5)(x - 4)$

(OL) $(3n - 6)(n + 4)$

(UI) $xy(2x - 7y)(2x + 7y)$

(TH) $3xy(3x + 5y)(x + 2y)$

(EF) $5(x + 6y)(x - 2y)$

(ET) $(x^2 + 2)(3x + 2y)$

(SR) $(3n - 8)(n - 3)$

(FO) $xy(9x + 5y)(x - 7y)$

(LL) $(x^2 + 4)(3x - y)$

(NT) $x^2y(2x + 1)(x + 10)$

Answers:

(IS) $2ab(a^2b^2 + 12)(a^4b^2 + 12)$

(OT) $(t + 3)^2(t - 1)^2$

(TE) $8ab^3(2a^2b + 5ab^2 + 1)$

(AT) $2ab(a^3b + 12)(a^3b - 12)$

(EY) $(t + 3)^3$

(EP) $a^2b^2(2a + b)(3a - 2b)$

(YQ) $(t + 1)(t - 1)(t + 6)(t - 6)$

(UL) $(5a - b)(7ab - 1)$

(LS) $8ab^3(2ab^2 + 5ab^3 + 1)$

(IX) $(5a - 2b)(7ab - 5)$

(EA) $a^2b^2(2a - b)(3a - 4b)$

6	9	1	11	4	8	2	7	5	12	3	10

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OBJECTIVE 3–v: To factor polynomials completely (review of all types on preceding pages).

OBJECTIVE 4–a: To solve equations when one side is in factored form and the other side is 0.

Moving Words

Solve each equation in the top block and find the solution set in the bottom block. Transfer the word from the top box to the corresponding bottom box. Keep working and you will get a moving fact.

$(x+3)(x+8)=0$ (1) WHY	$(x-12)(x+5)=0$ (6) THAT	$(x-10)(4x-3)=0$ (11) ONLY	$x(4x+7)=0$ (16) ROBBERS
$(x+4)(x+11)=0$ (2) THE	$x(x-9)=0$ (7) TO	$(3x+2)(3x-2)=0$ (12) BANK	$x(2x+1)(x-6)=0$ (17) PLACE
$(x-5)(x-2)=0$ (3) IS	$x(x+14)(x-1)=0$ (8) THEY	$(9x-2)(5x+1)=0$ (13) BECAUSE	$2x(4x-8)(x+1)=0$ (18) CANADA
$(x-1)(x-6)=0$ (4) HAVE	$(2x-1)(x+4)=0$ (9) IS	$(2x+2)(7x+6)=0$ (14) ESCAPED	$7x(3x+5)(5x+2)=0$ (19) TORONTO
$(x+3)(x-7)=0$ (5) ALWAYS	$(x-2)(3x+1)=0$ (10) THE	$(2x-5)(3x+1)=0$ (15) REASON	$(x-9)(x+1)(x-1)=0$ (20) RUN

$\left\{2, -\frac{1}{3}\right\}$	$\left\{\frac{5}{2}, -\frac{1}{3}\right\}$	$\{-3, -8\}$	$\left\{-1, -\frac{6}{7}\right\}$	$\left\{-\frac{2}{3}, \frac{2}{3}\right\}$
$\left\{0, -\frac{7}{4}\right\}$	$\{-3, 7\}$	$\{9, -1, 1\}$	$\{0, 9\}$	$\{0, 2, -1\}$
$\{5, 2\}$	$\left\{\frac{2}{9}, -\frac{1}{5}\right\}$	$\{12, -5\}$	$\left\{\frac{1}{2}, -4\right\}$	$\{-4, -11\}$
$\left\{10, \frac{3}{4}\right\}$	$\left\{0, -\frac{1}{2}, 6\right\}$	$\{0, -14, 1\}$	$\{1, 6\}$	$\left\{0, -\frac{5}{3}, -\frac{2}{5}\right\}$

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What Is the Title of This Picture?

Solve each equation below. Find the solution set in the answer list and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it. Keep working and you will decode the title of the picture.

(1) $a^2 + 7a + 10 = 0$

(2) $n^2 - 8n + 12 = 0$

(3) $y^2 - 49 = 0$

(4) $x^2 + 5x - 6 = 0$

(5) $u^2 - 7u - 18 = 0$

(6) $m^2 - 5m = 0$

(7) $2t^2 + 5t - 3 = 0$

(8) $3w^2 - 8w + 4 = 0$

(9) $2x^2 - 3x - 5 = 0$

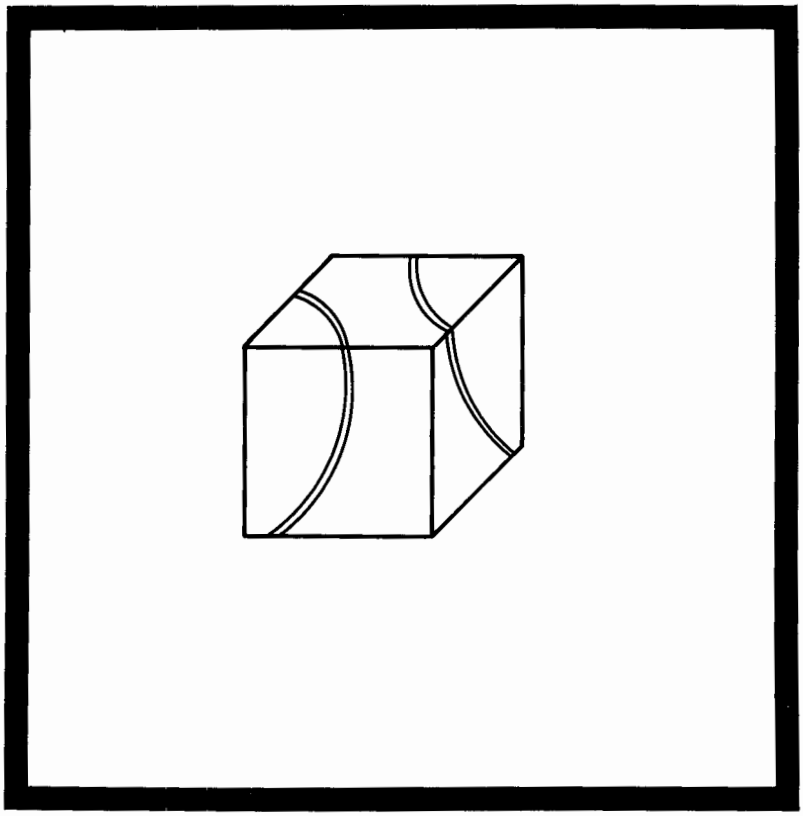
(10) $5v^2 + 29v + 20 = 0$

(11) $6n^2 - 19n + 15 = 0$

(12) $2k^2 + 7k = 0$

(13) $3b^2 + b - 10 = 0$

(14) $4y^2 - 25 = 0$



CODED TITLE:

												14	12	13	13	1	6	9	11	5	5
(													)
10	11	2	14	3	8	4	8	12	7	12	2	14	

(N) $\left\{\frac{5}{3}, -2\right\}$	(D) $\left\{\frac{3}{2}, \frac{5}{2}\right\}$	(B) $\left\{\frac{5}{2}, -1\right\}$	(L) $\{-2, 9\}$
(R) $\left\{\frac{2}{3}, 2\right\}$	(I) $\{-2, -5\}$	(E) $\left\{0, -\frac{7}{2}\right\}$	(H) $\left\{\frac{3}{5}, -1\right\}$
(S) $\{0, 5\}$	(T) $\left\{\frac{5}{2}, -\frac{5}{2}\right\}$	(Y) $\{-6, 1\}$	(C) $\{2, 6\}$
(O) $\{7, -7\}$	(F) $\left\{-\frac{4}{5}, -5\right\}$	(J) $\left\{\frac{1}{2}, -3\right\}$	(A) $\left\{\frac{3}{2}, \frac{5}{3}\right\}$

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OBJECTIVE 4–b: To solve quadratic equations by factoring (equations in standard form).

Did You Hear About...

A	B	C	D	E	F	G
H	I	J	K	L	M	N ?

Solve each equation below. Find the solution set in one of the answer columns and notice the word next to it. Write this word in the box above that contains the letter of that exercise.

(A) $n^2 - 10n = -21$	(H) $2x^2 + 10 = 9x$
(B) $x^2 + 4x = 5$	(I) $12t + 9 = 5t^2$
(C) $u^2 - 8 = 7u$	(J) $9y^2 = 16$
(D) $m^2 = 11m$	(K) $15 + 26d = -8d^2$
(E) $9a = -a^2 - 18$	(L) $18n = 2n^2$
(F) $h^2 = 32 - 4h$	(M) $10v^2 = 13v + 3$
(G) $3y^2 + 14y = 5$	(N) $23p = 5p^2 + 24$

$\{-8, 4\}$ WHO	$\{-\frac{1}{5}, \frac{3}{2}\}$ NOT
$\{0, 15\}$ COACH	$\{\frac{1}{3}, -5\}$ WAS
$\{\frac{8}{5}, 3\}$ SWIM	$\{\frac{1}{5}, -\frac{5}{2}\}$ SCORE
$\{7, 3\}$ THE	$\{8, -1\}$ WATER
$\{-\frac{3}{5}, 3\}$ BECAUSE	$\{\frac{4}{5}, -6\}$ RUN
$\{0, 11\}$ POLO	$\{0, 9\}$ COULD
$\{-\frac{1}{2}, \frac{2}{3}\}$ WON	$\{\frac{5}{2}, 2\}$ UPSET
$\{-5, 1\}$ NOVICE	$\{-6, -3\}$ PLAYER
$\{-\frac{5}{2}, -\frac{3}{4}\}$ HORSE	$\{\frac{4}{3}, -\frac{4}{3}\}$ HIS

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What Happened When Zonk Blew Air Into a Rubber Glove?

Solve each equation below. Find the solution set at the bottom of the page and write the letter of that exercise above it.

(G) $n^3 + 8n^2 + 12n = 0$

(A) $m^3 - 16m = 0$

(D) $a^3 + 3a^2 = 10a$

(I) $u^3 = 14u^2 + 32u$

(E) $2d^3 + 6d = 7d^2$

(O) $x^4 - 10x^2 + 9 = 0$

(A) $8y^3 = 2y$

(H) $9t^2 + 2t = 5t^3$

(G) $9k^3 + 30k^2 = 24k$

(T) $x^4 - 13x^2 + 36 = 0$

(H) $17v^2 + 5v = -6v^3$

(B) $5w^3 = 40w^2 - 80w$

(N) $30q^3 + 14q^2 - 4q = 0$

$\{0, -\frac{1}{5}, 2\}$	$\{0, \frac{3}{2}, 2\}$	$\{0, \frac{3}{2}, -\frac{3}{2}\}$	$\{0, -2, -6\}$	$\{1, -1, 3, -3\}$	$\{2, -2, 3, -3\}$	$\{0, 3, -2\}$	$\{0, 4, -4\}$	$\{0, \frac{2}{15}, -1\}$	$\{0, 4\}$	$\{0, 16, -2\}$	$\{0, \frac{2}{3}, -4\}$	$\{0, \frac{1}{2}, 5\}$	$\{0, -\frac{5}{2}, -\frac{1}{3}\}$	$\{0, \frac{1}{2}, -\frac{1}{2}\}$	$\{0, \frac{1}{5}, -\frac{2}{3}\}$	$\{0, 2, -5\}$

What Kind of Music Do Barbers and Tailors Play Together?

Solve each problem and find your answer at the bottom of the page. Cross out the letter above each correct answer. When you finish, you will have the answer to the noteworthy question above.

1. Eight more than the square of a number is the same as 6 times the number. Find the number.
2. Fifteen less than the square of a number is the same as twice the number. Find the number.
3. If a number is added to twice its square, the result is 6. Find the number.
4. Seven less than 4 times the square of a number is 18. Find the number.
5. Find two consecutive integers whose product is 56.
6. Find two consecutive positive odd integers whose product is 35.
7. The sum of the squares of two consecutive integers is 41. Find the integers.
8. Find two consecutive odd integers such that the square of the first, added to 3 times the second, is 24.
9. Find two consecutive even integers such that the square of the second, decreased by twice the first, is 52.
10. Find three consecutive positive integers such that the square of the first, increased by the last, is 22.

S	C	U	H	A	L	T	I	O	P	S	O	I	E	N	W	G
3, 5	4, 6 or −2, −4	5 or −3	4, 5, 6	5, 7	6, 7 or −7, −6	$3/2$ or −2	$4/3$ or −5	$5/2$ or $-5/2$	5, 6 or −6, −5	6 or −1	2 or 4	6, 8 or −8, −6	−9, −7	4, 5 or −5, −4	6, 7, 8	7, 8 or −8, −7

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Did You Hear About...

A	B	C	D
E	F	G	H ?

Solve each problem below. Find your answer in the answer column and notice the word next to it. Write this word in the box containing the letter of that exercise. Keep working and you will hear about something hot.

(A) The length of a rectangle is 3 cm more than the width. The area is 70 cm^2. Find the dimensions of the rectangle.

(B) The length of a rectangle is 4 cm more than the width. The area is 96 cm^2. Find the dimensions of the rectangle.

(C) The length of a photograph is 1 cm less than twice the width. The area is 45 cm^2. Find the dimensions of the photograph.

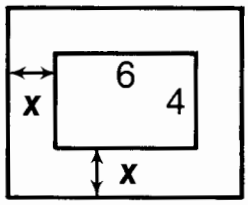
(D) If the sides of a square are increased by 3 m, the area becomes 64 m^2. Find the length of a side of the original square.

(E) A square field had 5 m added to its length and 2 m added to its width. The field then had an area of 130 m^2. Find the length of a side of the original field.

(F) The dimensions of a rectangular garden were 4 m by 5 m. Each dimension was increased by the same amount. The garden then had an area of 56 m^2. Find the dimensions of the new garden. (Hint: Let **x** be the amount of increase.)

(G) The dimensions of a rectangular garden were 3 m by 10 m. When both dimensions were increased by equal amounts, the area of the garden doubled. Find the dimensions of the new garden.

(H) A 4 m by 6 m rug covers half of the floor area of a room and leaves a uniform strip of bare floor around the edges. What are the dimensions of the room?



6 m	THAT
5 m by 12 m	HOT
7 cm by 10 cm	THE
8 cm by 11 cm	CHAIRS
8 m	WHO
4 cm by 7 cm	GUY
5 m	DEALER
7 m by 9 m	PILLOWS
8 cm by 12 cm	CROOKED
7 m by 8 m	BUYS
5 m by 6 m	STUFF
6 m by 8 m	WATERBEDS
8 m by 9 m	SELLS
7 m by 14 m	TABLES
5 cm by 9 cm	FURNITURE

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What Do You Call an Alligator That Sneaks Up and Bites You From Behind ?

Simplify each expression below. Cross out the box that contains your answer. When you finish, print the letters from the remaining boxes in the squares at the bottom of the page.

① $\dfrac{2x+10}{x+5}$

② $\dfrac{x-3}{7x-21}$

③ $\dfrac{x^2-4}{x+2}$

④ $\dfrac{x^2-25}{3x-15}$

⑤ $\dfrac{x^2+4x}{x^2-9x}$

⑥ $\dfrac{n^2+7n+10}{n^2+2n-15}$

⑦ $\dfrac{n^2-7n+12}{n^2-2n-3}$

⑧ $\dfrac{n^2+7n-18}{n^2-4}$

⑨ $\dfrac{4n+28}{n^2+6n-7}$

⑩ $\dfrac{n-6}{n^2-6n}$

⑪ $\dfrac{2b^2-6b}{5b^2-15b}$

⑫ $\dfrac{b^2+4b-21}{2b^2-18}$

⑬ $\dfrac{3b^2+15b}{2b^3-50b}$

⑭ $\dfrac{b^2+4b+4}{2b^2+3b-2}$

⑮ $\dfrac{6b^3-24b^2}{b^2+b-20}$

AB	CH	AT	ES	AD	TO	AP	AI	RE	NO
$\dfrac{4}{n-1}$	$\dfrac{6b^2}{b+5}$	$\dfrac{3b}{b-5}$	$\dfrac{n+2}{n-3}$	$\dfrac{b+7}{2(b+3)}$	2	$\dfrac{n+9}{n+2}$	$\dfrac{b+4}{2b+1}$	$\dfrac{b+2}{2b-1}$	$\dfrac{x+4}{x-9}$
LG	TE	BR	AT	RY	BI	DO	OR	TE	AT
$\dfrac{x+4}{x-2}$	$\dfrac{1}{7}$	$\dfrac{2}{5}$	$\dfrac{n+2}{n-1}$	$\dfrac{1}{n}$	$\dfrac{x+5}{3}$	$\dfrac{3}{2(b-5)}$	$\dfrac{3}{2(b+10)}$	$\dfrac{n-4}{n+1}$	$x-2$

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CRYPTIC QUIZ

1. What do you call a skydiver with the flu?

___	___	___	___	___	___	___	___	___	___	___
3	12	6	11	9	11	2	10	8	5	1

2. How do you crash a houseboat party?

___	___	___	___	___	___	___	___	___	___	___
7	10	12	8	14	3	1	13	5	6	4

Simplify each expression below. Find your answer in the answer column and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it.

(1) $\frac{x+3}{9-x^2}$

(2) $\frac{49-x^2}{x-7}$

(3) $\frac{5x-20}{4-x}$

(4) $\frac{-x^2+8x-12}{x-2}$

(5) $\frac{x^2-2x-15}{10-2x}$

(6) $\frac{-x^2+8x-16}{3x^2-12x}$

(7) $\frac{-x^2-3x+10}{25-x^2}$

(N) $-(x-6)$

(H) $-(x+7)$

(A) -5

(O) $-\frac{x+5}{x-2}$

(J) $\frac{x-2}{x-5}$

(R) $-\frac{1}{x-3}$

(L) $\frac{x-4}{6x}$

(E) $-\frac{x+3}{2}$

(I) $-\frac{x-4}{3x}$

(8) $\frac{6-5c-c^2}{7c^2-7}$

(9) $\frac{-c^2+6c-9}{c^2+5c-24}$

(10) $\frac{-10c^3-5c^2}{2c^2+15c+7}$

(11) $\frac{c^2-d^2}{c+d}$

(12) $\frac{-c^2+2cd+3d^2}{5c-15d}$

(13) $\frac{c^2d+4cd^2}{-c^2+16d^2}$

(14) $\frac{-3c^2+6cd}{-3c^2+7cd-2d^2}$

(F) $-(c+2d)$

(C) $c-d$

(M) $c-2d$

(K) $-\frac{c-3}{c+8}$

(B) $\frac{3c}{3c-d}$

(S) $-\frac{c+d}{5}$

(T) $-\frac{c+6}{7(c+1)}$

(G) $-\frac{cd}{c-4d}$

(U) $-\frac{5c^2}{c+7}$

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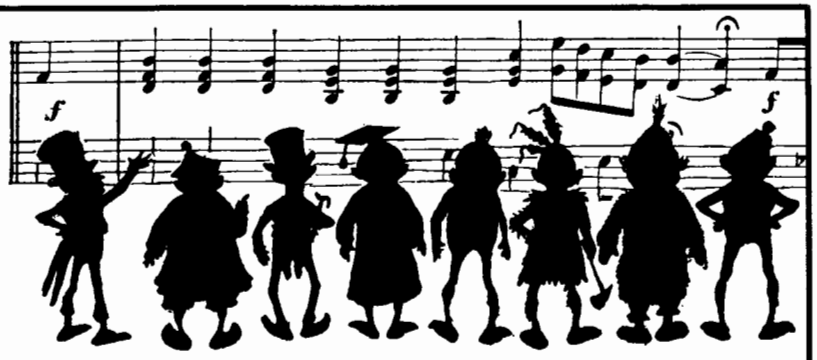
What Do You Call an Insect That Plays Drums?

Simplify each expression. Find your answer below and print the letter of that exercise above it.



(T) $\dfrac{6a^5b^4}{9a^3b^7}$

(C) $\dfrac{12a^5b^3(3-b)}{4a^4b(b^2+b-12)}$

(C) $\dfrac{15a^2b^6}{25a^7b}$

(I) $\dfrac{6a^2-30a+36}{4a-12}$

(I) $\dfrac{a^5b^2(a^2+7a+10)}{a^2b^4(a+5)}$

(Y) $\dfrac{a^3-49a}{a^3+7a^2}$

(T) $\dfrac{a^2b-7a^2}{a^5}$

(H) $\dfrac{3ab^3(a-1)}{6a^4b^4(1-a)}$

(K) $\dfrac{2a^2b^2+4ab^2}{a^4b+4a^3b}$

(H) $\dfrac{8a^2b-8b^3}{6a^2b+12ab^2+6b^3}$

(A) $\dfrac{ab^6(a^2-2a-15)}{a^7b^5(5-a)}$

(M) $\dfrac{3a^3(16-a^2)}{12a^6(a^2-9a+20)}$

(R) $\dfrac{(b-5)^3}{15+7b-2b^2}$

$-\dfrac{b(a+3)}{a^6}$	$-\dfrac{a-4}{4a^2(a+5)}$	$-\dfrac{(b-5)^2}{2b+3}$	$-\dfrac{1}{2a^3b}$	$\dfrac{a-7}{a}$	$\dfrac{2a^2}{3b^3}$	$\dfrac{4(a-b)}{3(a+b)}$	$-\dfrac{a+4}{4a^3(a-5)}$	$\dfrac{a^3(a+2)}{b^2}$	$-\dfrac{3ab^2}{b+4}$	$\dfrac{4(a+b)}{3(2a-b)}$	$\dfrac{b-7}{a^3}$	$\dfrac{3(a-2)}{2}$	$\dfrac{3b^5}{5a^5}$	$\dfrac{2b(a+2)}{a^2(a+4)}$

OBJECTIVE 5–c: To simplify algebraic fractions (numerator and denominator contain monomial factors).

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• BOOKS NEVER WRITTEN •

Everybody Needs Insurance by

9	3	12	1	8	11	6	2	12	10

Rock 'n Roll Your Baby by

5	10	12	7	2	11	6	10

50 Years in the Navy by

8	8	12	10	4	4

ABOVE ARE THE TITLES OF THREE "BOOKS NEVER WRITTEN." TO DECODE THE NAMES OF THEIR AUTHORS:

Simplify each expression below. Find your answer and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it.

(1) $\dfrac{2x^2 - 18}{4x + 12}$

(2) $\dfrac{3x^2 - 24x + 36}{2x^2 - x - 6}$

(3) $\dfrac{5x^2 - 25x}{3x^3 - 75x}$

(4) $\dfrac{x^2 + 5x - 24}{3 - x}$

(5) $\dfrac{-x^2 + 8x - 16}{x^3 - 4x^2}$

(6) $\dfrac{49x - x^3}{7 - 6x - x^2}$

(7) $\dfrac{a^2 + 11ab + 18b^2}{a^2b + 9ab^2}$

(8) $\dfrac{15a^5b(5 - a)}{6a^2b^3(a - 5)}$

(9) $\dfrac{4a^3b^4(a^2 + a - 42)}{28a^4b^4(6 - a)}$

(10) $\dfrac{a^4 - 8a^3b}{a^3 - 64ab^2}$

(11) $\dfrac{4a^2 + 8ab - 12b^2}{6a^2 - 12ab + 6b^2}$

(12) $\dfrac{10a^3b + 10a^2b}{4a^2b^3 + 2ab^3}$

Answers for exercises 1–6:

(W) $-\dfrac{x - 4}{x - 1}$

(A) $\dfrac{3(x - 6)}{2x + 3}$

(U) $\dfrac{5}{3(x + 5)}$

(R) $-(x + 8)$

(T) $\dfrac{x - 3}{2}$

(M) $\dfrac{x(x - 7)}{x + 2}$

(C) $\dfrac{x(x - 7)}{x - 1}$

(L) $-\dfrac{x - 4}{x^2}$

Answers for exercises 7–12:

(J) $-\dfrac{a + 7}{7a}$

(N) $\dfrac{2(a + 3b)}{3(a - b)}$

(P) $\dfrac{2(a - 3b)}{3(a + b)}$

(D) $\dfrac{a + 2b}{ab}$

(I) $-\dfrac{5a^3}{2b^2}$

(S) $\dfrac{5a(a + 1)}{b^2(2a + 1)}$

(E) $\dfrac{a^2}{a + 8b}$

(B) $-\dfrac{a - 7}{7ab}$

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OBJECTIVE 5–d: To simplify algebraic fractions (review of preceding three pages).

What Do You Call a Message Printed on a Lion With Chickenpox?

Express each product in simplest form. Find your answer below and notice the letter next to it. Write this letter in each box containing the number of that exercise.

(1) $\frac{x^3}{2y^2} \cdot \frac{6y^4}{xy}$

(2) $\frac{5xy^2}{4x^2} \cdot \frac{8x^3y}{15y^5}$

(3) $\frac{x^2+7x+12}{x-5} \cdot \frac{2x-10}{x+3}$

(4) $\frac{x^2-3x-10}{x+7} \cdot \frac{3x+21}{6x-30}$

(5) $\frac{x-1}{4xy^3} \cdot \frac{6x^2y}{1-x}$

(6) $\frac{13xy^2}{x^2+3x-18} \cdot \frac{x^2-9}{26x^4y^2}$

(7) $\frac{25-x^2}{14x^3y^8} \cdot \frac{7x^2y}{8x+40}$

(8) $\frac{2x^2+5x-7}{x+4} \cdot \frac{x^2+4x}{x^2-2x+1}$

(9) $\frac{2x+10}{32-8x} \cdot \frac{x^2-10x+24}{x^2-x-30}$

(10) $\frac{12x+48}{6x-15} \cdot \frac{4x^2-25}{x^2+9x+20}$

(G) $-\frac{3x}{2y^2}$	(O) $\frac{4(2x+5)}{x+5}$	(L) $\frac{x+3}{2x^3(x+6)}$
(F) $-\frac{x-4}{x+4}$	(H) $3x^2y$	(T) $-\frac{1}{4}$
(D) $\frac{2x^2}{3y^2}$	(I) $\frac{x+2}{2}$	(E) $2(x+4)$
(N) $\frac{x(2x+7)}{x-1}$	(S) $-\frac{x-5}{16xy^7}$	(A) $\frac{4(2x-5)}{3(x+4)}$

7	4	5	8	10	8	9	1	3	2	10	9	9	3	2	6	4	10	8

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Why Are Ancient Stories Like Feet?

Express each product below in simplest form. Find your answer in the answer column and notice the two letters next to it. Write these letters in the two boxes at the bottom of the page that contain the number of that exercise.

① $\dfrac{a^2-b^2}{a^4b}\cdot\dfrac{ab^2}{3a+3b}$

② $\dfrac{4-a}{5a}\cdot\dfrac{a^2+5a}{a^2+a-20}$

③ $\dfrac{a^2+5ab+6b^2}{a^2-5ab+6b^2}\cdot\dfrac{10a-30b}{5a+10b}$

④ $\dfrac{3a^2b-ab^2}{6a}\cdot\dfrac{9a^2}{9a^2-b^2}$

⑤ $\dfrac{2a^2-13a+15}{8a^2-12a}\cdot\dfrac{6a-4a^2}{a^2-10a+25}$

⑥ $\dfrac{-a^3+ab^2}{a^2}\cdot\dfrac{a^3+7a^2b}{a^2+6ab-7b^2}$

⑦ $\dfrac{6a+24}{2a^2+5a-12}\cdot\dfrac{4a^2-9}{15a^2}$

⑧ $\dfrac{8a-40}{40-3a-a^2}\cdot\dfrac{a-8}{2a^2-8a}$

⑨ $\dfrac{27a^4b^7}{3a^2-6a+3}\cdot\dfrac{(a-1)^3}{9ab^3}$

ES	$3a^3b(a-1)$
OT	$-a(a+b)$
EG	$a^3b^4(a-1)$
HL	$\dfrac{3a^2b}{2(3a+b)}$
EB	$\dfrac{b(a-b)}{3a^3}$
TS	$-\dfrac{4(a-8)}{4a-8}$
DS	$-\dfrac{4(a-8)}{a(a+8)(a-4)}$
TH	$\dfrac{2(a+3b)}{a-2b}$
AR	$\dfrac{2(2a+3)}{5a^2}$
EN	$-\dfrac{1}{5}$
EY	$-\dfrac{2a-3}{2(a-5)}$

3	3	5	5	7	7	1	1	6	6	4	4	9	9	2	2	8	8

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What Happened to the Peanut Who Went Walking Late at Night?

Express each quotient below in simplest form. Find your answer in the answer column and notice the letter next to it. Write this letter in each box containing the number of that exercise.

① $\dfrac{12m^2n^5}{m+5} \div \dfrac{3m^3n}{m^2-25}$

② $\dfrac{n^2-9n+20}{6m^7n^2} \div \dfrac{5n-20}{10mn^2}$

③ $\dfrac{m^2}{m^2-7m} \div \dfrac{1}{m^2-4m-21}$

④ $\dfrac{16-2m}{m^2+2m-24} \div \dfrac{m-8}{3m+18}$

⑤ $\dfrac{12n-36}{9-n^2} \div \dfrac{8n^5}{n^2+3n}$

⑥ $\dfrac{m^2-n^2}{m^2+2mn+n^2} \div \dfrac{m^2n-mn^2}{7m^2}$

⑦ $\dfrac{n^2-n-12}{2n^2-15n+18} \div \dfrac{3n^2-12n}{2n^3-9n^2}$

⑧ $\dfrac{17mn^3}{m^2+2m-35} \div \dfrac{34m^8n^4}{m^2+7m}$

⑨ $\dfrac{4n^3-25n}{3n^2-16n+5} \div (10n+25)$

Ⓗ $7m(m-n)$

Ⓝ $-3n^4(n-3)$

Ⓣ $m(m+3)$

Ⓓ $-\dfrac{3}{2n^4}$

Ⓤ $\dfrac{4n^4(m-5)}{m}$

Ⓡ $\dfrac{1}{2m^4n(m-7)}$

Ⓢ $\dfrac{n(2n-9)(n+3)}{3(2n-3)(n-6)}$

Ⓘ $-\dfrac{6}{m-4}$

Ⓐ $\dfrac{n(2n-5)}{5(3n-1)(n-5)}$

Ⓦ $\dfrac{7m}{n(m+n)}$

Ⓛ $\dfrac{1}{2m^6n(m-5)}$

Ⓔ $\dfrac{n-5}{3m^6}$

4	3	6	9	7	9	7	7	9	1	8	3	2	5

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What Happens When the Smog Lifts in Los Angeles, California ?

Simplify each expression below and find your answer at the bottom of the page. Cross out the letter above each correct answer. When you finish, the answer to the title question will remain.

① $\dfrac{9x}{x^2-25} \cdot \dfrac{x^2+5x}{2x-4} \cdot \dfrac{x^2+3x-10}{3x^4}$

② $\dfrac{x+4}{2x^2-14x} \cdot \dfrac{x^3+4x^2}{3x-24} \div \dfrac{x^2+8x+16}{x^2-3x-28}$

③ $\dfrac{4x^2-y^2}{x^2y-xy^2} \cdot \dfrac{x^2+xy}{8x+4y} \div \dfrac{2x^2-7xy+3y^2}{8x^5y}$

④ $\dfrac{(2x-5)^3}{3-x} \div \dfrac{2x^2-3x-5}{6x^2+15x} \cdot \dfrac{x^2-2x-3}{4x^2-25}$

⑤ $\dfrac{x^4-y^4}{3x^2y-3xy^2} \div \dfrac{x^2+2xy+y^2}{9xy^3} \div \dfrac{4x^2+4y^2}{xy^2+y^3}$

⑥ $(75x^2-12) \div \left(\dfrac{35-2x-x^2}{x^2+7x} \div \dfrac{x-5}{5x^3+2x^2}\right)$

A	B	U	S	C	O	L	R	A	Y
$\dfrac{x(x+4)}{6(x-8)}$	$-\dfrac{3(5x-2)}{x}$	$\dfrac{2x^3(x+y)}{x-3y}$	$-3x(2x-5)$	$\dfrac{3y^3(x+y)}{4(x-y)}$	$\dfrac{3y^4}{4}$	$-3(2x-5)$	$\dfrac{3(x+5)}{2x^2(x-5)}$	$\dfrac{x(x+4)}{3(x-7)}$	$\dfrac{2x^5(x+y)}{(x-y)(x-3y)}$

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OBJECTIVE 5–h: To simplify products and quotients involving three algebraic fractions.

Why Does the U.S. Mint Need a New Building?

For each exercise below, use the clue to help unscramble the letters of the word in parentheses. Then write this word in the adjacent boxes. One or more of the boxes has a number. Whenever you write a letter in a numbered box, transfer that letter to the matching numbered box at the bottom of the page.

(1) A symbol used to represent a number (BARELAVI).																			15			
(2) A statement of equality (OUTNQEAI).																	9				20	
(3) A value that satisfies an open sentence (LOUNSIOT).																				17		
(4) For all real numbers ***a***, ***b***, and ***c***: $a(b+c)=ab+ac$ (RIIIUVESDBTT).	8																				6	
(5) An equation that expresses a relationship between measurements (ARFLMOU).																			2			
(6) A number that is multiplied by a variable (EOFIETIFCNC).																21						
(7) For a real number ***a***, the real number $-a$ (PESTOOIP).																					23		12	
(8) For a nonzero real number ***a***, the real number $\frac{1}{a}$ (CLERIRACPO).															14									
(9) To express as a product of two or more quantities (OFCRTA).																						1		
(10) A product in which all the factors are the same (EORPW).																					5			22
(11) A sum of monomials (PMALONOILY).																							18	
(12) A polynomial with two terms (IAMNILBO).																	10							
(13) A polynomial whose greatest monomial factor is 1 (MREIP).																				3				11
(14) The set of whole numbers and their opposites (EENSIGRT).																	7						4	
(15) A polynomial equation of degree two (DUCATARQI).															16					19		13		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

OBJECTIVE 6--a: To demonstrate knowledge of basic vocabulary used in first-semester algebra.

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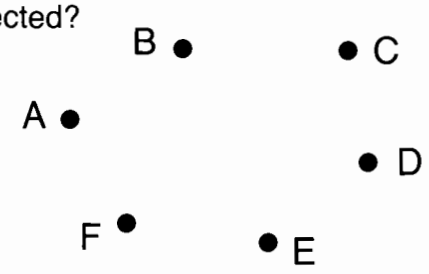
TEST OF GENIUS

(1) The land of Euclidia has six remote towns, which we shall call A, B, C, D, E, and F. Unfortunately, not all the towns are connected by telephone lines. Town A is connected to all the other five towns, but Town B is connected to only four. Town C, too, is connected to four; whereas D, E, and F are each connected to only three towns.

There is a line from Town D to Town F. To what towns is Town E connected?

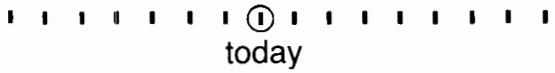


(2) In the following multiplication problem, the letters A, B, C, and D represent four different digits. What digit should replace each letter?

$$\begin{array}{r} ABCD \\ \times\ \ 4 \\ \hline DCBA \end{array}$$

(3) On what day of the week was the following statement made:

When the day before yesterday was referred to as "the day after tomorrow," the day that was then called "yesterday" was as far away from today as today is from next Saturday. (HINT: Use the diagram below.)



(4) A clock loses ten minutes each hour. If the clock is set correctly at 12 o'clock noon, what is the correct time when the clock reads 3:00 P.M.?

(5) How tall is a tree which is 15 feet shorter than a pole that is three times as tall as the tree?

(6) Rollo, Gorgo, and Zed work in the circus. They are the ringmaster, lion tamer, and clown, though not necessarily in that order.

1. Zed has red hair.
2. Rollo has curly hair.
3. The ringmaster is shorter than Rollo.
4. The lion tamer is bald.

Who is the clown?

(7) Three men, A, B, and C, were traveling with their wives, a, b, and c. They came to a river which they had to cross. There was just one boat and only two could cross at one time. Since the husbands were jealous, no woman could be left with a man unless her husband were also present. How did they get across the river?

(8) Find the number that logically continues each of these series:

a) 2, 3, 5, 9, 17, _____

b) 14, 19, 29, 40, 44, 52, _____

SCORING KEY

7 or 8—*Extra Extraordinary Genius*
5 or 6—*Extraordinary Genius*
3 or 4—*Ordinary Genius*
1 or 2—*Ex-Genius*

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What Unusual Accident Happened to Brainless Flunkalot?

Simplify each expression below. Find your answer and notice the letter next to it. Write this letter in each box containing the number of that exercise.

(1) $\frac{2}{5x}+\frac{7}{5x}+\frac{3}{5x}$

(2) $\frac{4}{2x}-\frac{5}{2x}+\frac{9}{2x}$

(3) $\frac{8x}{x-4}+\frac{3x}{x-4}$

(4) $\frac{x^2}{x-7}-\frac{49}{x-7}$

(5) $\frac{x^2}{3x+15}-\frac{25}{3x+15}$

(6) $\frac{x^2}{5x+40}+\frac{8x}{5x+40}$

(7) $\frac{x+5}{9}+\frac{5x+7}{9}$

(8) $\frac{4x+1}{4x}+\frac{6x-11}{4x}$

(9) $\frac{x}{x^2+4x-21}+\frac{7}{x^2+4x-21}$

(10) $\frac{3x}{x^2-9x+20}-\frac{12}{x^2-9x+20}$

(11) $\frac{x^2}{x^2-4}+\frac{7x-18}{x^2-4}$

(12) $\frac{2x^2-x}{(x-3)^2}-\frac{15}{(x-3)^2}$

(R) $\frac{4}{x}$

(E) $\frac{x-3}{x-5}$

(I) $\frac{11x}{x-4}$

(U) $\frac{5(x-1)}{2x}$

(M) $\frac{x}{5}$

(D) $\frac{3(x+2)}{2x}$

(G) $\frac{12}{5x}$

(T) $\frac{2x+5}{x-3}$

(C) $\frac{x-5}{3}$

(N) $\frac{2x-1}{x-3}$

(A) $x+7$

(K) $\frac{2(x+2)}{3}$

(H) $\frac{3}{x-5}$

(S) $\frac{x+9}{x+2}$

(O) $\frac{1}{x-3}$

4	12	10	9	8	1	10	12	11	12	2	8	5	7	10	3	6

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ALGEBRA WITH PIZZAZZ!
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What Lives in the Sea and Yells?

Express each sum below in simplest form. Cross out the box containing your answer. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

① $\frac{3n}{7} + \frac{n}{14}$

② $\frac{4n}{15} + \frac{2n}{5}$

③ $\frac{5n}{3} + \frac{7}{4} + \frac{11n}{12}$

④ $\frac{4n+7}{6} + \frac{3n-1}{2}$

⑤ $\frac{2n-6}{5} + \frac{n-3}{10}$

⑥ $\frac{5n}{4} + \frac{n}{6} + \frac{7n}{12}$

⑦ $\frac{3x-2}{6x} + \frac{5x+1}{9x}$

⑧ $\frac{6x+7}{15} + \frac{x-3}{10}$

⑨ $\frac{4x-1}{3x} + \frac{x-8}{5x}$

⑩ $\frac{5x+1}{3x} + \frac{3x+4}{2x} + \frac{x+2}{6x}$

⑪ $\frac{4x+2}{5x} + \frac{10x-1}{20x} + \frac{2x-3}{4x}$

⑫ $\frac{2x-1}{5} + \frac{x}{6} + \frac{8-3x}{10}$

FI	TH	AC	ES	AN	LA	ND	SH	MS
$2n$	$\frac{n}{2}$	$\frac{3n-9}{5}$	$\frac{13n+4}{6}$	$\frac{4x+9}{15}$	$\frac{6x+11}{30}$	$\frac{3x+1}{6}$	$\frac{2(5x+4)}{3x}$	$\frac{8x-7}{10x}$
EA	HO	OF	RN	UT	ME	YE	ER	LL
$\frac{2n}{3}$	$\frac{19n+8}{6}$	$\frac{31n+21}{12}$	$\frac{n-3}{2}$	$\frac{13x+9}{6x}$	$\frac{9x-2}{5x}$	$\frac{19x-4}{18x}$	$\frac{21x-17}{15x}$	$\frac{23x-29}{15x}$

OBJECTIVE 1–b: To add algebraic fractions with unlike monomial denominators (excluding unlike powers).

Why Did Orgo Take a Bath After Walking Through Mudsucker Swamp?

Express each sum below in simplest form. Find your answer and notice the letter next to it. Write this letter in each box at the bottom of the page that contains the number of that exercise.

(1) $\frac{5}{x}+\frac{2}{x^2}$

(2) $\frac{3}{2x^2}+\frac{7}{6x}$

(3) $\frac{1}{3x}+\frac{5}{4x^3}$

(4) $\frac{-4}{x^3}+\frac{9}{x}+\frac{2}{x^2}$

(5) $\frac{7}{10x^2}+\frac{1}{2x^3}+\frac{11}{5x}$

Answers:

(U) $\frac{2x^2+5}{12x^3}$

(B) $\frac{11x^2+x+15}{5x^3}$

(S) $\frac{5x+2}{x^2}$

(E) $\frac{9x^2+2x-4}{x^3}$

(M) $\frac{22x^2+5x+10}{10x^3}$

(I) $\frac{22x^2+7x+5}{10x^3}$

(Y) $\frac{7x+9}{6x^2}$

(C) $\frac{3x+14}{6x^2}$

(A) $\frac{4x^2+15}{12x^3}$

(O) $\frac{9x^2-4x+4}{x^3}$

ALGEBRA WITH PIZZAZZ!
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OBJECTIVE 1-d: To add algebraic fractions with polynomial denominators.

Why Do Helicopters Get Sick So Often?

Express each sum below in simplest form. Find your answer and notice the three letters next to it. Write these letters in the three boxes at the bottom of the page that contain the number of that exercise.

① $\frac{7}{x-3}+\frac{4}{x^2-9}$

② $\frac{x}{x+5}+\frac{7x+10}{x^2+5x}$

③ $\frac{x-20}{x^2-4x}+\frac{x}{x-4}$

④ $\frac{m}{m+5}+\frac{10m}{m^2-25}$

⑤ $\frac{2}{m+3}+\frac{9}{m^2+8m+15}$

⑥ $\frac{11m}{m^2+3m-28}+\frac{m}{m+7}$

⑦ $\frac{3}{a+2}+\frac{8}{a-5}$

⑧ $\frac{6}{a^2-4}+\frac{2}{a+2}+\frac{5}{a-2}$

⑨ $\frac{2}{a-3}+\frac{7}{a^2+a-12}+\frac{1}{a+4}$

(COP) $\frac{3m}{m+7}$

(BIR) $\frac{m}{m-4}$

(DCA) $\frac{7x+25}{(x+3)(x-3)}$

(TES) $\frac{5a+14}{(a+2)(a-2)}$

(NTT) $\frac{9a+4}{(a+2)(a-5)}$

(THE) $\frac{x+2}{x}$

(RLY) $\frac{7a+12}{(a+2)(a-2)}$

(WHI) $\frac{m}{m-5}$

(HEG) $\frac{3}{a-3}$

(HAT) $\frac{4a+9}{(a-3)(a+4)}$

(ERM) $\frac{2m+19}{(m+3)(m+5)}$

(ENT) $\frac{x-1}{x}$

(ICK) $\frac{11m+2}{(m+3)(m+5)}$

(EST) $\frac{x+5}{x}$

(TCH) $\frac{11a+1}{(a+2)(a-5)}$

(HEL) $\frac{2m}{m+5}$

2	2	2	4	4	4	8	8	8	6	6	6	1	1	1	7	7	7	3	3	3	9	9	9	5	5	5

WHY ISN'T A SNOWMAN VERY SMART?

Express each difference below in simplest form. Find your answer and notice the letter next to it. Write this letter in each box containing the number of that exercise.

(1) $\frac{8}{x^2-4}-\frac{3}{x-2}$

(2) $\frac{9}{x^2-2x-15}-\frac{2}{x+3}$

(3) $\frac{7x}{x^2-9x+14}-\frac{4}{x-7}$

(4) $\frac{3}{x-4}-\frac{x-9}{x^2-16}$

(5) $\frac{5}{x+5}-\frac{2x+5}{x^2+9x+20}$

(6) $\frac{3}{d-7}-\frac{2}{3d+1}$

(7) $\frac{8}{5d+4}-\frac{1}{2d-3}$

(8) $\frac{d+2}{4d-1}-\frac{7}{d+5}$

(9) $\frac{d^2+3}{d^2-2d}-\frac{d-4}{d}$

(10) $\frac{d^2-11}{d^2-7d+12}-\frac{d+1}{d-4}$

Answers:

(L) $\frac{3x}{x+5}$ (A) $\frac{-2x+19}{(x+3)(x-5)}$

(I) $\frac{3}{x+4}$ (U) $\frac{2x+3}{(x-2)(x-7)}$

(O) $\frac{-3x+2}{(x+2)(x-2)}$ (W) $\frac{2x+21}{(x+4)(x-4)}$

(E) $\frac{3x+8}{(x-2)(x-7)}$ (C) $\frac{7x+11}{(x+3)(x-5)}$

Answers:

(Y) $\frac{3d+8}{d(d-2)}$ (P) $\frac{8d-15}{(5d+4)(2d-3)}$

(S) $\frac{2}{d-3}$ (H) $\frac{7d+17}{(d-7)(3d+1)}$

(N) $\frac{d^2-21d+17}{(4d-1)(d+5)}$ (T) $\frac{d^2-18d+4}{(4d-1)(d+5)}$

(R) $\frac{6d-5}{d(d-2)}$ (B) $\frac{11d-28}{(5d+4)(2d-3)}$

6	3	6	2	10	10	8	1	4	7	9	2	5	8	10

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Did You Hear About...

A	B	C	D	E
F	G	H	I	J ?

Express each sum or difference below in simplest form. Find your answer in the appropriate answer column and notice the word beneath it. Write this word in the box containing the letter of that exercise.

(A) $\frac{5}{a} + 2$

(B) $\frac{8}{a+4} + 3$

(C) $4 + \frac{5a}{2a-3}$

(D) $\frac{7}{3a-1} - 2$

(E) $\frac{a-9}{5a+2} - 6$

(F) $\frac{3x+1}{x^2+10} + 4$

(G) $\frac{5}{x^2-9} + \frac{2}{x-3} + 1$

(H) $\frac{x}{x+2} + \frac{x}{x-2} - 5$

(I) $\frac{10}{x-3} - \frac{10}{x+5} + 2$

(J) $3 - \frac{2x}{x-2} - \frac{5x}{x-5}$

Answers A–E:

$\frac{11a-15}{2a-3}$ SCHOOL
$\frac{-29a-21}{5a+2}$ DECIDED
$\frac{8a+17}{a+4}$ BOLD
$\frac{2a+5}{a}$ THE
$\frac{-3(2a-3)}{3a-1}$ WHO
$\frac{3a+20}{a+4}$ DRIVING
$\frac{-27a-16}{5a+2}$ WANTED
$\frac{13a-12}{2a-3}$ TEACHER
$\frac{-a+10}{3a-1}$ FROM

Answers F–J:

$\frac{2x^2+4x+50}{(x-3)(x+5)}$ THE
$\frac{x^2+5x+30}{x^2+10}$ THAT
$\frac{x^2+2x+2}{(x+3)(x-3)}$ GRADE
$\frac{-3(7x-10)}{(x-2)(x-5)}$ CURVE
$\frac{x^2+6x-30}{(x-3)(x+5)}$ HIGHWAY
$\frac{4x^2+3x+41}{x^2+10}$ TO
$\frac{3x^2+x-3}{(x+3)(x-3)}$ CRASH
$\frac{-3x^2+20}{(x+2)(x-2)}$ ON
$\frac{-5x^2+12}{(x+2)(x-2)}$ SOME

How Did the Hunter Get Hurt While Bending Over to Study Some Tracks?

Divide and write your answer as a polynomial or mixed expression. Cross out the box containing your answer. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

① $\frac{x^2 + 8x + 15}{x + 5}$

② $\frac{2x^2 + 3x - 14}{x - 2}$

③ $\frac{x^2 - 5x + 8}{x - 3}$

④ $\frac{x^2 - x + 12}{x - 6}$

⑤ $\frac{3x^2 - 5x - 11}{x + 1}$

⑥ $\frac{x^2 + 1 + 8x}{x + 4}$

⑦ $\frac{x^2 + 4}{x - 3}$

⑧ $\frac{2x^2 - 3x - 1}{2x + 1}$

⑨ $\frac{6x^2 - 7x + 5}{3x - 5}$

TH $x - 2 + \frac{2}{x - 3}$	HE $x + 3 + \frac{13}{x - 3}$	AT $2x + 2 + \frac{6}{3x - 5}$	ST $x + 5 + \frac{42}{x - 6}$	SH $2x + 1 + \frac{10}{3x - 5}$
RA $x - 3 + \frac{3}{2x + 1}$	SK $x + 3$	OT $x - 2 + \frac{1}{2x + 1}$	IN $3x - 6 - \frac{5}{x + 1}$	HI $x + 4 + \frac{9}{x - 3}$
BE $3x - 8 - \frac{3}{x + 1}$	TH $x + 2 - \frac{11}{x + 4}$	HU $2x + 7$	NT $x + 4 - \frac{15}{x + 4}$	IM $x + 7 + \frac{33}{x - 6}$

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What Do They Call People Who Like to Turn the Lights On and Off ?

Divide and write your answer as a polynomial or mixed expression. Find your answer below and notice the letter next to it. Write this letter in each box that contains the number of that exercise.

(1) $\frac{4x^2 - 4x + 3}{2x - 5}$

(2) $\frac{2x^2 - 20}{x + 3}$

(3) $\frac{x^3 + 5x^2 + 4x - 4}{x + 2}$

(4) $\frac{1 - 7x^2 + 6x^3 + 17x}{3x - 2}$

(5) $\frac{x^3 - 8}{x - 2}$

(6) $\frac{x^3 + 9x^2 - 80}{x + 4}$

(7) $\frac{6a^2 + 5ab - 5b^2}{2a - b}$

(8) $\frac{a^3 + 4a^2b + ab^2 - 2b^3}{a + b}$

(D) $x^2 + 2x - 7$

(T) $a^2 + 3ab - 2b^2$

(S) $x^2 + 2x + 4$

(N) $2x - 6 + \frac{7}{x + 3}$

(E) $2x^2 - x + 5 + \frac{11}{3x - 2}$

(A) $3a + 2b - \frac{8b^2}{2a - b}$

(R) $2x - 6 - \frac{2}{x + 3}$

(H) $x^2 + 5x - 20$

(I) $x^2 + 3x - 2$

(O) $x^2 + 5x - 18$

(C) $2x + 3 + \frac{18}{2x - 5}$

(U) $2x^2 - x - 5 + \frac{4}{3x - 2}$

(W) $3a + 4b - \frac{b^2}{2a - b}$

(M) $a^2 + 3ab - b^2 + \frac{5b^3}{a + b}$

5	7	3	8	1	6	6	3	8	8	4	2	5

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How Do We Know That Clocks Are Hungry?

For each exercise below, find the ratio or the rate as directed. Write the letter of the exercise in the box containing your answer.

I For each exercise below, express both measurements in the same unit. Then give their ratio as a fraction in simplest form.

(S) 20 sec to 2 min

(A) 3 h to 40 min

(O) 75¢ to $2

(H) 35 cm to 20 cm

(E) 60 cm to 4 m

(D) 1 kg to 250 g

(Y) 400 m to 5 km

(A) 96 people to 60 people

(W) The ratio of students to teachers in a school with 1200 students and 50 teachers.

(E) The ratio of men to women at a college with 1500 men and 1800 women.

(T) The ratio of tin to copper in an alloy that contains 48 kg of copper and 32 kg of tin.

(A) The ratio of wins to losses in 40 games with 15 losses and no ties.

(S) The ratio of advertising time to nonadvertising time in a one-hour TV show that includes 8 minutes of ads.

(E) The ratio of the area of a rectangle with sides 8 cm and 12 cm to the area of a square with sides 10 cm.

II For each exercise below, give the ratio of the two measurements in the unit indicated (a *rate*).

(V) A car traveled 500 miles on 25 gallons of gas. (miles per gallon)

(Y) Frank typed 90 words in 4 minutes. (words per minute)

(S) A jet traveled 1000 miles in 2.5 hours. (miles per hour)

(L) A gear revolved 480 times in 15 minutes. (revolutions per minute)

(N) Juan ran 600 meters in 1 minute 20 seconds. (meters per second)

(H) Osgood ate 9 hamburgers in half an hour. (hamburgers per minute)

(C) Mary Thon ran 26 miles in 2 hours 40 minutes. (minutes per mile to the nearest tenth)

$\frac{2}{3}$	$\frac{7}{4}$	$\frac{24}{25}$	$\frac{2}{25}$	$\frac{9}{2}$	32	$\frac{24}{1}$	$\frac{5}{3}$	22.5	$\frac{1}{6}$	0.3	$\frac{8}{5}$	20	$\frac{3}{20}$	400	$\frac{5}{6}$	6.2	$\frac{3}{8}$	7.5	$\frac{4}{1}$	$\frac{2}{13}$

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Did the Farmer Hurt Any Cows When He Lost Control of His Tractor?

Solve each problem below. Find your answer in the answer column and notice the two letters next to it. Write these letters in the two boxes that contain the number of that exercise.

VVVVVVVVVVVVVVVVVVVVVVVVVVVVV

(1) Two numbers are in the ratio 5 : 2 and their sum is 56. Find the numbers.

_____ , _____

(2) Find two numbers whose ratio is 3 : 7 and whose sum is 150.

_____ , _____

(3) A certain color is made by blending red paint and blue paint in a 9 : 4 ratio. How many liters of each are needed to make 65 liters of this color?

_____ ℓ, _____ ℓ

(4) A commission of $1000 is to be divided between two people in a 3 : 5 ratio. How much should each person receive?

$ _____ , $ _____

(5) Three numbers are in a 2 : 3 : 5 ratio and their sum is 70. Find the numbers.

_____ , _____ , _____

(6) The sum of the angle measures of any triangle is 180°. Find the three angle measures of a triangle if they are in an 8 : 3 : 4 ratio.

_____ °, _____ °, _____ °

TH	48, 102
NO	24, 18, 6
EM	45, 20
NE	350, 650
ED	40, 16
LO	6, 6, 9, 18, 21
AZ	32, 48
TH	14, 21, 35
HE	45, 105
IF	26, 18, 4
GR	96, 36, 48
RU	98, 32, 50
JU	8, 8, 12, 24, 28
ST	375, 625
EW	30, 45

(7) A grass seed mixture contains bluegrass, ryegrass, and fescue seeds in a 4 : 3 : 1 ratio. How many ounces of each seed are contained in a 3 pound (48 ounce) box of the mix?

_____ oz, _____ oz, _____ oz

(8) A market carries five flavors of ice cream. They sell in approximately a 2 : 2 : 3 : 6 : 7 ratio. How many cartons of each should be stocked if there is space for 80 cartons?

_____ , _____ , _____ , _____ , _____

(9) The width and length of a rectangular poster are in a 2 : 3 ratio. The perimeter of the poster is 160 cm. Find its dimensions.

_____ cm, _____ cm

7	7	2	2	8	8	4	4	6	6	9	9	1	1	5	5	3	3

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BOOKS NEVER WRITTEN

Yours Forever by

___	___	___	___	___	___	___	___	___	___	___	___	___	___
$\frac{84}{5}$	$\frac{20}{3}$	$-\frac{3}{2}$	$-\frac{3}{2}$	$\frac{20}{3}$	$\frac{32}{3}$	-12	$\frac{11}{4}$	$\frac{12}{7}$	$\frac{84}{5}$	$\frac{20}{3}$	15	$\frac{32}{3}$	

The Incompetent Bullfighter by

___	___	___	___	___	___	___	___	___	___	___	___	___	___
$\frac{5}{8}$	$\frac{33}{16}$	$-\frac{43}{4}$	$\frac{11}{4}$	$\frac{33}{16}$	-12	$\frac{38}{7}$	$-\frac{3}{2}$	21	$\frac{11}{4}$	$\frac{11}{4}$	$\frac{8}{9}$		

ABOVE ARE THE TITLES OF TWO "BOOKS NEVER WRITTEN." TO DECODE THE NAMES OF THEIR AUTHORS, FOLLOW THESE DIRECTIONS:

Solve each equation below and find the solution in the code. Each time the solution appears, write the letter of that exercise above it.

(U) $\frac{x}{6}=\frac{7}{2}$

(E) $\frac{a}{8}=\frac{4}{3}$

(Y) $\frac{2}{9}=\frac{t}{4}$

(O) $\frac{8}{11}=\frac{3}{2y}$

(G) $\frac{1}{6x}=\frac{4}{15}$

(I) $\frac{k+5}{7}=\frac{5}{3}$

(B) $\frac{x-4}{2}=\frac{x+1}{9}$

(N) $\frac{7}{d+5}=\frac{10}{d+2}$

(A) $\frac{x}{4}=\frac{2x+3}{15}$

(M) $\frac{21}{y-8}=3$

(R) $\frac{17-4x}{12}=5$

(T) $\frac{11u}{6}=u+14$

(D) $\frac{2n+3}{4}=\frac{5n-1}{6}$

(L) $\frac{15}{8x-3}=\frac{1}{2+2x}$

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Why Is a Good Grade in Algebra Like a Puppy in Antarctica ?

Solve each problem and find your answer in the rectangle below. Cross out the box that contains your answer. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

1	If there are 560 calories in 8 ounces of meat, how many calories are in 3 ounces of meat?	_____ calories
2	If 2 cubic feet of sawdust weigh 25 pounds, how much do 9 cubic feet of sawdust weigh?	_____ pounds
3	A certain hose delivers 5 gallons of water in 24 seconds. How much water will the hose deliver in 10 minutes?	_____ gallons
4	The ratio of the weight of an object on Mars to its weight on Earth is 9 to 25. If a person weighs 120 pounds on Earth, how much would the person weigh on Mars?	_____ pounds
5	A flagpole casts a shadow 8.5 meters long. If an algebra student 1.6 meters tall casts a shadow 2.0 meters long at the same time and location, how tall is the flagpole?	_____ meters
6	A U.S. nickel is composed of 3.9 grams of copper and only 1.2 grams of nickel. How many kilograms of copper must be combined with 4 kilograms of nickel in the manufacture of nickel coins?	_____ kilograms
7	At a certain college, the ratio of men to women is 6 to 5. If there are 2580 men, how many women are there?	_____ women
8	In a town of 30,000 households, a survey was taken to estimate the number of households in which a certain TV program had been viewed. Of the 200 residences surveyed, the program had been seen in 64. Assuming that this was a representative sample, estimate the total number of households in the town in which the program was viewed.	_____ households

PU	I	NA	PS	TS	A	DO
125	14.2	9600	43.2	8800	13	41.5
IT	GO	T	NI	OD	RA	CE
210	132	6.8	2230	112.5	2150	7.3

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DOUBLE CROSS

1. What do you get when you cross an absent-minded elephant with a small flea?

   Answer:

$\frac{1}{2}$	-4	$\frac{9}{4}$	$-\frac{17}{15}$	$\frac{30}{7}$	-2	1	23	-2	$\frac{30}{7}$	5	$\frac{1}{2}$	1

2. What do you get when you cross a shark with a snowball?

   Answer:

-4	$-\frac{17}{15}$	$\frac{9}{4}$	$\frac{11}{2}$	1	$-\frac{5}{4}$	20	1	-2

Solve each equation below and find the solution in the code. Each time the solution appears, write the letter of that exercise above it.

(G) $\frac{x}{2}+\frac{2x}{3}=5$

(I) $\frac{9x}{5}-\frac{3x}{2}=6$

(O) $\frac{2n-3}{2}=\frac{3}{4}$

(S) $\frac{1}{3}(a+5)=\frac{7}{2}$

(A) $\frac{3x-1}{4}+\frac{x}{2}=\frac{3}{8}$

(E) $\frac{2t+2}{3}-\frac{5t}{4}=\frac{11}{6}$

(M) $\frac{1}{5}(2x-1)=\frac{1}{3}(x+4)$

(B) $\frac{3k-8}{14}+\frac{5}{7}=\frac{k+1}{2}$

(R) $\frac{x+3}{4}-2=\frac{5x-2}{5}$

(N) $\frac{4x}{3}-\frac{2x+3}{6}=\frac{9}{2}$

(F) $\frac{1}{10}(m+8)-\frac{1}{15}(m-5)=1$

(T) $\frac{5x}{6}-\frac{3-x}{8}=\frac{4x+3}{12}$

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What Did the Girl Rock Say to the Boy Rock?

Solve each problem below. Find your answer in the answer column and notice the two letters next to it. Write these letters in the two boxes that contain the number of that exercise.

(1) One half of a number added to two thirds of the number is 21. Find the number. _____

(2) Three fifths of a number plus one fourth of the number is 34. Find the number. _____

(3) One third of a number is 15 less than five sixths of the number. Find the number. _____

(4) Two thirds of a number is $3\frac{1}{2}$ more than three eighths of the number. Find the number. _____

(5) One half of a certain even integer plus one fifth of the next consecutive even integer equals 48. Find the two integers. _____ , _____

(6) A class has 1 more boy than girl. One third of the boys and three fourths of the girls love pizza. If 9 students love pizza, how many girls and how many boys are in the class? _____ , _____

(7) Will is twice as old as Jill. Three years ago, Jill's age was two fifths of Will's age then. How old is each now? _____ , _____

(8) Zarina spent one fourth of her money on food, three tenths of her money on books, and two fifths of her money on records. If she spent $95 on these three items all together, how much money did she have to begin with? $ _____

NO 48, 50
AL 8, 9
IT 18
ST 120
BE 12
LD 100
ER 40
ES 10, 20
TL 68, 70
EN 60
OU 30
EB 9, 18
DO 15
AF 14, 15

4	4	6	6	1	1	5	5	7	7	3	3	8	8	2	2

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Did You Hear About...

A	B	C	D	E	F
G	H	I	J	K	L ?

11	WANTED
−8	HAD
−6	STUDENTS
3	THE
$-\frac{11}{3}$	CONTROL
$\frac{1}{8}$	REASON
10	CROSS
$\frac{8}{3}$	HIS
−4	COLLEGE

Solve each equation below. Find your answer in one of the answer columns and notice the word next to it. Write this word in the box above that contains the letter of that exercise. Keep working and you will hear about a college "eye deal."

(A) $\frac{1}{9}+\frac{1}{x}=\frac{4}{9}$

(B) $\frac{2}{5}+\frac{1}{x}=\frac{1}{2}$

(C) $\frac{5}{4x}+\frac{1}{x}=3$

(D) $\frac{7}{n-3}=\frac{4}{n}$

(E) $\frac{8}{5x}-\frac{2}{3x}=\frac{4}{15}$

(F) $\frac{a+5}{4a}+\frac{11}{12}=\frac{2}{3a}$

(G) $\frac{x}{2x+6}-\frac{1}{x+3}=1$

(H) $\frac{1}{m+5}=\frac{2}{m^2-25}$

(I) $\frac{1}{y+3}=\frac{7}{y-3}-\frac{2}{y^2-9}$

(J) $\frac{x-3}{2x-4}=\frac{x}{x-2}+2$

(K) $\frac{x+5}{x^2-x}-\frac{3}{x}=\frac{1}{x-1}$

(L) $\frac{n+3}{n}-\frac{n+2}{n+5}=\frac{1}{n}$

$\frac{7}{2}$	PROFESSOR
$\frac{3}{4}$	EYED
$-\frac{2}{9}$	SUBJECTS
1	OVER
7	NO
$\frac{9}{5}$	A
$-\frac{1}{2}$	WHO
−2	PUPILS
$\frac{5}{12}$	THAT

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What Sound Did the Sheep Hear When Her Sister Exploded?

Solve each equation and find your answer in the rectangle below. Cross out the box that contains your answer. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

① $\frac{2}{x+3}+\frac{3}{x+4}=\frac{7}{x^2+7x+12}$

② $\frac{4}{x-5}+\frac{1}{x+2}=\frac{2x+7}{x^2-3x-10}$

③ $\frac{a-30}{a^2+4a-21}=\frac{5}{a+7}-\frac{2}{a-3}$

④ $\frac{x}{x+4}=\frac{3}{x-1}$

⑤ $\frac{6}{y+2}+\frac{1}{y-2}=1$

⑥ $\frac{3}{n}+\frac{2}{n-1}=2$

⑦ $2=\frac{x}{x+3}-\frac{3}{x-5}$

⑧ $\frac{1}{d-7}+\frac{d}{d-2}=\frac{5}{d^2-9d+14}$

⑨ $\frac{x-1}{x+1}-\frac{6}{x-3}=3$

YE	SI	CK	SB	AM	SH	OO	FR	KO	MB	IG	UP	AH	ER
6, 1	−5, 2	−1	−9	−3, 1	$-\frac{1}{2}$	2, 8	−7, 3	−2	$\frac{1}{4}$, −1	$\frac{1}{2}$, 3	$\frac{4}{3}$	$\frac{1}{3}$, 5	6, −2

(((

OBJECTIVE 3–h: To solve fractional equations (solving a quadratic equation may be required).

Why Was the Dirty Old Hotel Called "The Fiddle"?

Do each exercise below and find your answer at the bottom of the page. Write the letter of that exercise above your answer.

(S) 67% of 24

(I) 4% of 9.25

(H) $2\frac{1}{2}$% of 60

(N) 100% of 77

(T) 180% of 29

(U) 0.6% of 42.5

(W) 37.5% of 80

(A) 250% of 1.7

(I) $1\frac{3}{4}$% of 4

(E) 0.12% of 5000

(S) $87\frac{1}{2}$% of 200

(A) 1% of 9.9

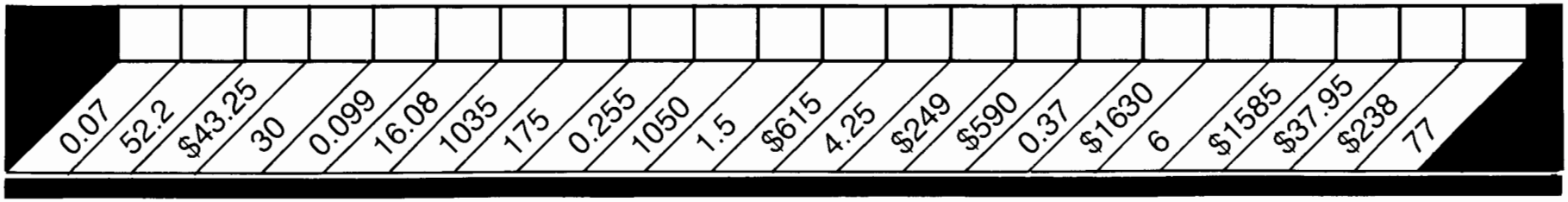
(I) Zoomer Bix plans to buy a microcomputer that costs $690, excluding sales tax. If the sales tax rate is $5\frac{1}{2}$%, how much tax will Zoomer have to pay?

(C) Wheel World sold 875 cars last year. If sales this year are 120% of sales last year, how many cars will Wheel World sell this year?

(V) Klutz Schlump borrowed $500. He agreed to pay back the entire loan, plus interest, at the end of the year. If the interest rate is 18% per year, what is the total amount Klutz agreed to pay back?

(N) The "suggested retail" price of a certain camera is $340, but a discount store sells the camera at a 30% discount. What is the price of the camera at the discount store?

(L) Mr. J. Doe has a taxable income of $9000. If the income tax rate is 16% on the first $4000 of income, 19% on the next $4000, and 23% on the next $1000, how much is Mr. Doe's tax?



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ALGEBRA WITH PIZZAZZ! © Creative Publications

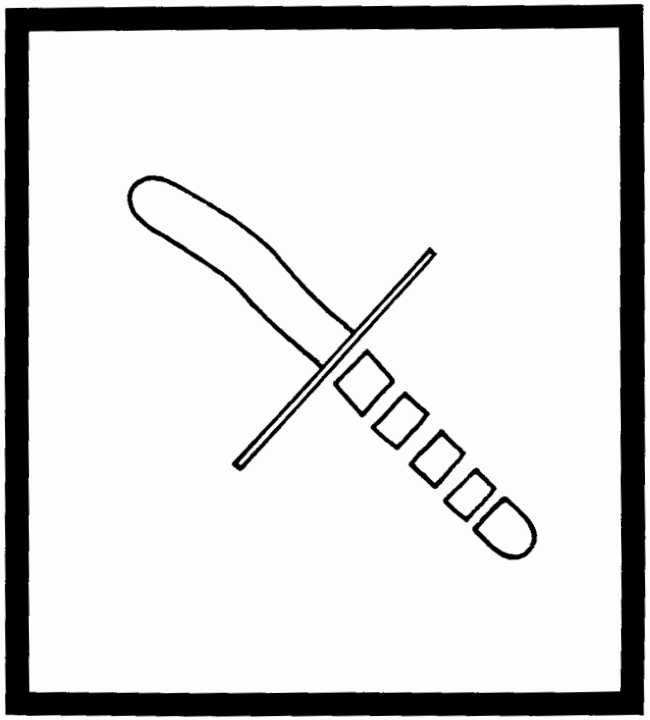
What Is the Title of This Picture?

CODED TITLE:

18	11	32	11	200	45	60	11.34	11	18

5	25.2	200	45	54.12	200	25.2	24	24	60	11.34	30

7	200	7	85	25.2	200	70	6.4	7	18	11



TO DECODE THE TITLE OF THIS PICTURE:

Find what number should go in the blank in each exercise below. Each time this number appears in the code, write the letter of that exercise above it.

(N) 21% of 54 = ____

(O) 7% of 360 = ____

(G) 40% of 75 = ____

(I) ____ % of 40 = 24

(T) ____ % of 25 = 8

(A) ____ % of 500 = 35

(C) 66% of 82 = ____

(E) ____ = 4% of 275

(L) ____ = 80% of 8

(W) ____ % of 90 = 4.5

(Z) 10.2 = ____ % of 12

(S) 14.4 out of 60 = ____ %

(B) 30% of ____ = 21

(M) 8% of ____ = 3.6

(D) 75% of ____ = 13.5

(R) 3% of ____ = 6

DAFFYNITION DECODER

1. Sleeping Bag:

___	___	___	___	___	___	___
225	$33\frac{1}{3}$	31.2	7000	$33\frac{1}{3}$	15	45

2. Twins:

___	___	___	___	___	___	___	___	___
90	1.25	140	$26\frac{2}{3}$	140	$33\frac{1}{3}$	224	3.5	7000

3. Buckshot:

___	___	___	___	___	___	___	___	___	___	___	___	___
$33\frac{1}{3}$	200	1.25	19.6	19.6	$33\frac{1}{3}$	32	90	$33\frac{1}{3}$	7000	224	3.5	200

TO DECODE THESE THREE DAFFYNITIONS:

Find what number should go in the blank in each exercise below. Each time this answer appears in the code, write the letter of the exercise above it. Keep working and you will decode "define" print.

(T) 70% of 320 = ____

(P) 130% of 24 = ____

(O) 2.5% of 50 = ____

(C) ____ % of 80 = 12

(B) 4 out of 15 = ____ %

(E) 2.1 out of 60 = ____ %

(K) 20% of ____ = 9

(R) 6% of ____ = 1.92

(D) $1\frac{1}{2}$% of ____ = 3

(N) $37\frac{1}{2}$% of 600 = ____

(L) ____ = 280% of 7

(M) ____ % of 25 = 35

(A) 18 = ____ % of 54

(W) 110% of ____ = 99

(S) 7 = 0.1% of ____

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When the Snake Charmer Married the Undertaker, What Did They Have Monogrammed on Their Towels?

Solve each problem below. Find your answer in the answer column and notice the letter next to it. Write this letter in each box that contains the number of that problem.

(1) After taking his girl friend out to dinner, Osgood decides to leave a tip of 15% of the bill. If the bill is $38, how much should the tip be? $ _____

(2) Profits of Calculess Corporation this year were 140% of profits last year. If profits last year were $5200, what were profits this year? $ _____

(3) Klutz got 10 out of 16 problems on an algebra test correct. What percent were correct? _____ %

(4) A team won 13 games, lost 15 games, and tied 2 games. What percent of its games did the team win? _____ %

(5) In a magazine drive a school keeps 40% of all sales dollars. How many dollars worth of magazines must be sold for the school to earn $5000. $ _____

(6) A real estate broker earns $2\frac{1}{2}$% of her sales as a commission. How many dollars in sales does she need in order to earn a commission of $1000? $ _____

(7) A steel cable expands 0.2% of its length when its temperature is increased 100°C. How much longer will a 750 meter cable become with this increase in temperature? _____ m

(8) Elmo Buckets made 54 out of 80 free throws. What percent did he miss? _____ %

(M)	$36\frac{2}{3}$
(H)	1.5
(R)	12,500
(I)	5.70
(T)	4.25
(D)	$62\frac{1}{2}$
(N)	40,000
(A)	7280
(O)	7160
(S)	$32\frac{1}{2}$
(L)	36,000
(E)	$43\frac{1}{3}$

7	1	8	8	2	6	3	7	4	2	5	8	4

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Why Did the Termite Like Expensive Hotels?

Solve each problem below. Find your answer in the answer column and notice the two letters next to it. Write these letters in the two boxes that contain the number of that exercise.

(1) The price of an Instazoom camera increased from \$75 to \$90. Find the percent of increase in price.

(2) The number of students attending Sky High School increased from 1500 to 1700. What was the percent of increase?

(3) Because of improved technology, the time needed to manufacture an XYZ machine has fallen from 20 hours to 9 hours. Find the percent of decrease.

(4) After two weeks on the Try-No-Meal Diet, Thelda's weight dropped from 60 kg to 56 kg. Find the percent of decrease.

(5) During one year, the value of a diamond increased 25%. If the diamond was originally worth \$3000, what was it worth one year later?

(6) During June a car dealer sold 250 new cars. During July he sold 14% fewer cars. How many cars did he sell in July?

(7) At the close of one business day, TNT stock was trading at \$40 per share. At the close of the next business day, the stock was trading at \$43 per share. Find the percent of increase.

(8) A \$150 bicycle is on sale at a 20% discount. If there is a 5% sales tax, how much does the bicycle cost in all?

RS	12.5%
ET	215
OO	$13\frac{1}{3}\%$
LE	\$3675
SU	\$126
DA	20%
IT	64%
HA	\$3750
ER	224
HE	55%
TH	7.5%
MS	$8\frac{1}{3}\%$
IT	$6\frac{2}{3}\%$
PO	\$132

3	3	5	5	1	1	8	8	4	4	6	6	2	2	7	7

OBJECTIVE 3–I: To solve word problems involving the percent of increase or decrease in a quantity.

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What Do You Call a Wristwatch to Be Worn in the 23rd Century?

Solve each formula below for the indicated letter. Circle the letter next to your answer. Write this letter in the box at the bottom of the page that contains the number of that exercise.

$d = rt$, for r (E) $r = \frac{d}{t}$ ① (L) $r = dt$	$A = \frac{abc}{4r}$, for r (H) $r = \frac{A}{4abc}$ ⑤ (U) $r = \frac{abc}{4A}$	$\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$, for f (A) $f = \frac{pq}{q-p}$ ⑨ (U) $f = \frac{pq}{p+q}$	$\frac{A}{B} = \frac{C}{D}$, for C (S) $C = \frac{AD}{B}$ ⑬ (N) $C = \frac{BD}{A}$
$a = \frac{F}{m}$, for F (N) $F = \frac{m}{a}$ ② (T) $F = ma$	$\frac{P}{Q} = \frac{R}{S}$, for S (A) $S = \frac{QR}{P}$ ⑥ (I) $S = \frac{QP}{R}$	$\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$, for p (S) $p = \frac{q+f}{qf}$ ⑩ (F) $p = \frac{qf}{q-f}$	$A = \frac{h(a+b)}{2}$, for b (K) $b = \frac{2A}{h} - a$ ⑭ (E) $b = \frac{ah}{2A}$
$P = \frac{w}{t}$, for t (S) $t = \frac{P}{w}$ ③ (R) $t = \frac{w}{P}$	$a = \frac{v-i}{t}$, for v (I) $v = at + i$ ⑦ (P) $v = a(t-i)$	$\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2}$, for R (W) $R = \frac{r_1 r_2}{r_1 + r_2}$ ⑪ (N) $R = \frac{r_1 r_2}{r_1 - r_2}$	$V = \frac{Q}{r_1} - \frac{Q}{r_2}$, for Q (S) $Q = \frac{r_1 + r_2}{Vr_1 r_2}$ ⑮ (T) $Q = \frac{Vr_1 r_2}{r_2 - r_1}$
$h = \frac{V}{B}$, for B (I) $B = \frac{V}{h}$ ④ (V) $B = Vh$	$\frac{E}{e} = \frac{R+r}{r}$, for e (N) $e = \frac{ER}{r}$ ⑧ (C) $e = \frac{Er}{R+r}$	$\frac{1}{t} = \frac{1}{a} + \frac{1}{b}$, for b (S) $b = \frac{at}{t-a}$ ⑫ (T) $b = \frac{at}{a-t}$	$u = F\left(\frac{P}{T} - E\right)$, for P (R) $P = \frac{uT + EFT}{F}$ ⑯ (E) $P = \frac{uF + ET}{F}$

6	10	5	12	9	3	1	11	16	7	13	2	15	4	8	14	

OBJECTIVE 4–a: To solve a formula for a given letter (formulas may have variables in the denominator).

Why Is a Hill Like a Lazy Young Dog?

Solve each problem, assuming that all interest rates indicate annual simple interest. Cross out the box that contains your solution. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

(1) $0.05x + 0.09(3x) = 32$

(2) $0.08n + 0.12(n + 500) = 180$

(3) $0.15d + 0.07(1000 - d) = 130$

(4) $0.125y + 0.1(800 - y) = 85$

(5) Ms. Twinkle invested part of her savings at 6% and the rest at 9%. The amount at 9% was twice the amount at 6%. If her total return after one year was \$72, find the amount invested at each rate.

_____ at 6%; _____ at 9%

(6) Rockjaw invested part of his savings at 7% and the rest at 13%. The amount at 7% was \$200 more than the amount at 13%. If his total return after one year was \$84, find the amount invested at each rate.

_____ at 13%; _____ at 7%

(7) Cirilla invested part of her savings at 10% and the rest at 8%. The amount at 8% was \$1500 more than the amount at 10%. If the total annual income is \$480, how much was invested at each rate?

_____ at 10%; _____ at 8%

(8) Patty Wack had \$900. She invested part of it at 12% and the rest at 9%. If her total annual return was \$96, how much did she invest at each rate?

_____ at 12%; _____ at 9%

(9) Dr. Beaker invested \$3000, part at 8% and the rest at $7\frac{1}{2}$%. The total return for one year was \$231. How much was invested at each rate?

_____ at 8%; _____ at $7\frac{1}{2}$%

(10) A scholarship fund raised \$7000 in contributions. Part was invested in bonds paying 6% interest, and the rest was invested in bank certificates paying $8\frac{1}{2}$%. If the total annual income is \$520, find the amount invested at each rate.

_____ at 6%; _____ at $8\frac{1}{2}$%

AB 750	AD \$500; \$400	IT \$200; \$400	OG \$350; \$550	IS 450	IN 100	AS \$1400; \$1600	IT \$3000; \$4000
LE \$300; \$600	LO \$2500; \$4500	EP 200	VE \$1200; \$1800	PE \$700; \$200	TS \$2000; \$3500	UP \$2500; \$4000	AT 600

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What Did Finnegan Dislike About the Candle-Making Business ?

Solve each problem below. Assume that all interest rates indicate annual simple interest. Find your solution in the answer column and notice the three letters next to it. Write these letters in the three boxes that contain the number of that exercise.

(1) Solve: $0.05(x + 900) = 0.08x$

(2) Solve: $0.065(x - 2000) = 0.04x + 70$

(3) Sam Quirk invested $7000, part at 7% and the rest at 11%. If his total return for one year was $690, how much was invested at each rate?

_____ at 7%; _____ at 11%

(4) An investment fund has $3000 more invested at 8% than it does at 10%. If the annual return from the 8% investment is the same as the annual return from the 10% investment, how much is invested at each rate?

_____ at 10%; _____ at 8%

(5) Ms. Smyle has $200 less invested at 9% than she does at $6\frac{1}{2}$%. If the annual return from the two investments is the same, how much is invested at each rate?

_____ at $6\frac{1}{2}$%; _____ at 9%

(NSA)	$7200
(THE)	$9500; $12,500
(RKO)	$2000; $5000
(BRA)	$750; $950
(ADT)	1500
(NWI)	$6000
(CKE)	$720; $520
(OMA)	$2400; $4000
(NDS)	8000
(ION)	4200
(OWO)	$2100; $3700
(HEH)	$12,000; $15,000
(STA)	$2500; $4500

(6) Sally Snuggle has $1600 more invested at 5% than she does at 8%. The annual return from the 5% investment is $17 more than the annual return from the 8% investment. How much is invested at each rate?

_____ at 8%; _____ at 5%

(7) Merlin invested half of his money at 12%, one fourth at 8%, and the rest at 6%. If the total annual income is $570, how much was invested altogether?

4	4	4	1	1	1	6	6	6	3	3	3	7	7	7	5	5	5	2	2	2

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Why Is a Plowed Field Like Feathered Game?

Solve each problem below and find the solution at the bottom of the page. Write the letters next to the problem in the two boxes above the solution.

(IS) Nuts to You Shoppe sells cashews for $15 per kg and pecans for $10 per kg. How many kilograms of each should be mixed in order to get 20 kg of a mixture worth $12 per kg?

_____ kg of cashews
_____ kg of pecans

(ES) Coffee Grounds, Inc., has two kinds of coffee. Coffee A costs $9 per kg and Coffee B costs $6 per kg. How many kilograms of each should be combined to obtain 150 kg of a blend worth $8 per kg?

_____ kg of Coffee A
_____ kg of Coffee B

(RT) C and Y Candy Company mixes candy that costs $6.00 per kg with candy that costs $4.50 per kg. How many kilograms of each are needed to make a 3 kg box that costs $15.00?

_____ kg of $6.00 candy
_____ kg of $4.50 candy

(IT) Trail Snax Corp. mixes raisins that cost $5.00 per kg with peanuts that cost $3.80 a kg. How many kilograms of raisins should be mixed with 10 kg of peanuts to obtain a mixture worth $4.00 per kg?

_____ kg of raisins

(RI) Ground beef sells for $4.75 per kg and ground pork sells for $5.50 per kg. How many kilograms of ground pork should be mixed with 8 kg of ground beef to make a mixture that sells for $5.10 per kg?

_____ kg of pork

(PA) Speed Seed Company mixes bluegrass seed that costs $7.60 per kilogram with ryegrass seed that costs $6.25 a kg. How many kilograms of bluegrass seed should be mixed with 200 kg of ryegrass seed to make a mixture worth $7.00 per kg?

_____ kg of bluegrass

(DG) A card company mixes two varieties of cards. Embossed cards cost $.65 each, and regular cards $.40 each. How many cards of each type should be included in an assortment of 25 cards that costs $14.00?

_____ embossed cards
_____ regular cards

90			8			1	10		16	100	1.5
60	2	5	12	175	250	2	15	7	9	50	1.5

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What Happened to the Computer Programmer?

Solve each problem below and find the solution in the answer column. Notice the letter next to it. Look for this letter in the string of letters near the bottom of the page and CROSS IT OUT each time it appears. When you finish, write the remaining letters in the rectangle at the bottom of the page.

(1) How many liters of water must be added to 8 liters of a 40% acid solution to obtain a 10% acid solution?

(2) How many liters of water must be added to 20 liters of a 70% antifreeze solution to produce a 50% solution?

(3) Bunson Beaker has 150 grams of a 50% salt solution. How many grams of water must be added to obtain a 20% salt solution?

(4) How much water must be added to 12 grams of a 90% iodine solution to produce a 25% iodine solution?

(5) Moonshine has 50 liters of a 70% alcohol solution. How many liters of pure alcohol must be added to obtain an 80% alcohol solution?

(6) How many kilograms of pure salt must be added to 20 kilograms of a 10% salt solution to obtain a 25% salt solution?

(7) How much pure acid must be added to 6 milliliters of a 5% acid solution to produce a 40% acid solution?

(E) 22 ℓ
(S) 4 kg
(A) 3.1 mℓ
(U) 8 ℓ
(W) 32.5 g
(M) 225 g
(O) 3.5 mℓ
(L) 24 ℓ
(D) 5 ℓ
(I) 25 ℓ
(T) 5.5 kg
(R) 31.2 g
(H) 240 g

R H L I E S I W O E M N O S T U D O L A M I T O A U R W M A S Y

Answer:

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What Do You Call a Chicken Who Eats Clay ?

Solve each problem and find your answer in the rectangle below. Cross out the box containing your answer. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

1. Harry can paint a room in 3 hours, and Kerry can paint it in 4 hours. How long will it take if they work together?

2. Matthew can build a block wall in 3 days. Andy can build the wall in 5 days. How long will it take if they work together?

3. Pump A can fill a tank in 8 hours. Pump B can fill the tank in 6 hours. How long will it take to fill the tank using both pumps?

4. To do a job alone, it would take Jennifer 5 hours, Bob 8 hours, and George 10 hours. How long would it take if they all work together?

5. Susan and Mary working together can rake a lawn in 2 hours. Susan can do the job alone in 3 hours. How long would it take Mary to rake the lawn alone?

6. Pipe A can empty a pool in 8 hours. If Pipe B is also used, the pool can be emptied in 3 hours. How long would it take Pipe B, by itself, to empty the pool?

7. Noah can build an ark in 40 days. Together, Noah and his wife can build the ark in 24 days. How long would it take Noah's wife working alone?

CH 6 h	AB 58 d	AD $1\frac{5}{7}$ h	IG 60 d	R $2\frac{11}{17}$ h	OP $1\frac{7}{8}$ d	IC 7 h
H $3\frac{3}{7}$ h	KL $4\frac{7}{8}$ h	A $1\frac{2}{3}$ d	TE $4\frac{4}{5}$ h	YE 75 d	GG $2\frac{6}{17}$ h	R $3\frac{7}{10}$ h

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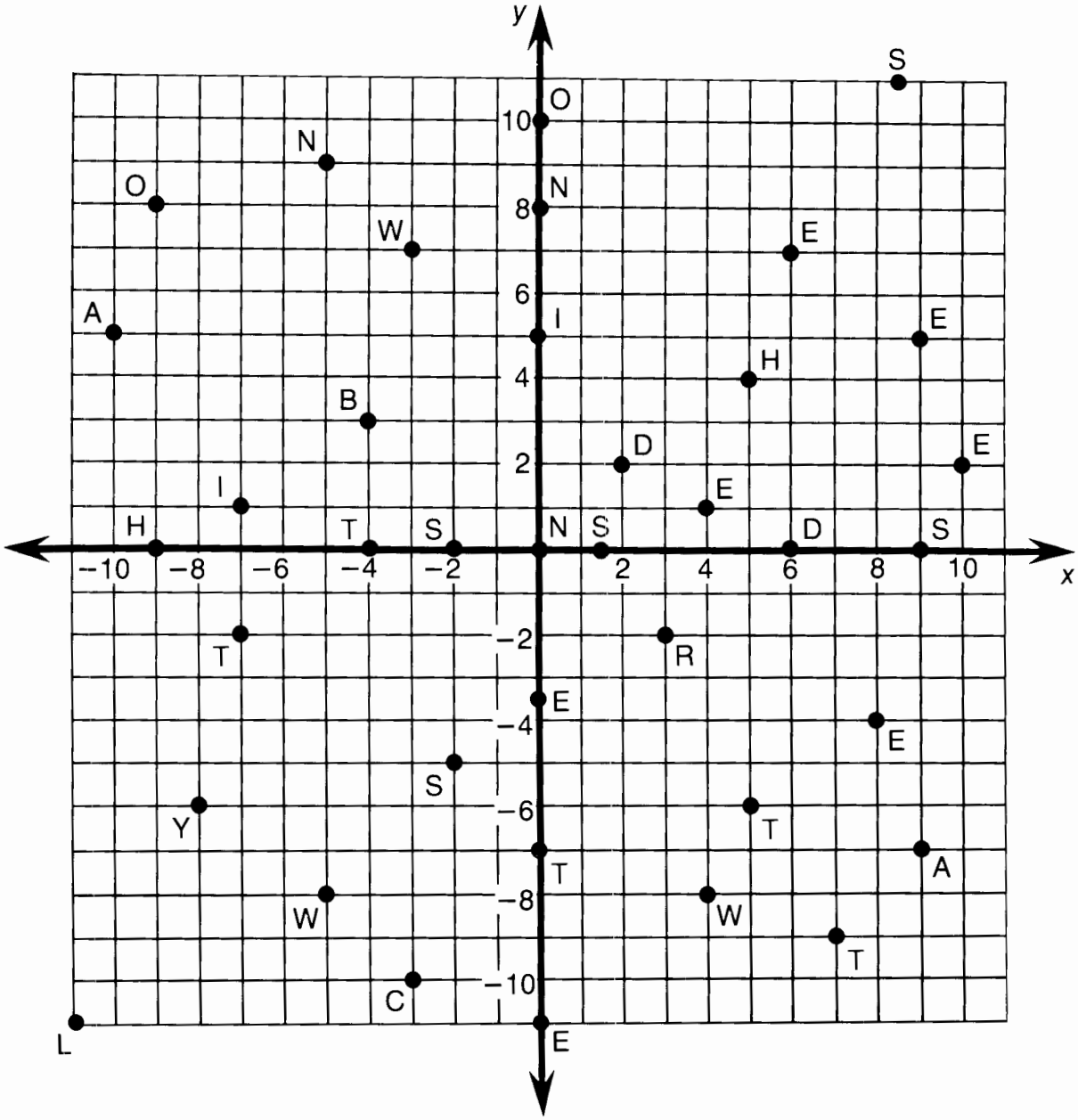
What Happened After a Burglar Broke Into a Tuba Factory ?

Each ordered pair at the bottom of the page represents a point on the coordinates below. Above each ordered pair, write the letter that appears at that point.



(5, 4) (10, 2) (−3, 7) (−10, 5) (−2, −5) (−3, −10) (3, −2) (8, −4) (6, 0) (0, 5) (−4, 0) (0, −11) (2, 2)

(−5, −8) (−7, 1) (7, −9) (−9, 0) (−7, −2) (4, −8) (6, 7) (−5, 9) (0, −7) (−8, −6) (0, 10) (0, 0) (9, 5)

(9, 0) (5, −6) (−9, 8) (−11, −11) (4, 1) (0, 8) (−4, 3) (9, −7) (−2, 0) (8.5, 11) (0, −3.5) (1.5, 0)

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OBJECTIVE 5–a: To locate a point in a coordinate plane given its coordinates.

Why Was the Baby Cookie Sad?

Each row across has five boxes. Only three of them contain solutions of the equation at the beginning of that row. CIRCLE these three solutions. Notice the number-letter pair above each solution you have circled. Write the letter in the box at the bottom of the page that contains the matching number.

1	12-S	19-B	5-O	22-L	15-A
$3x + y = 7$	(2,1)	(3, −4)	(4, −5)	(0, 5)	(−1, 10)
2	24-F	9-R	2-I	17-K	19-S
$-2x + y = 4$	(−2, 1)	(0, 4)	(−3, −2)	(−1, 5)	(3,10)
3	22-O	8-E	20-P	24-G	6-M
$5x - 2y = 1$	(3, 7)	(−1, −3)	(2, −5)	(1, 2)	(−2, 4)
4	1-R	17-E	3-Y	11-A	20-O
$y = 4x - 1$	(2, 5)	(0, −1)	(−1, 6)	(−2, −9)	(1, 3)
5	6-T	23-E	18-R	13-V	3-S
$y = x^2$	(3, 9)	(−2, −4)	(−3, 9)	(5, 10)	(−1, 1)
6	4-B	13-A	23-N	7-A	1-H
$y = 2x^2 + 3$	(3, 12)	(1, 5)	(−1, 5)	(0, 6)	(−2, 11)
7	7-H	14-P	10-W	4-M	21-B
$-x + 7y = -8$	(1, −1)	(−7, −3)	(8, 0)	(−6, −2)	(−3, 1)
8	21-L	16-L	16-F	14-P	14-W
$2xy = 20$	(2, 5)	(−2, 5)	(−2, −5)	(−5, 2)	(−5, −2)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

OBJECTIVE 5–b: To determine whether a given ordered pair is a solution of an equation in two variables.

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Why Did Zorna Pour Ketchup on Her Brother's Hand?

Complete the table for each equation. Find each answer in the code key and notice the letter next to it. Write this letter in the box at the bottom of the page that contains the circled number in that row of the table.

1 $y = -2x$

x	y	
1		(1)
4		(2)
−5		(3)
3		(4)

2 $y = 4 + 2x$

x	y	
3		(5)
−7		(6)
1		(7)
−3		(8)

3 $y = -3x + 1$

x	y	
3		(9)
−3		(10)
4		(11)
−2		(12)

4 $y = \frac{1}{2}x - 4$

x	y	
10		(13)
−2		(14)
4		(15)
−8		(16)

5 $y = -x + 6$

x	y	
4		(17)
−1		(18)
6		(19)
0		(20)

6 $y = -\frac{3}{2}x - 2$

x	y	
4		(21)
2		(22)
0		(23)
−2		(24)

7 $y = 7 - 3x$

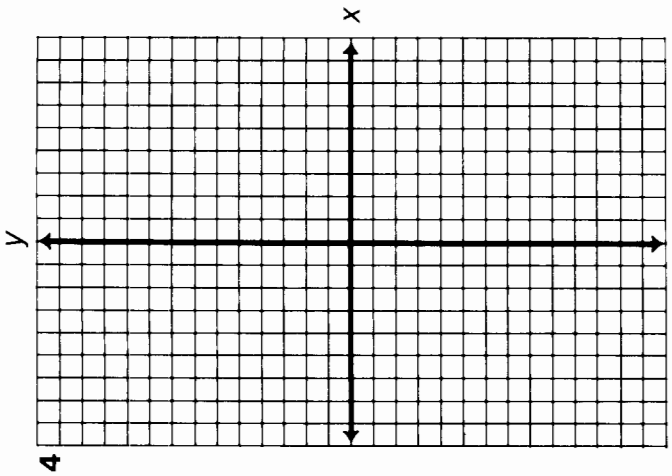
x	y	
6		(25)
1		(26)
0		(27)
−2		(28)

8 $y = 1 - x$

x	y	
−2		(29)
−9		(30)
9		(31)
6		(32)

CODE KEY	
13	L
10	R
7	A
6	T
4	P
3	M
2	W
1	I
0	N
−2	H
−5	D
−6	B
−8	E
−10	O
−11	S

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32



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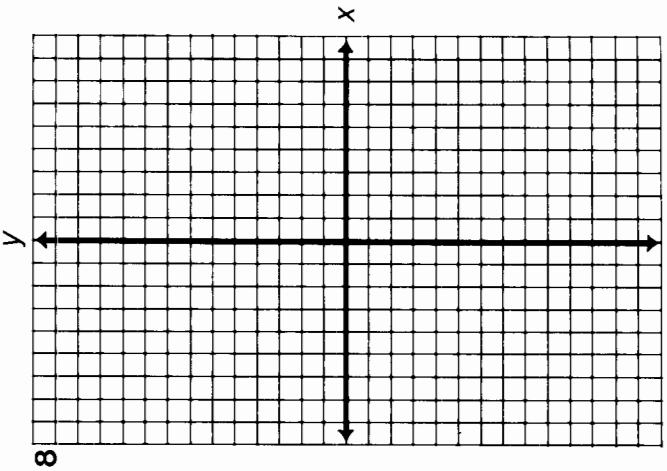

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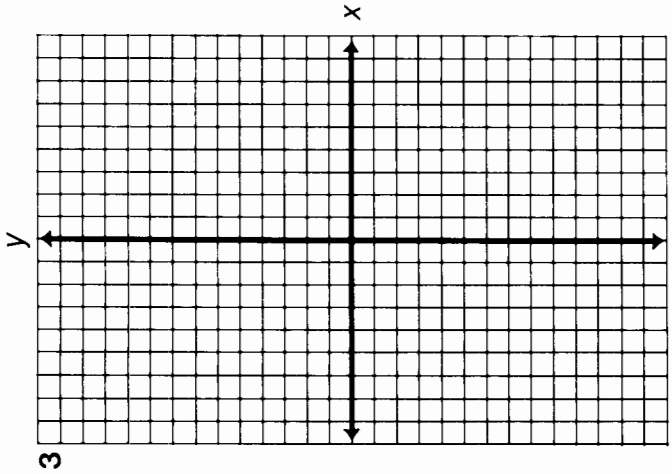

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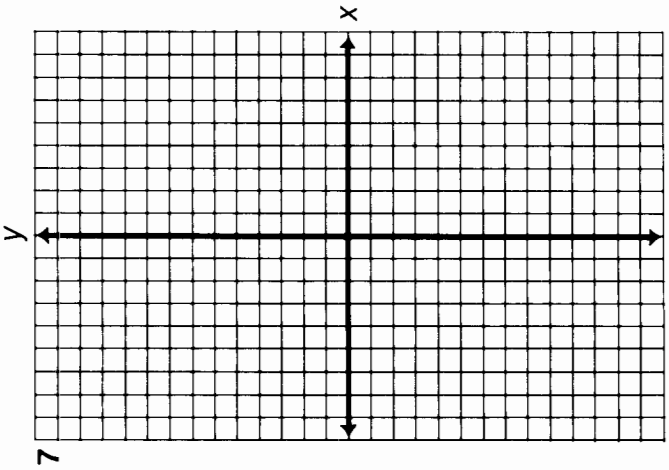

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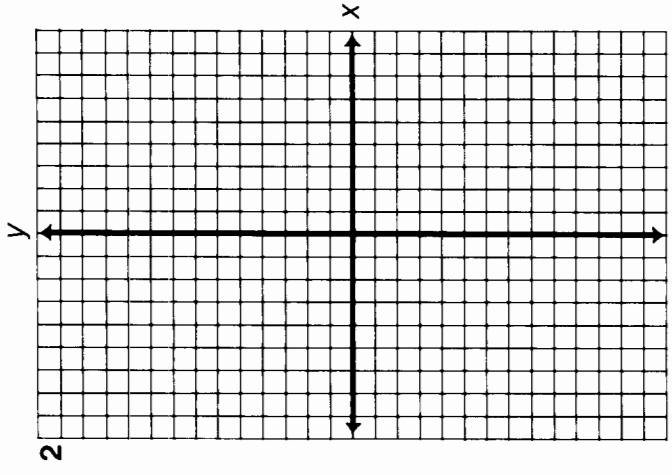

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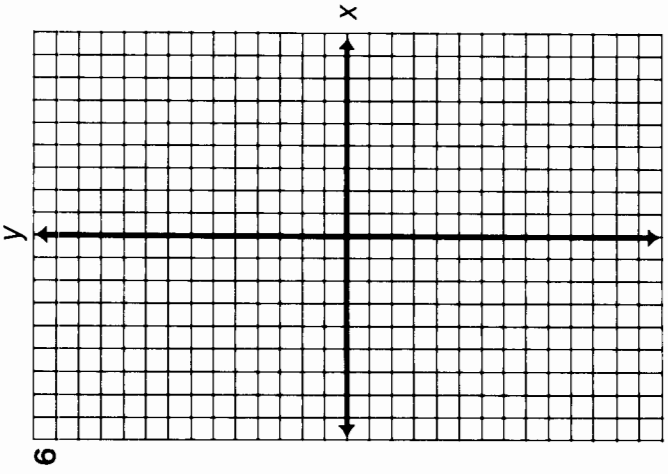

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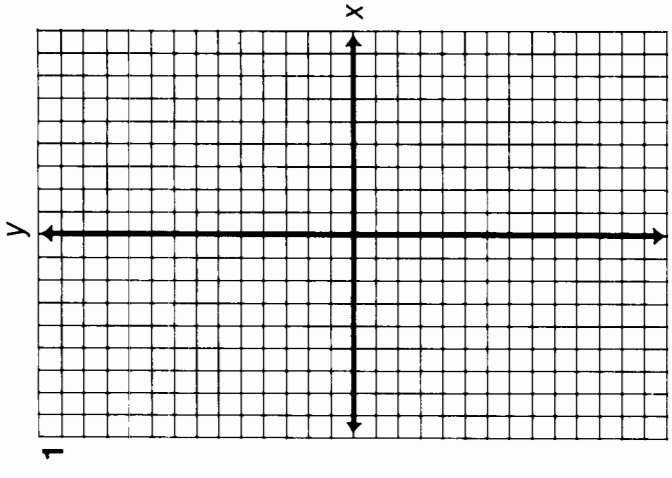
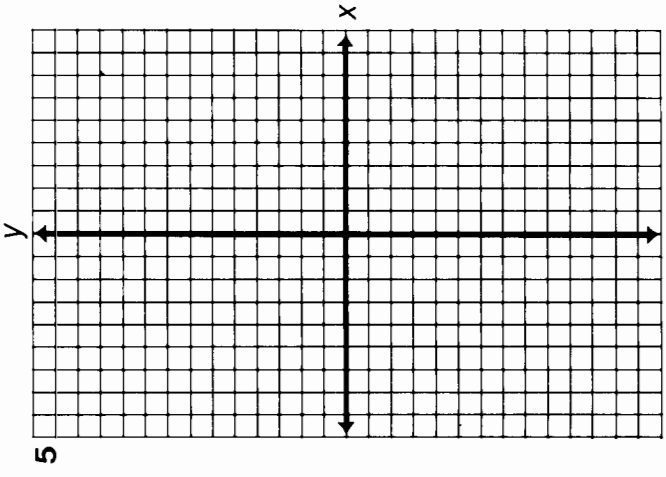


1



5

CRYPTIC QUIZ

1. Why did the little girl paint spots on the staircase?

Answer:

14	7	4	3	11	14	11	14	15	4	1	9	2	15	15	4	12

2. What do you call a thirty-six-inch two-by-four?

Answer:

11	10	6	13	8	4	12	5	11	12	9

Solve each equation for y in terms of x. Find your answer below and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it.

(1) $x + y = 5$

(2) $-3x + y = -2$

(3) $x - y = 7$

(4) $-4x - y = 1$

(5) $3x - y = -10$

Answers:

(E) $y = -4x - 1$

(F) $y = 3x - 1$

(P) $y = -x + 5$

(W) $y = x - 7$

(Y) $y = 3x + 10$

(O) $y = 3x - 2$

(6) $-x + 2y = 6$

(7) $x - 2y = 2$

(8) $-2x + 3y = -12$

(9) $5x + 2y = 1$

(10) $4x - 3y = -2$

Answers:

(D) $y = -\frac{5}{2}x + \frac{1}{2}$

(U) $y = \frac{1}{2}x + 3$

(L) $y = \frac{4}{3}x + \frac{2}{3}$

(G) $y = \frac{3}{4}x - 4$

(H) $y = \frac{1}{2}x - 1$

(B) $y = \frac{2}{3}x - 4$

(11) $3x + 2y - 6 = 0$

(12) $x - 4y + 2 = 0$

(13) $-2x - 6y = 0$

(14) $8y - 3x = -6$

(15) $7x = 2y$

Answers:

(N) $y = \frac{4}{3}x + \frac{1}{4}$

(S) $y = \frac{3}{8}x - \frac{3}{4}$

(R) $y = \frac{1}{4}x + \frac{1}{2}$

(A) $y = -\frac{3}{2}x + 3$

(T) $y = \frac{7}{2}x$

(M) $y = -\frac{1}{3}x$

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What Did the Doctor Say After Examining Yunn Yunsberger?

Complete the table for each function. Find each ordered pair at the bottom of the page and write the corresponding letter above it. (Answers for Exercises 1–4 are to the left, and answers for Exercises 5–8 are to the right of the center line.)

1 $2x + y = 1$

x	y	
−1		A
−4		D
3		O

2 $x - y = 5$

x	y	
7		I
1		E
−2		Y

3 $3x - y = -4$

x	y	
2		U
−1		A
−3		I

4 $x - 2y = 2$

x	y	
6		V
2		H
−4		C

5 $-2x + 3y = 6$

x	y	
6		D
0		U
−3		E

6 $x + 4y = 12$

x	y	
8		T
0		N
−8		E

7 $x + y + 6 = 0$

x	y	
−5		Y
2		N
−8		C

8 $3x = 2y + 8$

x	y	
8		N
2		S
−4		H

(−2, −7)	(3, −5)	(2, 10)	(7, 8)	(2, 0)	(−1, 3)	(6, 2)	(1, −4)	(2, 4)	(−1, 1)	(−4, −3)	(−3, −5)	(−4, 9)	(6, 8)	(7, 2)	(8, 8)	(2, 3)	(6, 6)	(−8, 5)	(8, −2)	(−8, 2)	(−4, −10)	(−3, 0)	(2, −1)	(8, 1)	(−5, 3)	(−5, −1)	(0, 2)	(2, −8)	(0, 3)

OBJECTIVE 5–e: To find ordered pairs that satisfy a linear equation and use them to graph the equation (equations are not solved for y).

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OBJECTIVE 5–f: To find the *x*-intercept and the *y*-intercept of the graph of a linear equation and use them to graph the equation.

Did You Hear About...

A	B	C	D	E	F
G	H	I	J	K	L ?

Find the *x*-intercept and the *y*-intercept of the graph of each equation below. Then find your answer in the answer column nearest the exercise and notice the word under it. Write this word in the box containing the letter of that exercise. Keep working and you will hear about a novel name.

(A) $3x + 2y = 6$

(B) $3x - 2y = 6$

(C) $-5x + 3y = 15$

(D) $5x + 3y = -15$

(E) $x - 2y = 4$

(F) $-2x + y = -4$

(G) $2x + y = 5$

(H) $-3x + 2y = 9$

(I) $-x - 4y = 6$

(J) $4x - 3y - 12 = 0$

(K) $5y = 2x - 10$

(L) $x = 2y - 3$

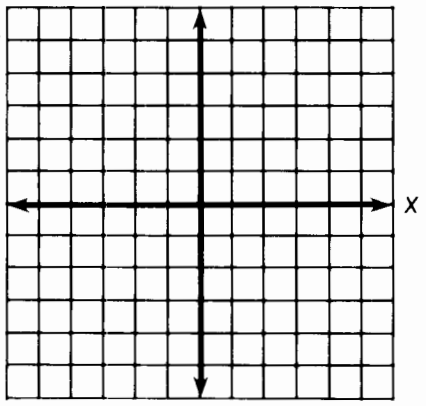
Answers for A–F:

(2, 0); (0, −6) COW
(2, 0); (0, 3) THE
(4, 0); (0, −2) HIS
(−3, 0); (0, 5) WHO
(4, 0); (0, −3) DECIDED
(2, 0); (0, −4) PET
(2, 0); (0, −3) FARMER
(−3, 0); (0, −5) NAMED

Answers for G–L:

$(-6, 0); (0, -\frac{3}{2})$ BECAUSE
$(-3, 0); (0, \frac{3}{2})$ SO
$(\frac{5}{2}, 0); (0, 5)$ ROOSTER
(3, 0); (0, −4) IT
$(-3, 0); (0, \frac{9}{2})$ ROBINSON
(−3, 0); (0, 3) CRACKED
(5, 0); (0, −2) CREW
(−6, 0); (0, −2) UP

A



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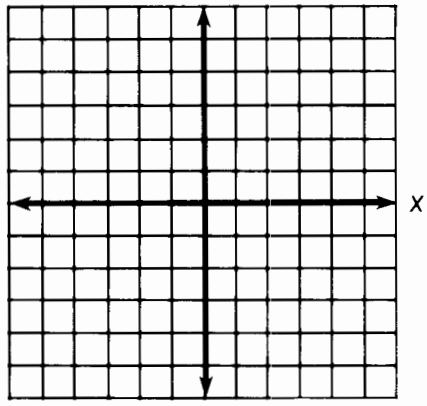

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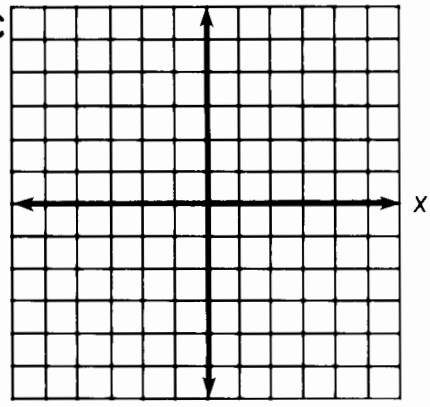

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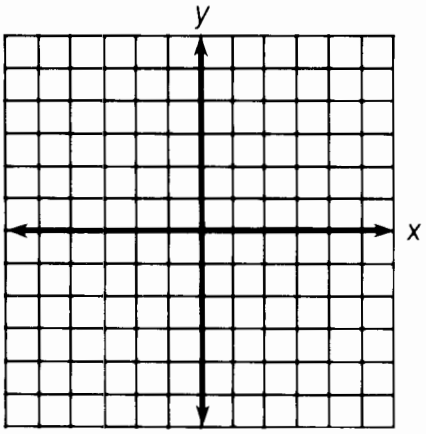

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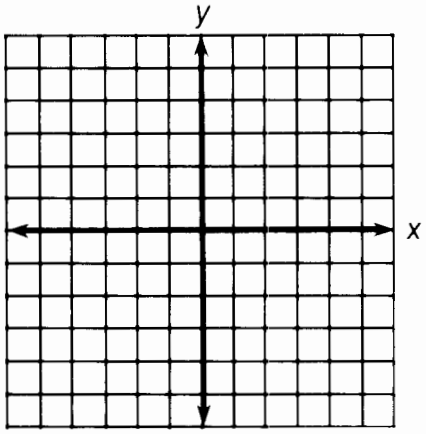

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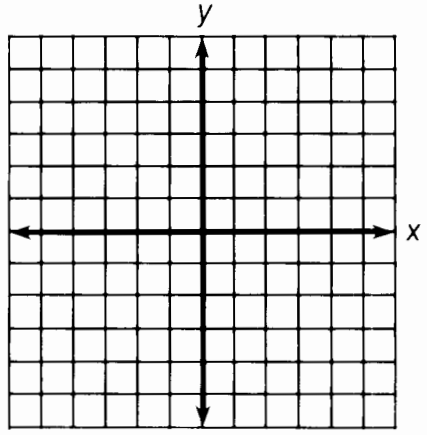

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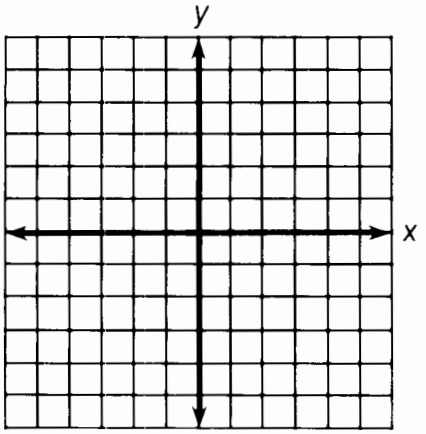
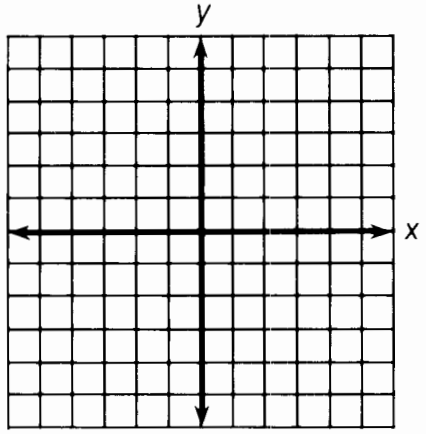
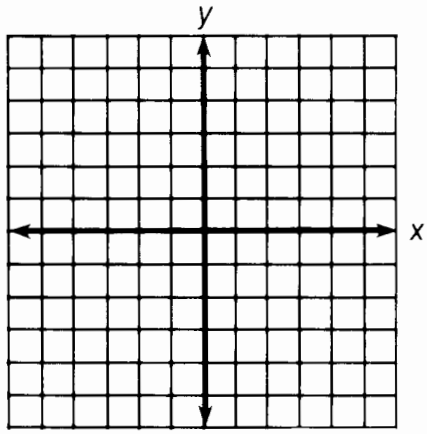


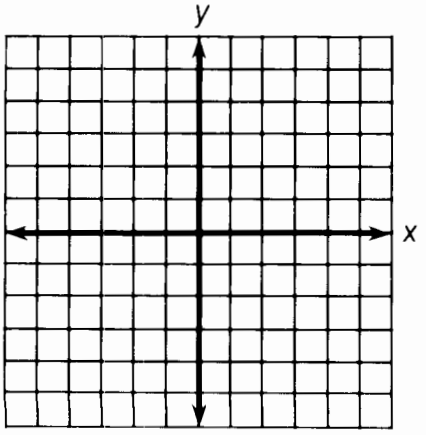
H



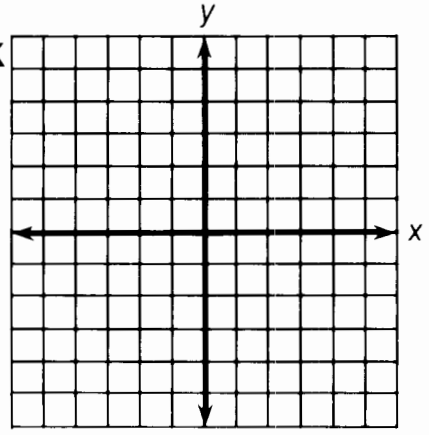
I



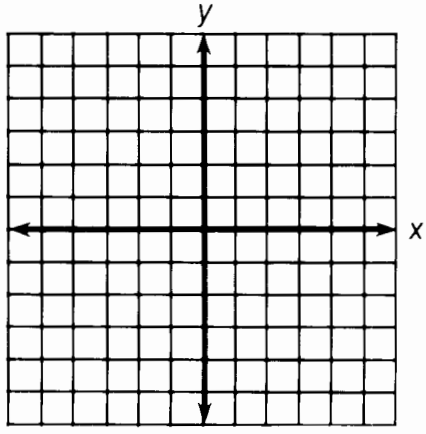
J



K



L



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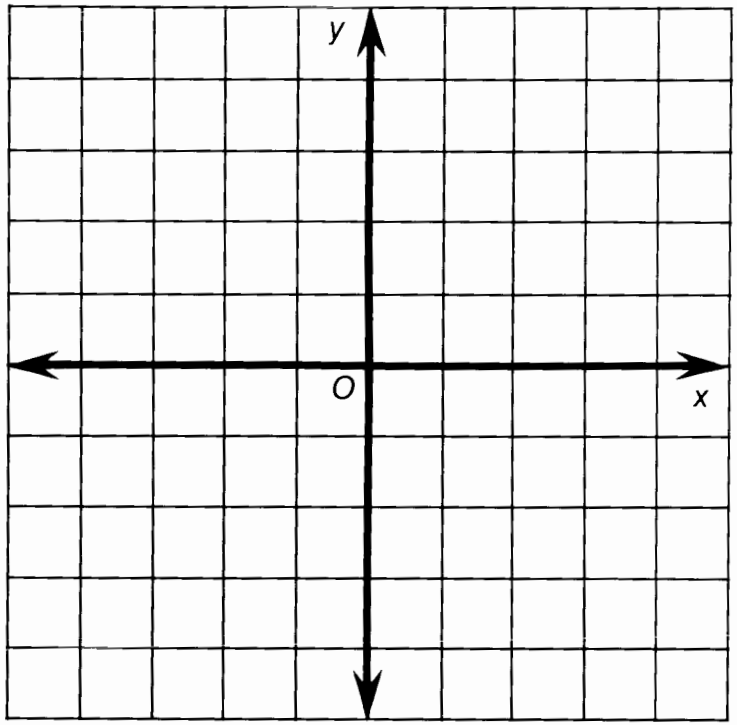
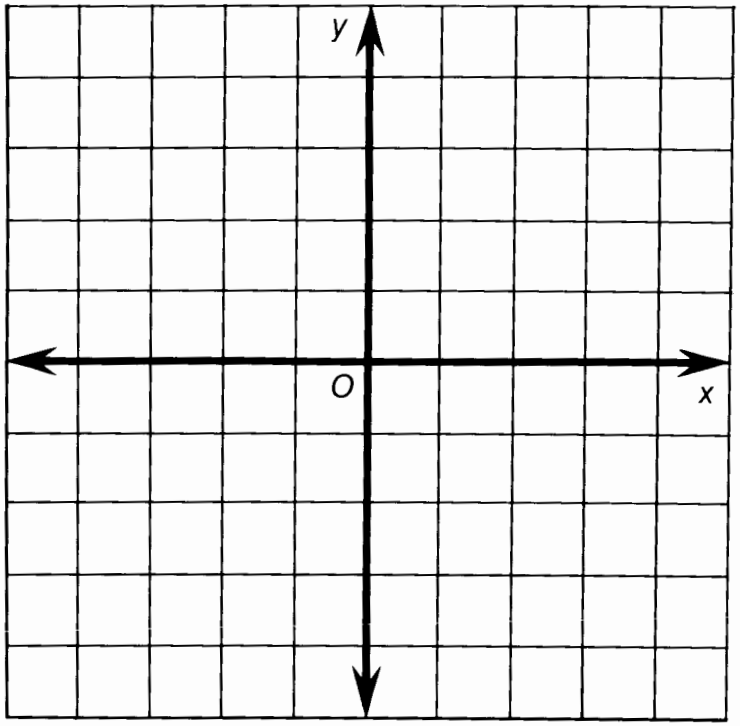
What Might You Have If You Don't Feel Well ?

For each exercise, draw a line through the two given points. Determine the *slope* of this line. Find your answer at the bottom of the page and write the letter of that exercise above it.





(E) (1, 2) and (4, 4)

(G) (−4, −2) and (2, −5)

(O) (3, −3) and (4, 1)

(S) (−2, 4) and (0, −2)

(O) (0, −1) and (4, 3)

(V) (−1, 0) and (−3, 4)

(N) (−5, 2) and (−3, −3)

(L) (5, −1) and (−2, −4)

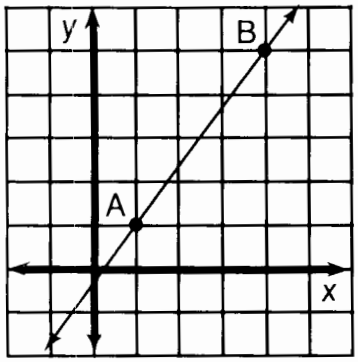
$-\frac{4}{3}$	$-\frac{1}{2}$	$\frac{3}{7}$	1	−2	$\frac{2}{3}$	−3	$\frac{7}{3}$	4	$-\frac{5}{2}$	0

OBJECTIVE 5–g: To find the slope of a line given two points on the line (using the graph).

What Do You Call a Duck That Steals?

For the first six exercises, find the slope of the line $\overleftrightarrow{AB}$. For the remaining exercises, find the slope of the line that passes through the two given points. Cross out each box in the rectangle below that contains a correct answer. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

(1)



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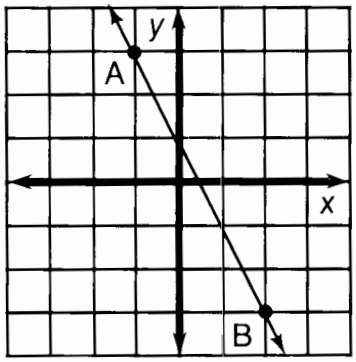

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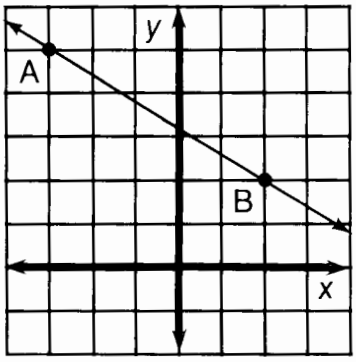

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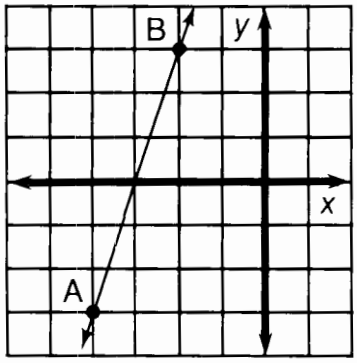
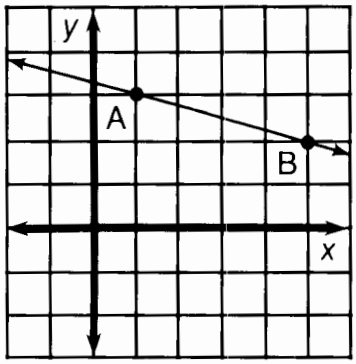
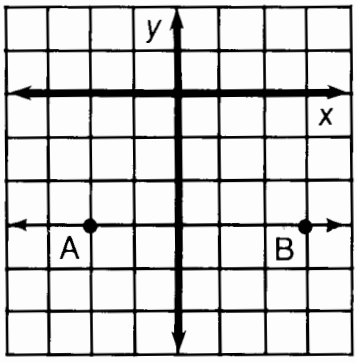


(5)



(6)



(7) (2, 1); (5, 3)

(8) (8, 3); (2, 5)

(9) (1, −4); (6, −2)

(10) (−3, 1); (−7, 4)

(11) (9, 2); (3, −1)

(12) (−5, 8); (−4, 2)

(13) (0, −1); (4, −7)

(14) (1, −1); (−2, −6)

(15) (−4, −8); (−2, 0)

(16) (−3, −3); (0, 0)

(17) (2, 5); (9, 1)

(18) (0, 0); (−2, 7)

DU 0	AB −6	CK $-\frac{3}{5}$	ST $-\frac{4}{7}$	AR 9	IG $\frac{1}{2}$	AT $-\frac{7}{2}$	OB $-\frac{7}{6}$	IG $\frac{4}{3}$	ET $\frac{2}{3}$	BE $-\frac{5}{4}$	ST $\frac{5}{3}$
CA $\frac{2}{5}$	RD $\frac{1}{6}$	RI $-\frac{1}{4}$	CH −2	UC −8	RI $-\frac{3}{2}$	ME 1	AQ $-\frac{1}{3}$	UA $-\frac{3}{4}$	KY $\frac{8}{5}$	ET 4	CK 3

OBJECTIVE 5–h: To find the slope of a line given two points on the line (not using the graph).

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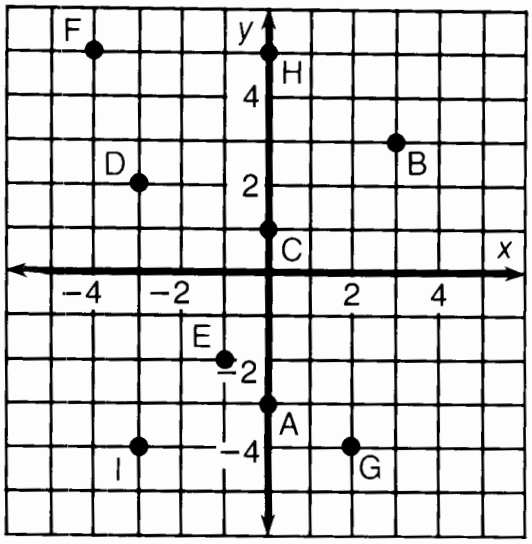
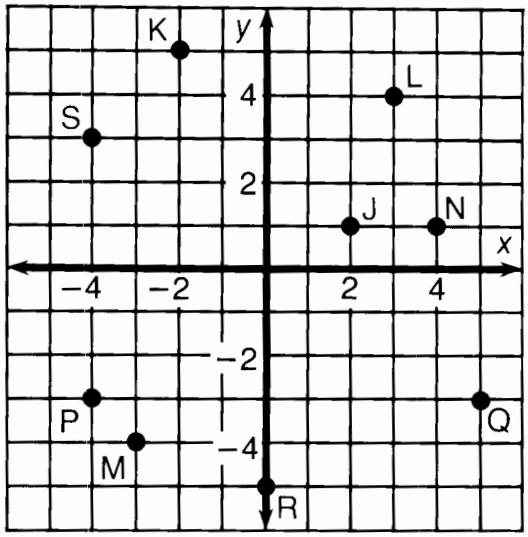
What Did the Ape Think of the Grape's House?

For each exercise, draw the line indicated and write its equation. Find your answer in the answer section and notice the two letters next to it. Print these letters in the two boxes at the bottom of the page that contain the number of that exercise.





(1) Equation of $\overleftrightarrow{AB}$ _____

(2) Equation of $\overleftrightarrow{CB}$ _____

(3) Equation of $\overleftrightarrow{DE}$ _____

(4) Equation of $\overleftrightarrow{FG}$ _____

(5) Equation of $\overleftrightarrow{HI}$ _____

(6) Equation of $\overleftrightarrow{JK}$ _____

(7) Equation of $\overleftrightarrow{LM}$ _____

(8) Equation of $\overleftrightarrow{NS}$ _____

(9) Equation of $\overleftrightarrow{PQ}$ _____

(10) Equation of $\overleftrightarrow{RQ}$ _____

Answers:

(DE) $y = -\frac{1}{4}x + 2$

(SA) $y = \frac{4}{3}x - 1$

(TH) $y = -\frac{3}{2}x + 2$

(AS) $y = 2x - 3$

(HE) $y = 3x + 5$

(TT) $y = \frac{2}{5}x$

(NE) $y = \frac{2}{3}x + 1$

(OU) $y = -x + 3$

(GH) $y = -\frac{3}{2}x - 1$

(TW) $y = -3$

(EA) $y = -2x + 3$

(VI) $y = \frac{2}{5}x - 5$

(TH) $y = -2x - 4$

(TI) $y = \frac{4}{3}x$

(SH) $y = \frac{2}{3}x + 5$

5	5	3	3	6	6	4	4	7	7	9	9	1	1	8	8	10	10	2	2

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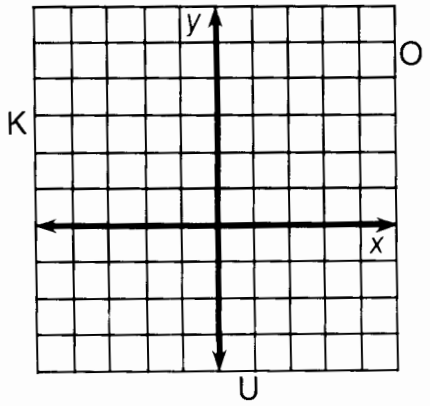
OBJECTIVE 5–i: To find an equation of a line given two points on the line (using the graph).

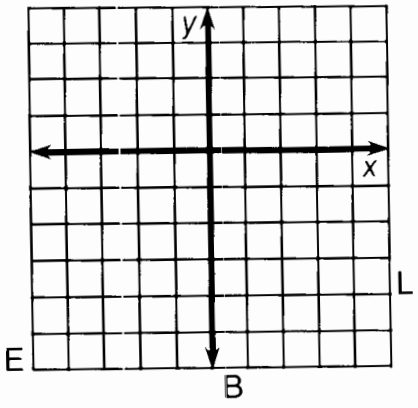
Whom Should You See at the Bank If You Need To Borrow Money?

Use the slope and y-intercept to graph each equation below. The graph, if extended, will cross a letter. Print this letter in each box that contains the number of that exercise.

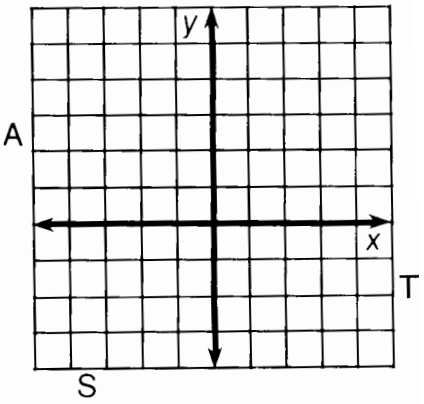
① $y = \frac{2}{3}x + 1$



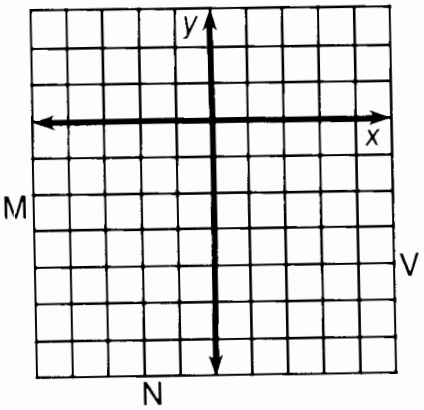
② $y = \frac{1}{2}x - 3$



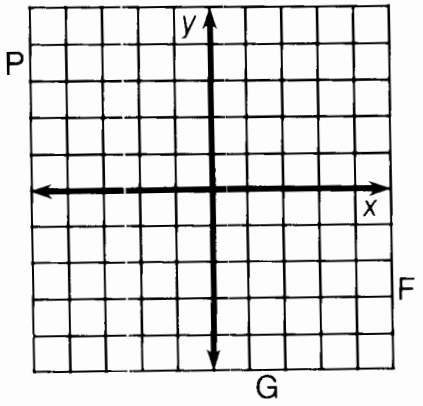
③ $y = -\frac{3}{4}x + 2$



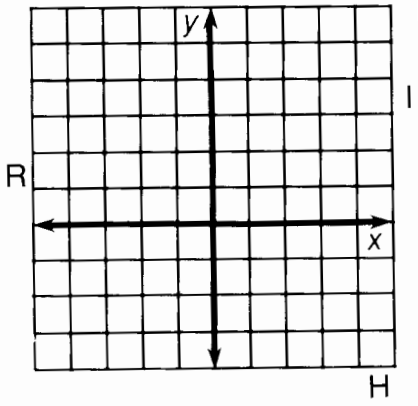
④ $y = 2x - 4$



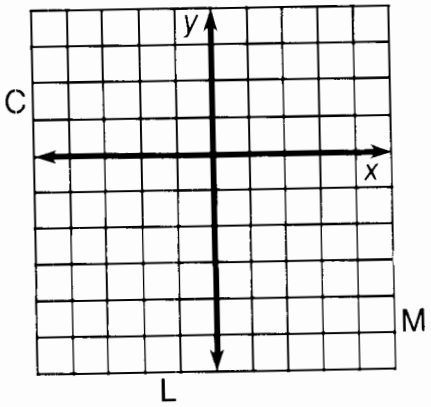
⑤ $y = -3x - 1$



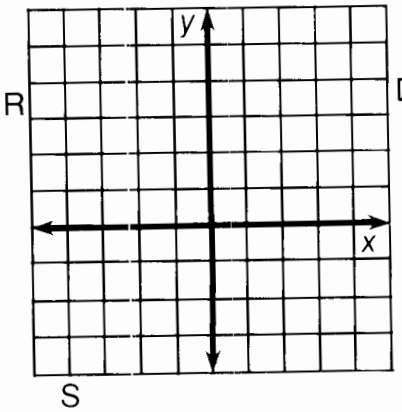
⑥ $y = -\frac{3}{2}x + 3$



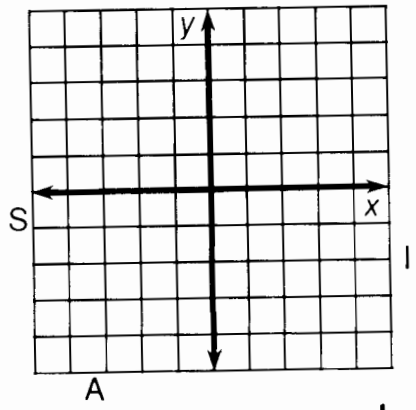
⑦ $y = 4x - 2$



⑧ $y = -\frac{1}{4}x + 2$



⑨ $y = \frac{5}{3}x$



3	6	2	7	1	9	4	9	8	8	9	4	5	2	8

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According to Some Students, What Is the True Purpose of Homework?

Write each equation below in slope-intercept form. Then find the slope and *y*-intercept at the bottom of the page. Write the letter of the exercise above them.

(O) $2x + 5y = 10$

(U) $-7x - 4y = 16$

(N) $4x + 3y = 9$

(R) $4x - 2y = 7$

(N) $5x - 9y = -7$

(L) $-2x + 3y = -21$

(I) $9x + 3y = 1$

(F) $-2x + 7y = 0$

(I) $-x + 4y = 20$

(S) $6x - y = 4$

(T) $12x = 2y + 1$

(H) $4x - 6y + 3 = 0$

(A) $3x - 5y = 5$

(G) $4x + 3y = 8$

(F) $x + 4 = 4y$

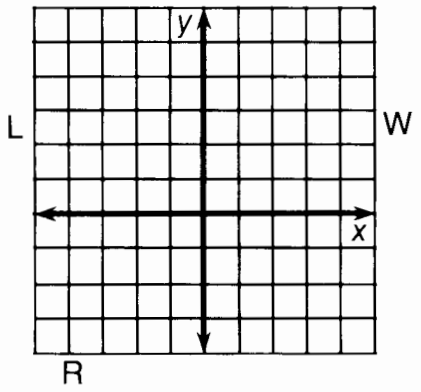
(V) $y - 2 = 0$

slope	$\frac{1}{4}$	6	6	-3	$\frac{2}{7}$	$-\frac{2}{5}$	2	$\frac{1}{4}$	$\frac{2}{3}$	$\frac{3}{5}$	$\frac{2}{3}$	0	-3	$-\frac{4}{3}$	$-\frac{4}{3}$	$\frac{2}{3}$	$\frac{1}{4}$	$-\frac{7}{4}$	$\frac{5}{9}$
y-intercept	5	$-\frac{1}{2}$	-4	2	0	2	$-\frac{7}{2}$	$-\frac{7}{2}$	$\frac{1}{2}$	-1	-7	2	$\frac{1}{3}$	3	$\frac{8}{3}$	-1	1	-4	$\frac{7}{9}$

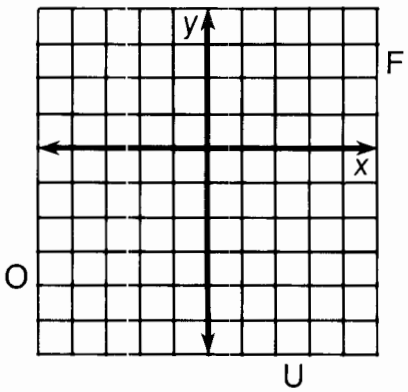
Why Does a Poor Man Drink Coffee?

Use the slope and y-intercept to graph each equation below. The graph, if extended, will cross a letter. Print this letter in each box that contains the number of that exercise.

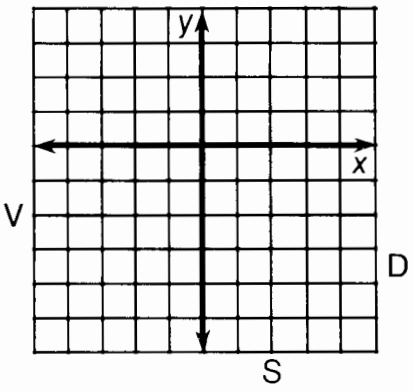
(1) $-3x + 2y = 2$



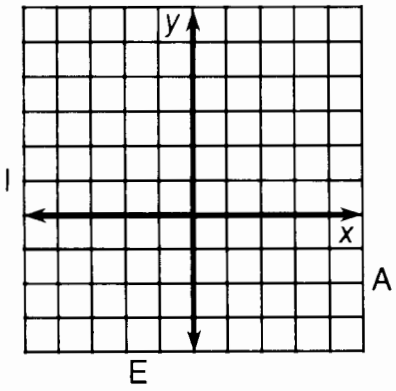
(2) $x - 4y = 8$



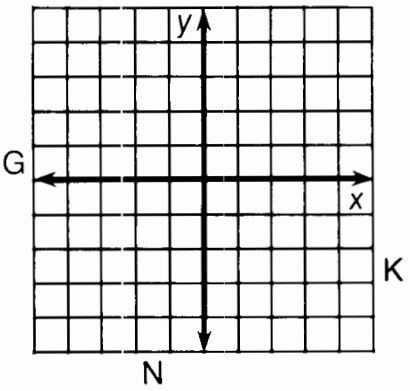
(3) $2x + y = -3$



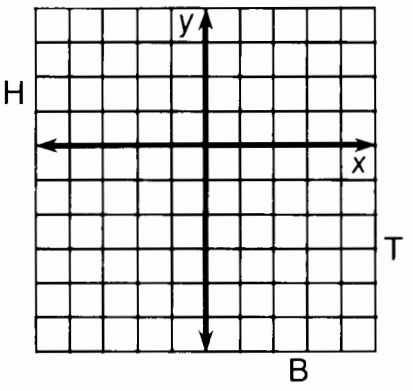
(4) $2x + 3y = 6$



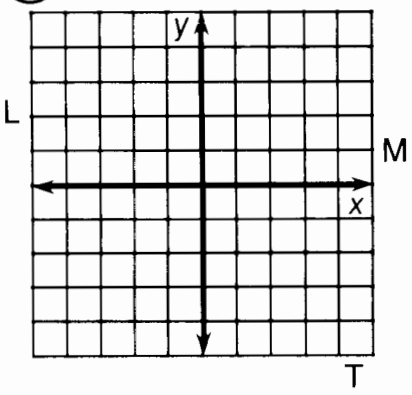
(5) $3x - y = 1$



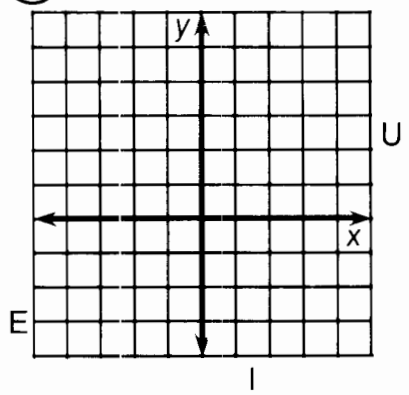
(6) $-3x - 5y = 10$



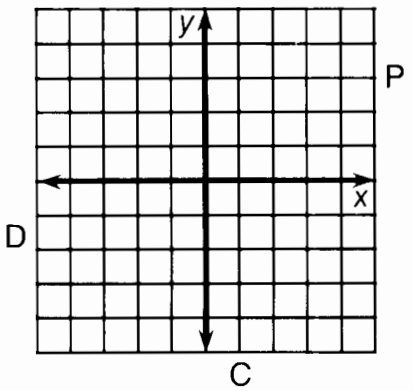
(7) $4x + 3y = 0$



(8) $2x - 2y + 5 = 0$



(9) $y - 3 = 0$



6	8	6	4	3	5	2	9	1	2	9	8	1	7	8	4

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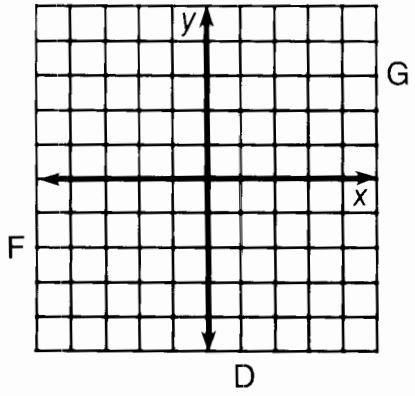
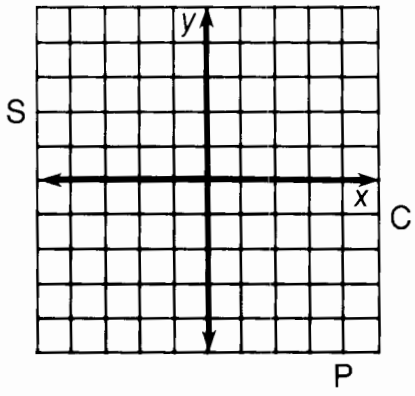
Why Did the Cow Want a Divorce?

Graph each equation below. The graph, if extended, will cross a letter. Look for this letter in the string of letters near the bottom of the page and CROSS IT OUT each time it appears. When you finish, write the remaining letters in the rectangle at the bottom of the page.

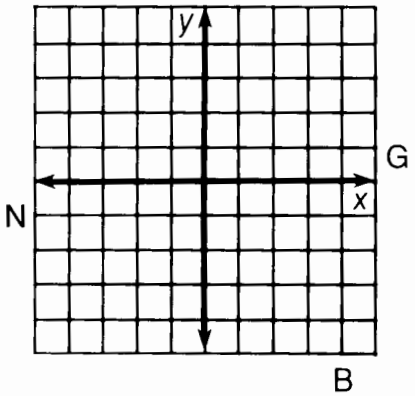
(1) $y = -2$



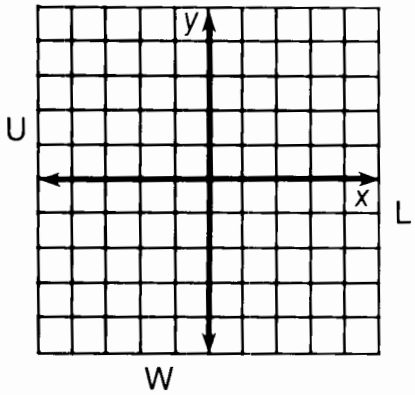
(2) $x = 4$



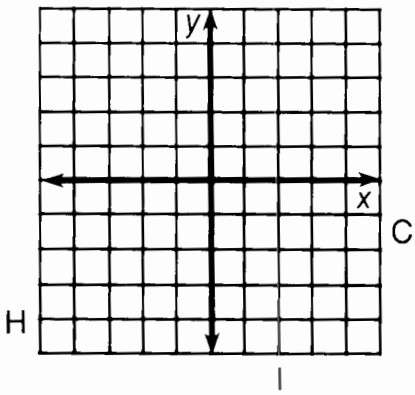
(3) $2x - 3y = 9$



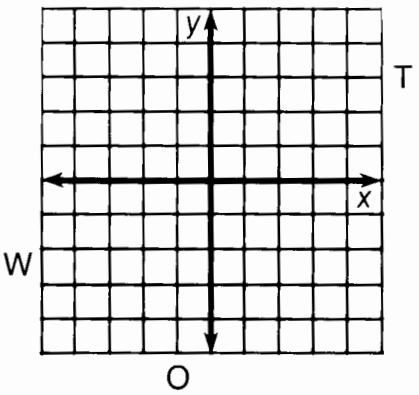
(4) $x + 2y - 4 = 0$



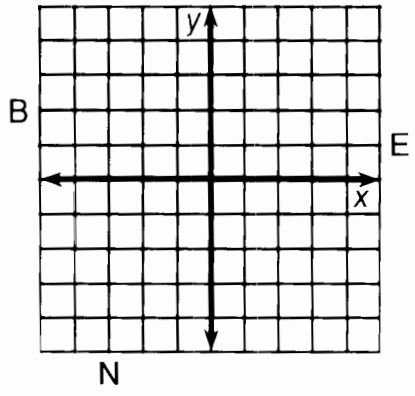
(5) $3x + 4y = 12$



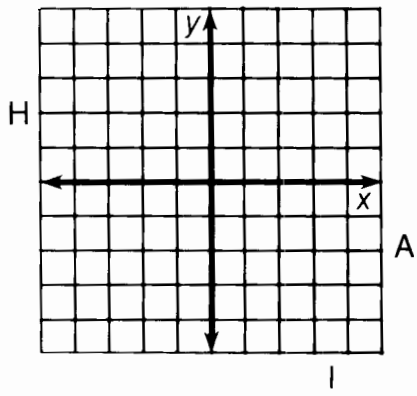
(6) $6x - 5y + 20 = 0$



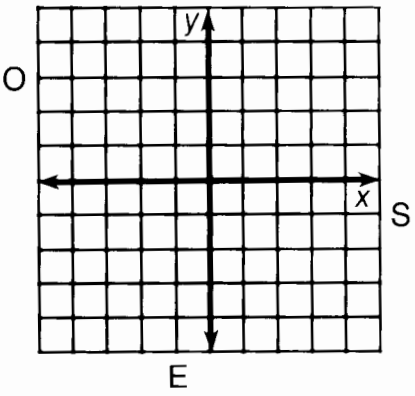
(7) $x + 3 = 0$



(8) $2x - 7 = 0$



(9) $-2x = 2y + 5$



C S I H O W E H O F A N D A P L B O I U L F G M S I P T O W E I E R N

Answer:

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Why Did Gyro Go Into a Bakery?

For each exercise below, find the equation of the line that has the given slope and passes through the given point. Circle the letter next to the correct equation. Then write this letter in each box at the bottom of the page that contains the number of that exercise.

(1) $m = 2$; (3, 2)	G	$y = 2x + 1$	R	$y = 2x - 4$
(2) $m = -3$; (1, 4)	O	$y = -3x + 7$	P	$y = -3x + 2$
(3) $m = -5$; (−1, 3)	M	$y = -5x - 2$	D	$y = -5x + 6$
(4) $m = 3$; (−4, −7)	V	$y = 3x + 1$	E	$y = 3x + 5$
(5) $m = -1$; (5, −2)	U	$y = -x + 3$	C	$y = -x - 1$
(6) $m = \frac{1}{2}$; (6, 1)	W	$y = \frac{1}{2}x - 5$	H	$y = \frac{1}{2}x - 2$
(7) $m = -\frac{2}{3}$; (3, 4)	A	$y = -\frac{2}{3}x - 7$	I	$y = -\frac{2}{3}x + 6$
(8) $m = \frac{4}{3}$; (−2, 0)	K	$y = \frac{4}{3}x + \frac{5}{2}$	F	$y = \frac{4}{3}x + \frac{8}{3}$
(9) $m = -\frac{1}{4}$; (2, 1)	J	$y = -\frac{1}{4}x + \frac{3}{2}$	D	$y = -\frac{1}{4}x - \frac{3}{8}$
(10) $m = 4; \left(-1, \frac{1}{2}\right)$	A	$y = 4x - \frac{2}{3}$	T	$y = 4x + \frac{9}{2}$
(11) $m = -2$; (0, 0)	L	$y = -2x$	B	$y = -2x - 2$
(12) $m = 0; \left(-5, \frac{3}{4}\right)$	S	$y = \frac{3}{4}$	N	$y = -5x$

9	5	12	10	8	2	1	10	6	4	12	3	4	11	11	2	8	7	10

OBJECTIVE 5–n: To find an equation of a line given the slope and one point on the line.

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What Happened When Two Fruit Companies Merged ?

For each exercise below, find the equation of the line passing through the given points. Circle the two letters next to the correct equation. Then write these letters in the two boxes at the bottom of the page that contain the number of that exercise.

Answers:

(1)	(1, 5) (2, 7)	(IS) $y = \frac{2}{3}x + 3$	(TH) $y = \frac{1}{2}x - 4$
(2)	(0, 1) (3, −8)	(AP) $y = -\frac{3}{2}x + 8$	(UI) $y = -3x + 5$
(3)	(2, −3) (4, −2)	(ST) $y = \frac{1}{2}x - 7$	(DE) $y = 2x + 3$
(4)	(2, 5) (4, 2)	(CT) $y = -3x + 1$	(EY) $y = 4x + 7$
(5)	(−3, −5) (−1, 3)	(LO) $y = -\frac{3}{2}x - 4$	(IL) $y = 2x + 1$

Answers:

(6)	(3, −1) (−6, −4)	(HA) $y = \frac{1}{2}x - 1$	(ER) $y = -\frac{3}{4}x + 4$
(7)	(4, 1) (−4, 7)	(IS) $y = \frac{1}{3}x + \frac{8}{3}$	(EL) $y = -2x - 1$
(8)	(−1, 2) (3, 4)	(PE) $y = -x + 2$	(EA) $y = -\frac{3}{4}x + 2$
(9)	(−1, −4) (2, 0)	(SO) $y = \frac{4}{3}x - 2$	(AR) $y = \frac{1}{3}x - 2$
(10)	(3, −1) (−3, 5)	(MA) $y = \frac{1}{2}x + \frac{5}{2}$	(FE) $y = \frac{4}{3}x - \frac{8}{3}$

3	3	5	5	8	8	1	1	4	4	7	7	9	9	2	2	10	10	6	6

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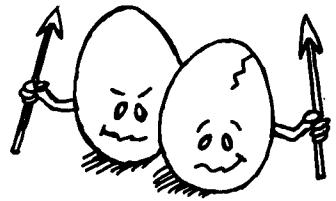
OBJECTIVE 5–o: To find an equation of a line given two points on that line (not using the graph).

What Were the Headlines After a Mad Scientist Trained Two Eggs to Attack a Candy Store With Sharp Sticks ?

Solve each system of equations below by graphing. Cross out the box containing your answer. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.



(1) $y = \frac{2}{3}x - 1$
$y = -x + 4$

(2) $y = -2x + 1$
$y = x - 5$

(3) $y = \frac{1}{2}x - 3$
$y = \frac{3}{2}x - 1$

(4) $y = 2x$
$x + y = 3$

(5) $x + y = 0$
$3x + y = -4$

(6) $x = 3 - 3y$
$x + 3y = -6$

(7) $x + 2y = -4$
$4y = 3x + 12$

(8) $y = -2$
$2x - 5y = 20$

(9) $4x + 3y = -15$
$y = x + 2$

TW (−4, 0)	EG (−4, −5)	OS no solution	GS (4, 1)	WE (3, 1)	ET (−2, −4)	SP (−1, 6)	TR (−3, −1)
EA (−3, 5)	TS (1, 2)	RA (0, 3)	TI (2, −3)	MI (4, −3)	SS (5, −2)	NT (−1, 0)	UP (−2, 2)

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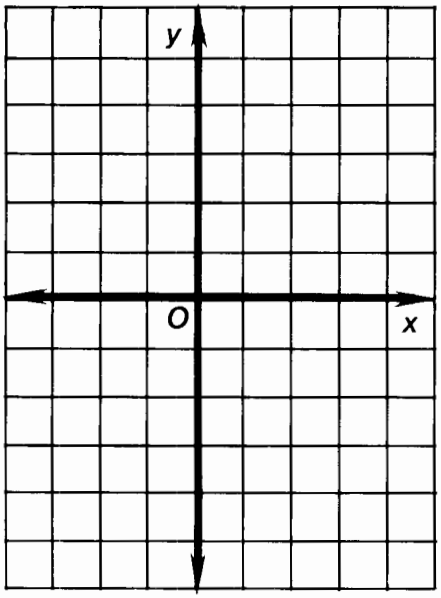
1



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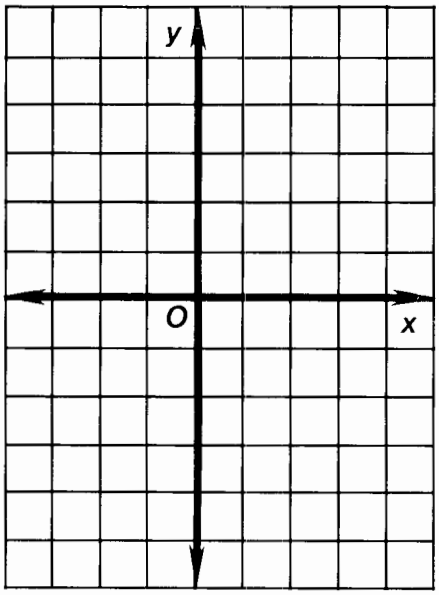

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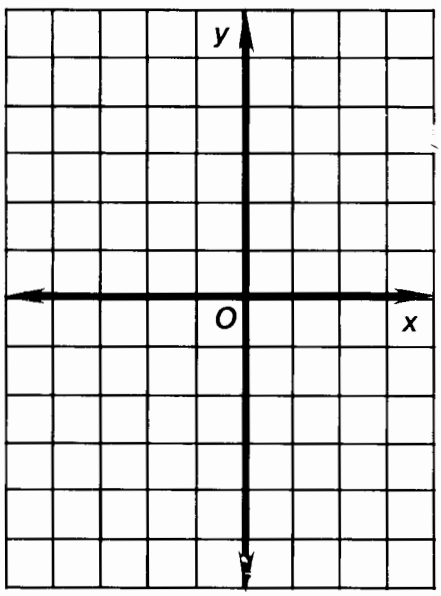

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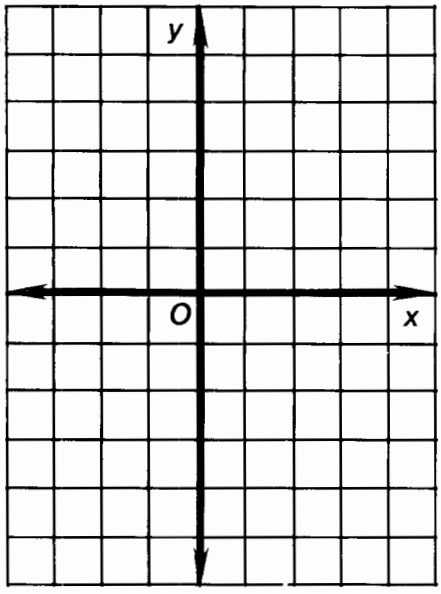

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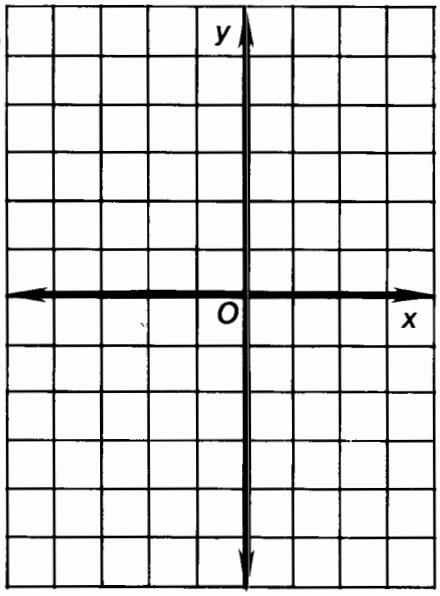

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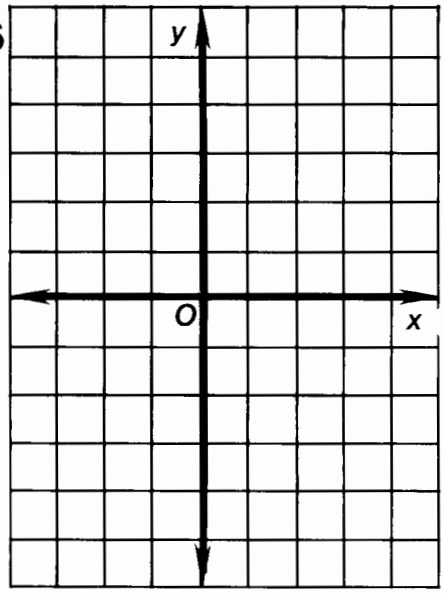

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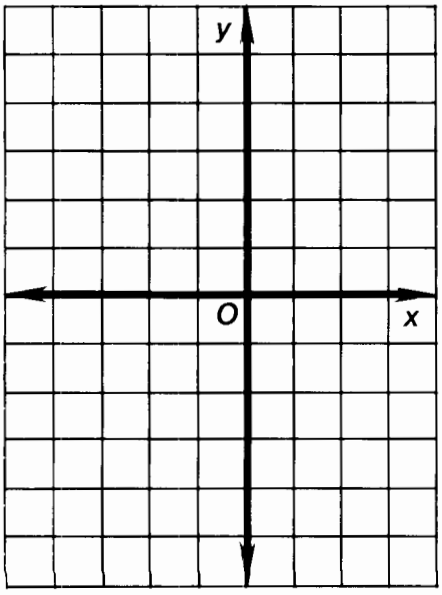

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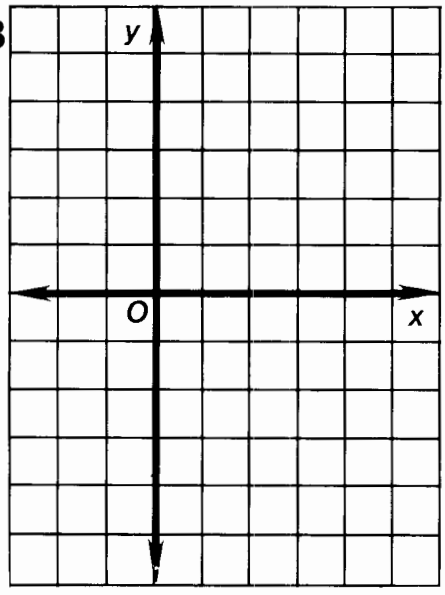

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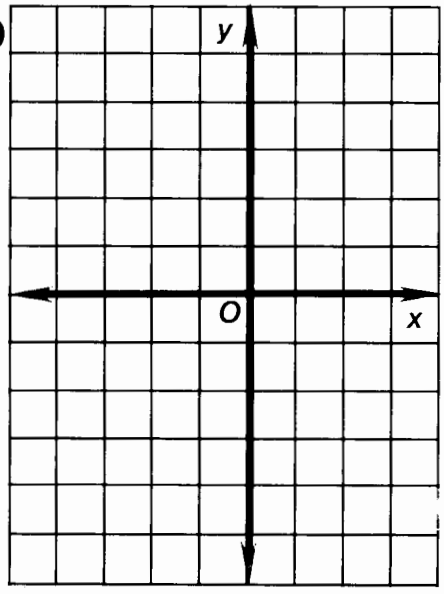

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Why Does the President Put Vegetables in His Blender?

Solve each system of equations below by the substitution method. Find the solution in the nearest answer column and notice the two letters next to it. Print these letters in the two boxes at the bottom of the page that contain the number of that exercise.

Answers 1–6:

(4, 2)	LD
(6, −1)	NG
(1, 2)	TR
(4, 8)	HE
(1, −3)	HO
(6, −3)	NT
(5, 3)	FO
(9, 2)	PI
(7, 3)	TH
(5, 2)	IS

(1) $y = 2x$
$x + y = 12$

(2) $x = 3y - 1$
$x + 2y = 9$

(3) $y = 2x - 5$
$4x - y = 7$

(4) $2x - 3y = 12$
$x = 4y + 1$

(5) $y = -x + 5$
$x - 4y = 10$

(6) $x - y = 2$
$4x - 3y = 11$

(7) $-2x + 3y = 14$
$x + 2y = 7$

(8) $6x - y = -4$
$2x + 2y = 15$

(9) $x + y = 1$
$2x - y = -2$

(10) $5x - 3y = -11$
$x - 2y = 2$

(11) $x - y = 3$
$6x + 4y = 13$

(12) $2x - y = 16$
$-x + 2y = -8$

Answers 7–12:

$\left(\frac{1}{2}, -3\right)$	IN
$\left(8, -\frac{1}{2}\right)$	VE
$\left(-\frac{1}{3}, \frac{4}{3}\right)$	RL
(8, 0)	AS
(−3, 4)	TE
$\left(\frac{1}{2}, 7\right)$	HI
$\left(\frac{5}{2}, \frac{4}{3}\right)$	LO
(−1, 4)	RW
$\left(\frac{5}{2}, -\frac{1}{2}\right)$	PE
(−4, −3)	ED

1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12

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ALGEBRA WITH PIZZAZZ!
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What Do You Call It When Someone Pays Back a Loan Quickly?

Solve each system of equations below by the addition method. Find the solution in the coordinate system and notice the letter at that point. Print this letter in each box at the bottom of the page that contains the number of that exercise.

(1) $x + y = 5$
$3x - y = 7$

(2) $2x + y = 3$
$-2x + 5y = -9$

(3) $3x + 5y = 0$
$2x - 5y = -25$

(4) $-4x - y = -6$
$4x + 3y = 18$

(5) $2x - y = -5$
$-2x - 5y = 11$

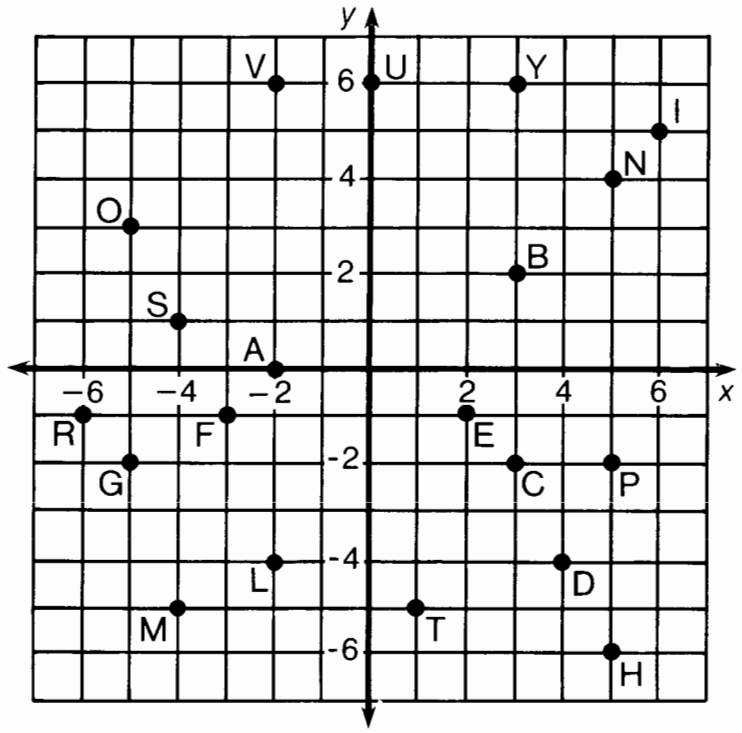
(6) $8 = 4x - 3y$
$17 = x + 3y$

(7) $-6 = 3x + y$
$10 = -5x - y$

(8) $3x + 8y = -1$
$-3x + y = -17$

(9) $x + 2y = 15$
$5x = 2y + 3$

(10) $7x - y = 12$
$-3y = 7x + 8$



(11) $y = 3x + 13$
$2x = y - 9$

(12) $4x + 12 = -7y$
$-y + 12 = 4x$

7	11	4	12	12	2	6	12	2	1	10	8	7	9	3	5	5

OBJECTIVE 6–c: To solve systems of equations by the addition method (no multiplication is required).

What Kind of Shoes Does a Frog Wear?

Solve each system of equations by the addition method. (You may first have to multiply both sides of one equation by −1.) Find your answer below and cross out the letter above it. When you finish, the answer to the title question will remain.

(1) $5x - 2y = 4$
$x + 2y = 8$

(2) $-3x + 2y = 11$
$3x - 4y = -19$

(3) $3x + y = 13$
$x + y = 3$

(4) $6x - 2y = 10$
$x - 2y = -5$

(5) $5x + y = 2$
$5x - 3y = 14$

(6) $7x - 4y = -10$
$4y = x - 2$

(7) $x = 5 - 9y$
$4x + 9y = -7$

(8) $3x = 5y - 9$
$2y = 3x + 3$

(9) $x + 2y = -2$
$4x + 2y = -17$

(10) $-6x - 5y = 20$
$-y = 6x + 4$

(11) $-3x + y = -2$
$-2 = 7x - y$

(12) $10x - 5 = 3y$
$2x - 3y = 1$

S	H	O	L	D	P	R	E	S	A	N	T	I	O	E	N	A	I	D	R
$(0, -4)$	$(\frac{1}{2}, 0)$	$(3, 7)$	$(\frac{1}{3}, 2)$	$(-2, -1)$	$(-5, 3)$	$(3, 4)$	$(\frac{1}{2}, 2)$	$(2, 3)$	$(-4, 1)$	$(2, -4)$	$(-2, 2)$	$(-1, -5)$	$(-1, 6)$	$(-1, 4)$	$(-5, \frac{3}{2})$	$(5, -3)$	$(5, -2)$	$(-5, 4)$	$(1, -3)$

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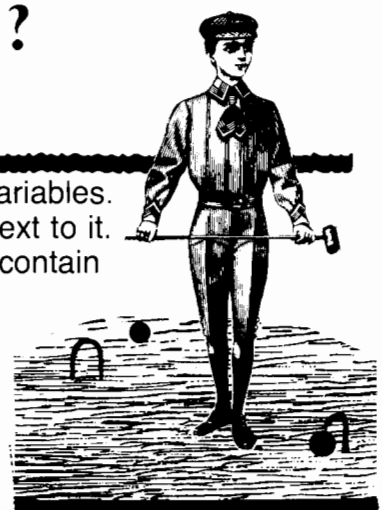
Why Are There Rules in Croquet?



Solve each problem below using a system of two equations in two variables. Find the solution in the answer column and notice the three letters next to it. Write these letters in the three boxes at the bottom of the page that contain the number of that exercise.

(1) The sum of two numbers is 90. Their difference is 18. Find the numbers.

(2) The second of two numbers is 4 more than the first. The sum of the numbers is 56. Find the numbers.

(3) The number of girls at Sky High School is 60 greater than the number of boys. If there are 1250 students all together, how many girls are there?

(4) The second of two numbers is 5 more than twice the first. The sum of the numbers is 44. Find the numbers.

(5) The sum of two numbers is 75. The second number is 3 less than twice the first. Find the numbers.

(6) The larger of two numbers is 8 more than four times the smaller. If the larger is increased by four times the smaller, the result is 40. Find the numbers.

(7) The number of calories in a piece of pie is 20 less than three times the number of calories in a scoop of ice cream. The pie and ice cream together have 500 calories. How many calories are in each?

(8) The sum of two numbers is 4 less than twice the larger. If the larger is decreased by three times the smaller, the result is -20. Find the numbers.

660	THE
655	WEC
38, 52	BEC
16, 12	DER
24, 4	LAW
36, 54	SOT
635	ITW
16, 28	ROQ
13, 31	ANH
24, 32	HER
370, 130	NOR
26, 30	HAT
36, 39	ITB
350, 150	YER
26, 49	AVE

1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8

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Did You Hear About...

A	B	C	D	E	F
G	H	I	J	K	L ?

Solve each system of equations below using multiplication with the addition method. Find the solution in the answer column and notice the word next to it. Write this word in the box containing the letter of that exercise. Keep working and you will hear about some "udder" nonsense.

(A) $5x - 2y = 4$
$3x + y = 9$

(B) $3x - 5y = 13$
$x - 2y = 5$

(C) $7x + 2y = -1$
$3x - 4y = 19$

(D) $x + 2y = 6$
$5x + 3y = 2$

(E) $2x + 3y = 7$
$3x + 4y = 10$

(F) $7x - 3y = -5$
$3x + 2y = 11$

(G) $3x - 5y = 7$
$5x - 2y = -1$

(H) $4x + 3y = 9$
$3x + 4y = 12$

(I) $5x - 3y = 16$
$4x + 5y = -2$

(J) $4x - 3y = -20$
$-x - 8y = 5$

(K) $-3x + 7y = -1$
$-2x + 5y = 0$

(L) $5x + 6y = -11$
$3x + y = -4$

TWEET	(1, 2)
HIS	(2, 1)
SELLING	(−5, 0)
BIRDSEED	(−1, −2)
UDDER	(2, 0)
THE	(2, 3)
SINGING	(−5, 4)
STARTED	(2, −2)
FED	(−2, 4)
BUTTER	(−1, 3)
COWS	(1, 4)
MILK	(−1, −1)
FARMER	(1, −2)
AND	(0, 3)
WINGS	(2, −4)
WHO	(1, −4)
MOO	(1, 3)
CHEEP	(5, 2)
BEEF	(3, −2)

OBJECTIVE 6–f: To solve systems of equations using multiplication with the addition method (equations are in standard form).

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ALGEBRA WITH PIZZAZZ!
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What Do You Get If You Drop a Grand Piano Down a Mine Shaft?

Solve each system of equations below using multiplication with the addition method. Find the solution at the bottom of the page and write the letter of that exercise in the box above it.

(A) $2(x - y) = 4$
$3x + y = 10$

(I) $a - 2b = -5$
$3(2a + b) = 0$

(R) $5x - y = 2x + 9$
$3x + 4y = -6$

(T) $2(x - 3y) = x + 4$
$3x + 8 = 5x - y$

(A) $\frac{1}{3}(2x + y) = 1$
$x + y = 4$

(O) $\frac{1}{2}(m - 3n) = 5$
$3(m + 4n) = -12$

(F) $\frac{x}{3} + \frac{y}{2} = -4$
$x - 3y = 6$

(M) $\frac{x}{2} + \frac{y}{5} = \frac{13}{10}$
$3(x - y) = x - 10$

(N) $\frac{1}{5}(x + 2y) = -2$
$\frac{x}{4} - \frac{3y}{2} = \frac{15}{2}$

(L) $\frac{a}{6} + \frac{b}{4} = \frac{5}{2}$
$\frac{2a}{3} - \frac{b}{2} = -2$

(4, −3)	(−1, 5)	(3, −4)	(−1, 1)	(−6, −4)	(3, 8)	(3, 1)	(4, 0)	(2, −5)	(1, −2)	(1, 4)	(−1, 2)	(0, −5)	(4, −2)	(2, −3)	(−6, 0)

What Kind of Monkey Can Fly?

Solve each problem below using a system of two equations in two variables. Find the solution in the answer column and notice the letter next to it. Write this letter in each box that contains the number of that exercise.

(1) Three times the larger of two numbers is equal to four times the smaller. The sum of the numbers is 21. Find the numbers.

(2) The difference between two numbers is 16. Five times the smaller is the same as 8 less than twice the larger. Find the numbers.

(3) The larger of two numbers is 1 more than twice the smaller. The sum of the numbers is 20 less than three times the larger. Find the numbers.

(4) Two records and three tapes cost $31. Three records and two tapes cost $29. Find the cost of each record and each tape.

(5) The sum of two numbers is the same as four times the smaller number. If twice the larger is decreased by the smaller, the result is 30. Find the numbers.

(6) A group of students go out for lunch. If two have hamburgers and five have hot dogs, the bill will be $8.00. If five have hamburgers and two have hot dogs, the bill will be $9.50. What is the price of a hamburger?

(S)	22, 6
(K)	16, 9
(R)	18, 6
(M)	11, 10
(B)	$20, $35
(I)	12, 9
(P)	$1.35
(N)	13, 6
(O)	14
(T)	$1.50
(L)	$8, $5
(A)	24, 8
(D)	$23, $41
(H)	$5, $7
(E)	17

(7) The price of a sweater is $5 less than twice the price of a shirt. If four sweaters and three shirts cost $200, find the price of each shirt and each sweater.

(8) A shipment of TV sets, some weighing 30 kg each and the others weighing 50 kg each, has a total weight of 880 kg. If there are 20 TV sets all together, how many weigh 50 kg?

2	4	8	6	2	1	5	7	2	7	8	8	3

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What Do You Call a Cow After She Has a Baby?

Solve each problem using a system of two equations in two variables. Cross out the box that contains your answer. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

(1) A boat travels 60 km upstream (against the current) in 5 hours. The boat travels the same distance downstream in 3 hours. What is the rate of the boat in still water? What is the rate of the current?

(2) When a plane flies into the wind, it can travel 3000 km in 6 hours. When it flies with the wind, it can travel the same distance in 5 hours. Find the rate of the plane in still air and the rate of the wind.

(3) When Lucy swims with the current, she swims 18 km in 2 hours. Against the current, she can swim only 14 km in the same time. How fast can Lucy swim in still water? What is the rate of the current?

(4) With the wind, a jet can fly 2500 km in 2 h 30 min. Against the wind, it can fly only 2000 km in the same time. Find the rate of the jet in still air and the rate of the wind.

(5) On an upstream trip, a canoe travels 40 km in 5 hours. Downstream, it travels the same distance in half the time. What is the rate of the canoe in still water and the rate of the current?

(6) A duck can fly 2400 m in 10 min with the wind. Against the wind, it can fly only two thirds of this distance in 10 min. How fast could the duck fly in still air? What is the rate of the wind?

(7) With the wind, a plane flew 1400 km in 4 hours. On the return trip, the pilot was forced to land after 1 h 30 min, having traveled only 450 km. Find the rate of the plane in still air and the rate of the wind.

(8) A salmon swims 100 m in 8 min downstream. Upstream, it would take the fish 20 min to swim the same distance. What is the rate of the salmon in still water? What is the rate of the current?

MA	DE	AL	AR	CA	ME	LL
325 km/h	9.5 m/min	16 km/h	8.75 m/min	310 km/h	8 km/h	12 km/h
25 km/h	3 m/min	4 km/h	3.75 m/min	40 km/h	1 km/h	4 km/h
LF	IN	TO	AT	HE	ED	MA
15 km/h	620 km/h	200 m/min	10 km/h	550 km/h	180 m/min	900 km/h
6 km/h	60 km/h	40 m/min	2 km/h	50 km/h	30 m/min	100 km/h

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FACTS: A "one-L" Lama is a Tibetan monk.
A "two-L" LLama is a beast of burden.

QUESTION: What is a "three-L" LLLama?

Solve each problem using a system of two equations in two variables. Find each answer below and cross out the letter above it. When you finish, the answer to the title question will remain.

(1) Larry is 8 years older than his sister. In 3 years, he will be twice as old as she is now. How old are they now?

(2) Barry is 8 years older than his sister. In 3 years, he will be twice as old as she will be then. How old is each now?

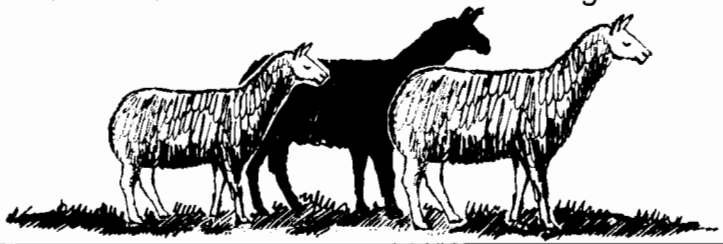
(3) Jennifer is 6 years older than Sue. In 4 years, she will be twice as old as Sue was 5 years ago. Find their ages now.

(4) Adam is 5 years younger than Eve. In 1 year, Eve will be three times as old as Adam was 4 years ago. Find their ages now.

(5) Jack is twice as old as Jill. In 2 years, Jack will be 4 times as old as Jill was 9 years ago. How old are they now?

(6) Four years ago, Katie was twice as old as Anne was then. In 6 years, Anne will be the same age that Katie is now. How old is each now?

(7) Five years ago, Tom was one third as old as his father was then. In 5 years, Tom will be half as old as his father will be then. Find their ages now.



S	A	B	A	E	I	T	G	F	A	T	I	R	M	E
26, 20	30, 24	37, 17	9, 14	19, 11	17, 9	16, 10	18, 12	20, 40	15, 35	13, 5	16, 8	18, 42	38, 19	10, 15

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Where Do Electricians Like to Sleep When They Travel?

Solve each problem below using a system of two equations in two variables. Circle your answer in the answer list. When you finish, arrange the letters of the correct answers in order, from the letter of the smallest correct answer to the letter of the largest correct answer. Write the letters in this order in the boxes at the bottom of the page. Can you "digit"?

(1) The sum of the digits of a two-digit number is 9. The value of the number is 12 times the tens digit. Find the number.

(2) The sum of the digits of a two-digit number is 12. If 15 is added to the number, the result is 6 times the units digit. Find the number.

(3) The sum of the digits of a two-digit number is 8. If the digits of the number are reversed, the new number is 18 less than the original number. Find the number.

(4) The tens digit of a two-digit number is twice the units digit. If the digits are reversed, the new number is 36 less than the original number. Find the number.

(5) The units digit of a two-digit number is 4 times the tens digit. If the digits are reversed, the new number is 54 more than the original number. Find the number.

(6) The sum of the digits of a two-digit number is 11. If 27 is added to the number, the digits will be reversed. Find the number.

(7) The units digit of a two-digit number is 1 less than 3 times the tens digit. If the digits are reversed, the new number is 45 more than the original number. Find the number.

(A)	14
(D)	92
(N)	84
(U)	38
(R)	45
(C)	12
(L)	36
(C)	42
(P)	28
(T)	27
(E)	87
(G)	39
(I)	47
(B)	85
(N)	53
(S)	17

Letter of smallest correct answer → | | | | | | | | ← Letter of largest correct answer

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What Did the Lady Say When a Gentleman Asked, "What Has Teeth and Flies Through the Air?"

Solve each problem using a system of two equations in two variables. Cross out the box that contains your answer. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

(1) Rocky McFist spends a total of \$90 per week for karate lessons and ballet lessons. If the amount spent on karate lessons increases \$10 per week, it will be two thirds of the amount spent on ballet lessons. How much does Rocky spend on ballet lessons?

_____

(2) Dr. D. Jones has a total of \$3000 invested in two stocks. Stock A pays dividends at the rate of 6% and Stock B at the rate of 8%. If her dividends from the two stocks total \$220 per year, how much did she invest in each stock?

Stock A _____, Stock B _____

(3) The recipe for Junky Crunchies requires a total of 8 cups of sugar and flour together. If the recipe had called for $\frac{1}{4}$ cup more sugar, the amount of sugar would be half the amount of flour. How many cups of sugar does the recipe call for?

_____

(4) Ms. U. S. Bonds invested a total of \$4500, some at 9% per year and the rest at 6% per year. The return from the 9% investment exceeds that from the 6% investment by \$180. How much did she invest at each rate?

_____ at 9%, _____ at 6%

(5) Prince Neva Ben Rich takes out two loans. He borrows \$800 more from a credit union that charges 12% interest than from a bank that charges 15% interest. If his interest payments total \$420 annually, how much does he borrow at each rate?

_____ at 12%, _____ at 15%

(6) Tony and Cleo are donating some of their books to a hospital. If Tony contributes half of his books and Cleo gives one third of hers, they will donate a total of 30 books. If Tony gives two fifths of his books and Cleo contributes half of hers, they will donate a total of 31 books. How many books does each have?

Tony _____, Cleo _____

TH	AF	E	AT	LY	IN	TO	GS	A	WS	A	IR	KY
\$1000	\$2500	\$60	40	50	\$1200	\$2000	\$2300	$2\frac{3}{4}$	\$50	$2\frac{1}{2}$	\$3300	\$3000
\$2000	\$2000		30	24	\$1800	\$1200	\$1500				\$1200	\$1500

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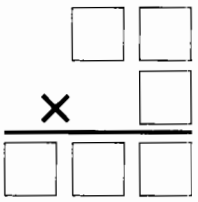
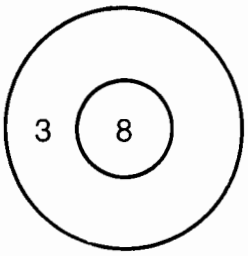
TEST OF GENIUS

1. If a brick balances evenly with three quarters of a pound and three quarters of a brick, what is the weight of a whole brick?

2. Arrange the digits 1 through 6 in the six boxes below so that the multiplication works out correctly.

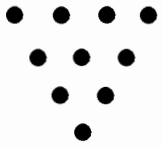


3. An unusual dartboard is shown below. Each dart scores either 3 points or 8 points. Suppose you can throw as many darts as you like, and your score is obtained by adding all the 3s and 8s together. Make a list of *all* the scores that are *impossible* to attain.



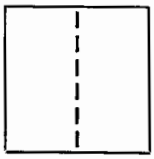
4. Bonzo went to a carnival. At the first game, he paid 10¢ to get in, spent half the money he had left, and spent 10¢ to get out. At the second game, he spent 10¢ to get in, spent half the money he had left, and spent 10¢ to get out. At the third game, he spent 10¢ to get in, spent half the money he had left, and spent 10¢ to get out. Then he found he had no money left. How much money did Bonzo start with?

5. Ten bowling pins are set up in the usual way forming a triangle with the point facing the bowler. How can 3 pins be moved so that the 10 pins are still set up in the conventional manner but with the point of the triangle away from the bowler?



6. Borfin caught a big fish. Its head was 5 inches long. The tail was as long as the head plus half the body. The body was as long as the head plus the tail. How long was the fish?

7. A square piece of paper is folded in half vertically. If the resulting figure has a perimeter of 12 cm, what was the area of the original square?



8. What is the value of the following expression:

$$(x - a)(x - b)(x - c) \ldots (x - z),$$

so that there are a total of 26 factors, with each letter of the alphabet subtracted from x in one of the factors?

SCORING KEY

7 or 8—*Innate Genius*
5 or 6—*Great Genius*
3 or 4—*Straight Genius*
1 or 2—*Late Genius*

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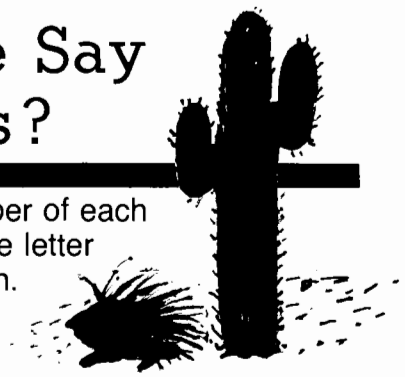
What Did the Baby Porcupine Say When It Backed Into a Cactus?



Determine which of the relations below are functions. Find the number of each relation that *is* a function at the bottom of the page and cross out the letter below it. When you finish, the answer to the title question will remain.

(1) {(−2, 7), (−1, 5), (0, 3), (1, 1), (2, 1)}

(2) {(−7, 20), (3, 5), (0, 5), (−2, 0), (6, −4), (−6, −9), (4, 4)}

(3) {(4, 8), (−3, −2), (9, 6), (2, −1), (−4, −5), (2, 7), (−8, 0)}

(4)

x	y
0	−19
1	−12
2	−4
3	3
4	13
5	27

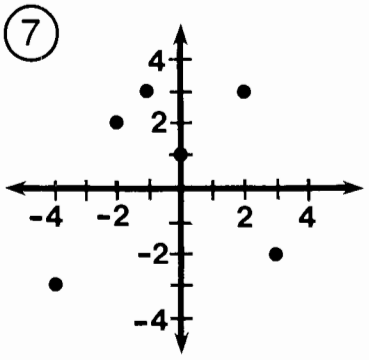
(5)

x	y
−5	8
−3	8
−1	−2
1	−2
3	11
5	23

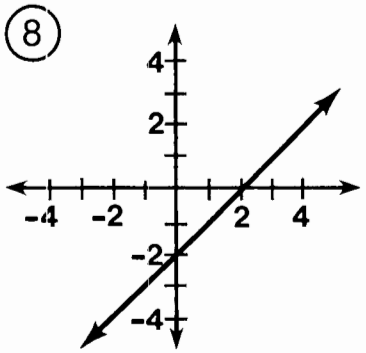
(6)

x	y
−2	−7
−2	5
0	−16
2	0
2	6

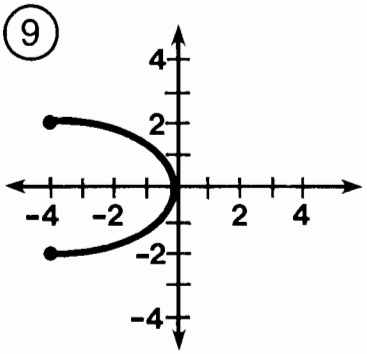
(7)



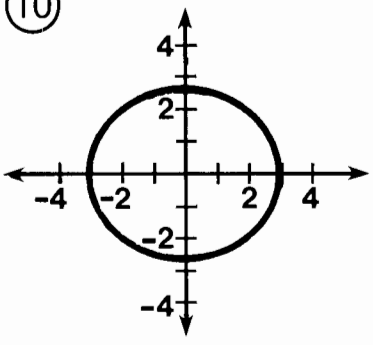
(8)



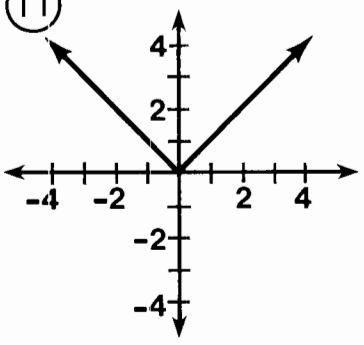
(9)



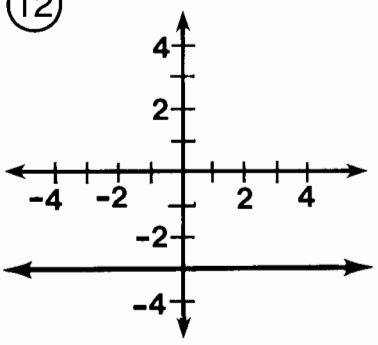
(10)



(11)



(12)



5	12	10	7	1	3	9	11	2	4	6	8
F	O	H	A	S	I	M	T	O	P	A	D

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What Did They Call the Duck Who Became a Test Pilot?

Follow the directions given for each section. Cross out each box in the rectangle below that contains a correct answer. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

I For each function, find the indicated values.

(1)	$f(x) = 2x - 5$	A. $f(6)$	B. $f(1)$
(2)	$f(x) = x^2 - 4$	A. $f(12)$	B. $f(-2)$
(3)	$g(x) = x^2 - 7x + 1$	A. $g(3)$	B. $g(0)$
(4)	$h(x) = \dfrac{x+3}{x^2+x-6}$	A. $h(4)$	B. $h(-1)$

II Find the range of each function for the given domain.

(5)	$f(x) = 3x + 2$	$D = \{-2, 0, 2\}$
(6)	$g(x) = 9 - 5x$	$D = \{-3, -1, 1\}$
(7)	$F(x) = 2x^2 - 1$	$D = \{5, 1, -4\}$
(8)	$h(x) = x^2 - 8x + 3$	$D = \{1, 0, -1\}$
(9)	$f(t) = \dfrac{t^2 + 4t}{t - 6}$	$D = \{4, 0, -4\}$
(10)	$G(n) = -n^2 + 2n + 3$	$D = \{-2, 1, 4\}$

SK $\{49, 1, 31\}$	Y 0	S $\frac{1}{2}$	AF $\{49, -1, 9\}$	E $\{-16, 0\}$	IL 7	LY $\{-16, 8, -2\}$
BE $\{24, 14, 4\}$	ER $\{-5, 0\}$	ST $\{-5, 4\}$	QU $-\frac{3}{2}$	IT $-\frac{1}{3}$	I -3	A $\{24, 14, -7\}$
DU -11	CK $\{-4, 7, 12\}$	MB 140	IN $\{-4, 2, 8\}$	H $\{-4, 3, 12\}$	ER $\{-4, 2, -1\}$	UP 1

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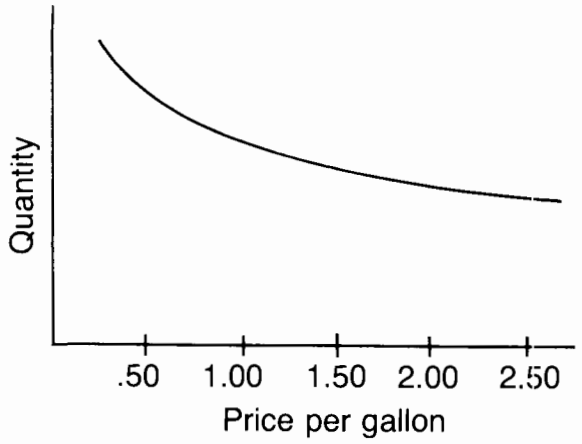
OBJECTIVE 1–b: To find values of a function; to find the range of a function for a given domain.

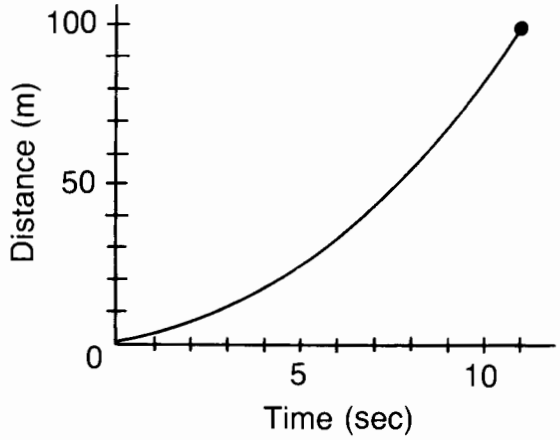
SKETCHING FUNCTIONS I

Study each function below and then answer the questions at the bottom of the page.

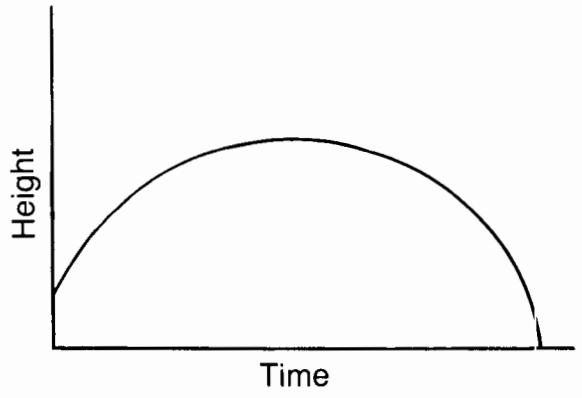
A. The quantity of gasoline consumed in the U.S. is a function of the price per gallon.



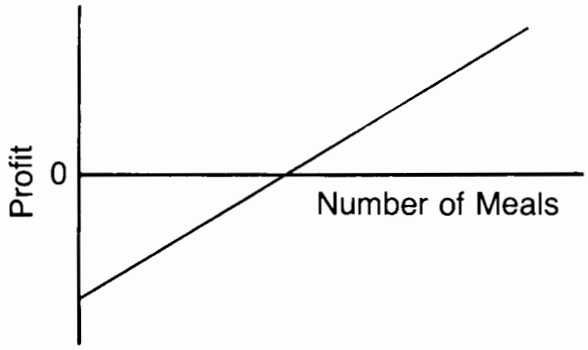
B. The distance from the starting line of a runner in the 100-meter dash is a function of the time since the start.



C. The height above ground of a cannon ball shot from a cannon is a function of the time since it was shot.



D. The profit from a restaurant is a function of the number of meals that are served.



GRAPH A: Does this curve appear to have a positive slope or a negative slope? Why do you suppose this is the case?

GRAPH B: Why does this curve slope more steeply upward as time increases? What is the domain of this function? What is the range?

GRAPH C: When time equals 0, why is the height of the cannon ball not equal to 0? Describe the domain of this function. Describe the range.

GRAPH D: Why does the range of this function include negative values? What is the significance of the point where the graph crosses the horizontal axis?

OBJECTIVE 1–c: To describe how real-world functional relationships can be represented by graphs, using concepts such as slope, domain, range, and initial conditions.

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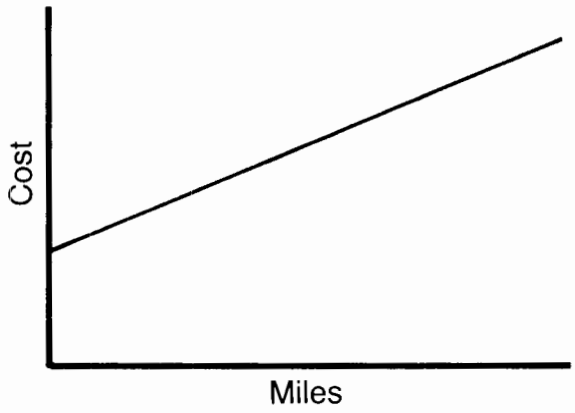
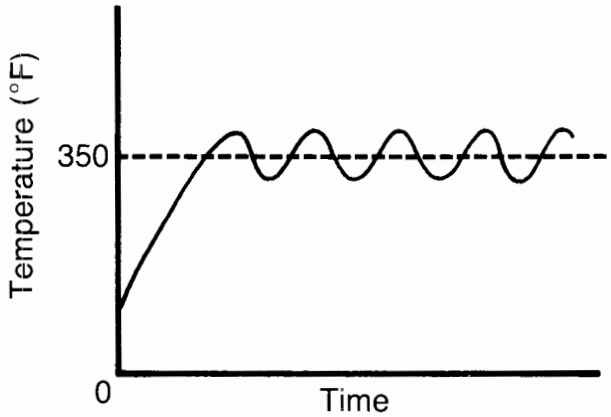
SKETCHING FUNCTIONS II

Study each function below and then answer the questions at the bottom of the page.

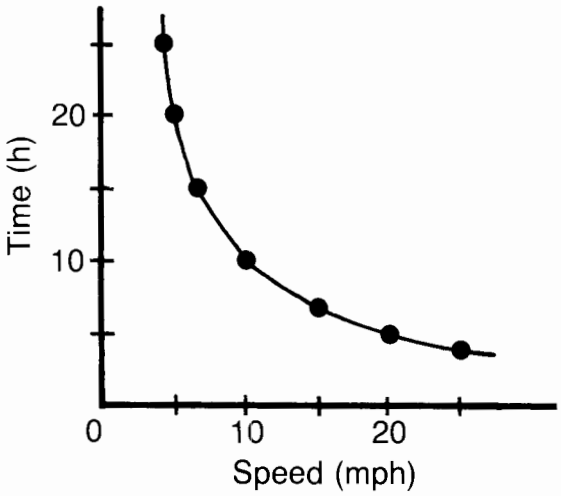
A. The cost per month of owning a car is a function of the number of miles driven.



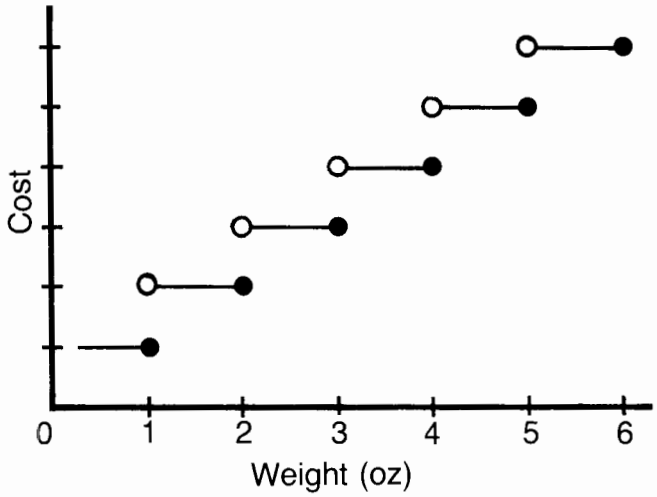
B. The temperature in an oven set at 350°F is a function of the time since it was turned on.



C. The time it takes to ride a bicycle 100 miles is a function of the average speed.



D. The cost of postage for a first-class letter is a function of its weight in ounces.



GRAPH A: When the number of miles driven equals 0, why is the cost per month not equal to 0? Why does the graph have a positive slope?

GRAPH B: When time equals 0, why is the temperature in the oven not equal to 0? Why does the temperature eventually oscillate around 350°F?

GRAPH C: How long does it take to ride a bicycle 100 miles at each of the following speeds: 5 mph, 10 mph, 15 mph, 20 mph, 25 mph? What is always true about the product *speed* × *time*?

GRAPH D: Why does the graph look like a series of steps rather than a smooth curve? Why is a hollow circle needed at the beginning of each step (except the first)?

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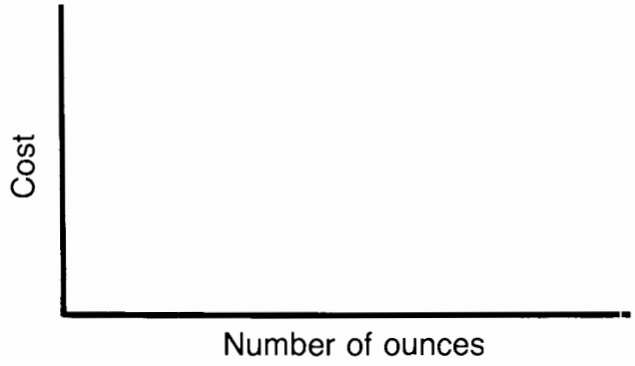
OBJECTIVE 1–c: To describe how real-world functional relationships can be represented by graphs, using concepts such as slope, domain, range, and initial conditions.

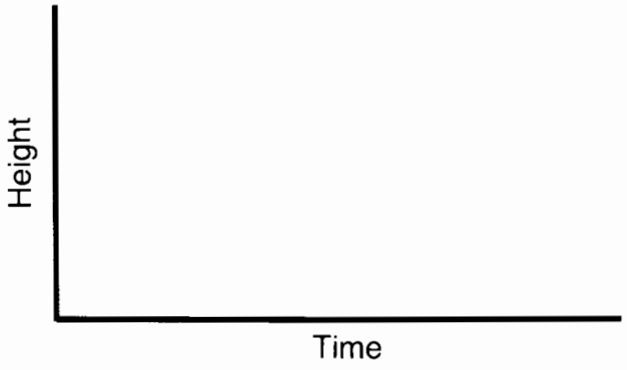
SKETCHING FUNCTIONS III

Make a sketch for each function described below. Use your knowledge of the relationships described.

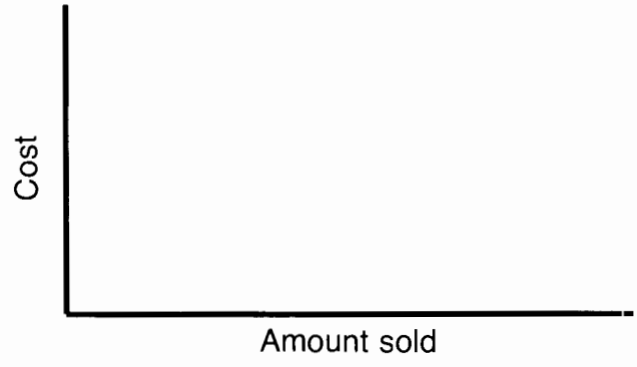
(A) At a fixed price per ounce, the cost of buying gold is a function of the number of ounces you buy.



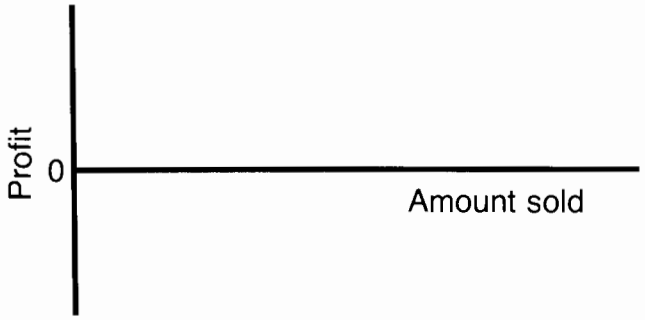
(B) The height of your head above the ground as you ride a Ferris wheel is a function of the time since you got on.



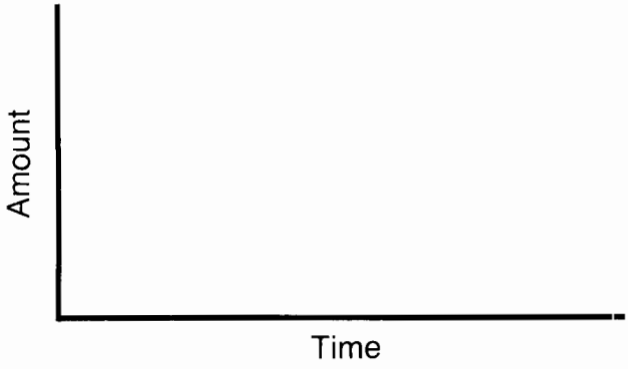
(C) The total cost of operating a lemonade stand is a function of the amount of lemonade sold.



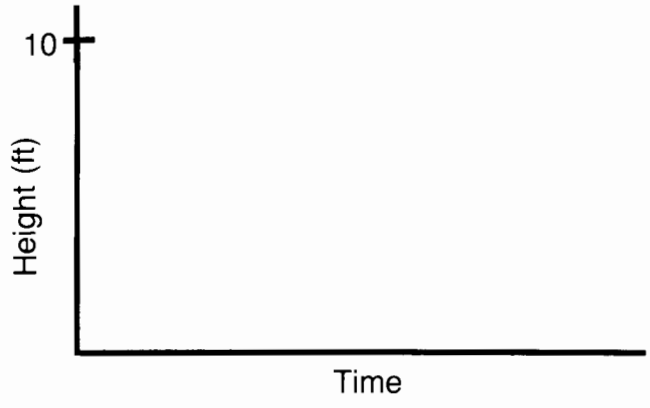
(D) The profit from operating a lemonade stand is a function of the amount of lemonade sold.



(E) The amount of water in a pan on a burner that is turned on "high" is a function of the time since the burner was turned on.



(F) The height of a ball that is dropped from a height of 10 feet is a function of the time since it was dropped.



OBJECTIVE 1–d: To sketch the graph of a function using knowledge of real-world relationships.

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ALGEBRA WITH PIZZAZZ!
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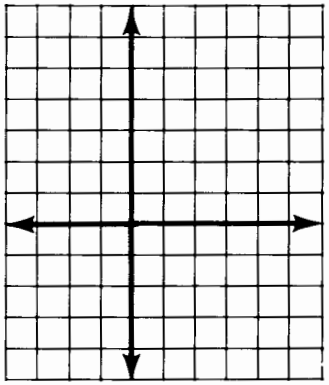
FROM LINEAR TO QUADRATIC

Complete each table and graph the function.

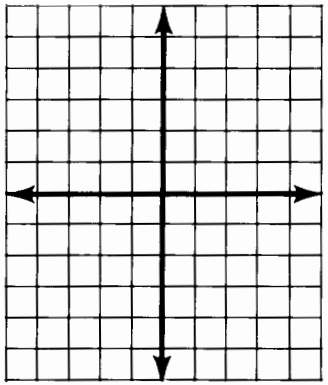
(1) $y = 2x - 3$

x	y
5	
2	
0	
−1	



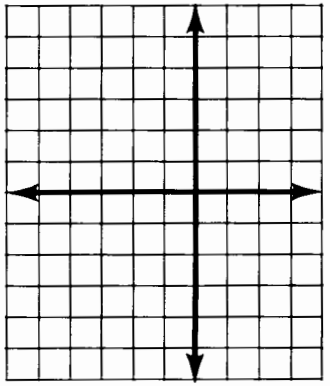
(2) $y = x^2 - 5$

x	y
3	
2	
1	
0	
−1	
−2	
−3	



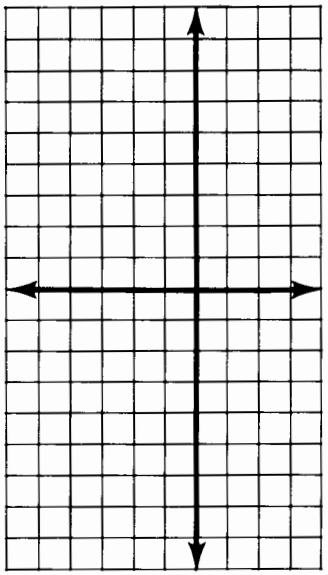
(3) $y = x^2 + 4x$

x	y
1	
0	
−1	
−2	
−3	
−4	
−5	



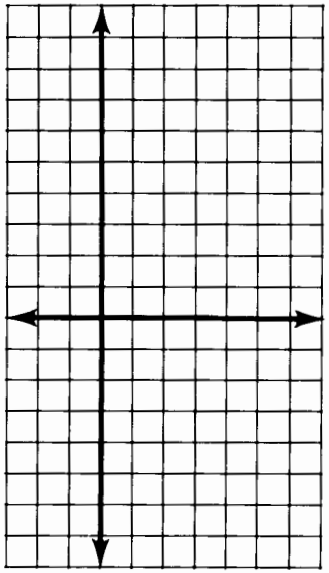
(4) $y = x^2 + 2x - 7$

x	y
−5	
−4	
−3	
−2	
−1	
0	
1	
2	
3	



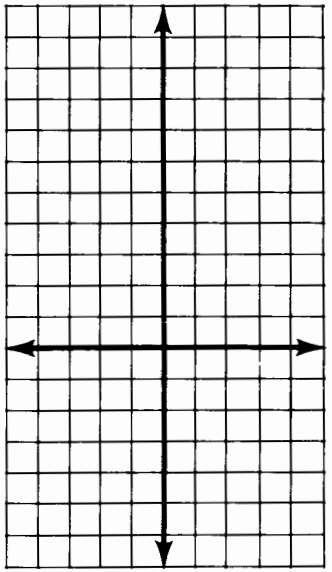
(5) $y = -x^2 + 6x + 1$

x	y
7	
6	
5	
4	
3	
2	
1	
0	
−1	



(6) $y = 2x^2 - 4x - 5$

x	y
4	
3	
2	
1	
0	
−1	
−2	



OBJECTIVE 1-e: To graph quadratic functions and compare them to a linear function.

Why Did Grok Jump Up and Down the First Time He Saw a Variable in Algebra Class ?

Write an equation expressing direct variation for each exercise below. Find your answer in the answer column and notice the two letters next to it. Write these letters in the two boxes that contain the number of that exercise.

NOTE: Each constant of variation is given in decimal form, unless it equals a *repeating* decimal. Then, it is left as a fraction in lowest terms.

(1) y varies directly as x, and $y = 20$ when $x = 5$.

(2) y varies directly as x, and $y = 9$ when $x = 27$.

(3) y varies directly with x, and $y = 40$ when $x = 16$.

(4) y varies directly with x, and $y = 32$ when $x = 20$.

(5) y is directly proportional to x, and $y = -10$ when $x = -15$.

(6) y is directly proportional to x, and $y = 300$ when $x = -60$.

(7) y is directly proportional to x, and $y = 17$ when $x = 17$.

(8) y varies directly as x, and $y = 1.2$ when $x = 1.6$.

(9) The distance, y, traveled at a fixed rate of speed varies directly with the time of travel, x. Write an equation if $y = 250$ m when $x = 25$ sec.

(10) The amount of interest, y, paid on a loan is directly proportional to the amount borrowed, x. Write an equation if $y = \$75$ when $x = \$500$.

(11) The circumference, y, of a circle varies directly with the diameter, x, of the circle. Write an equation if $y \doteq 44$ cm when $x = 14$ cm.

BI	$y = 6.2x$
NG	$y = 2.5x$
MO	$y = -5x$
VE	$y = 0.45x$
SA	$y = 4x$
SI	$y = 10x$
LL	$y = 3.5x$
NT	$y = \frac{1}{3}x$
ME	$y = 0.75x$
NX	$y = \frac{22}{7}x$
GH	$y = \frac{2}{3}x$
TI	$y = 0.15x$
IT	$y = 1.6x$
NA	$y = 0.13x$
WA	$y = x$
KI	$y = -3.4x$

4	4	7	7	1	1	11	11	9	9	5	5	10	10	3	3	6	6	8	8	2	2

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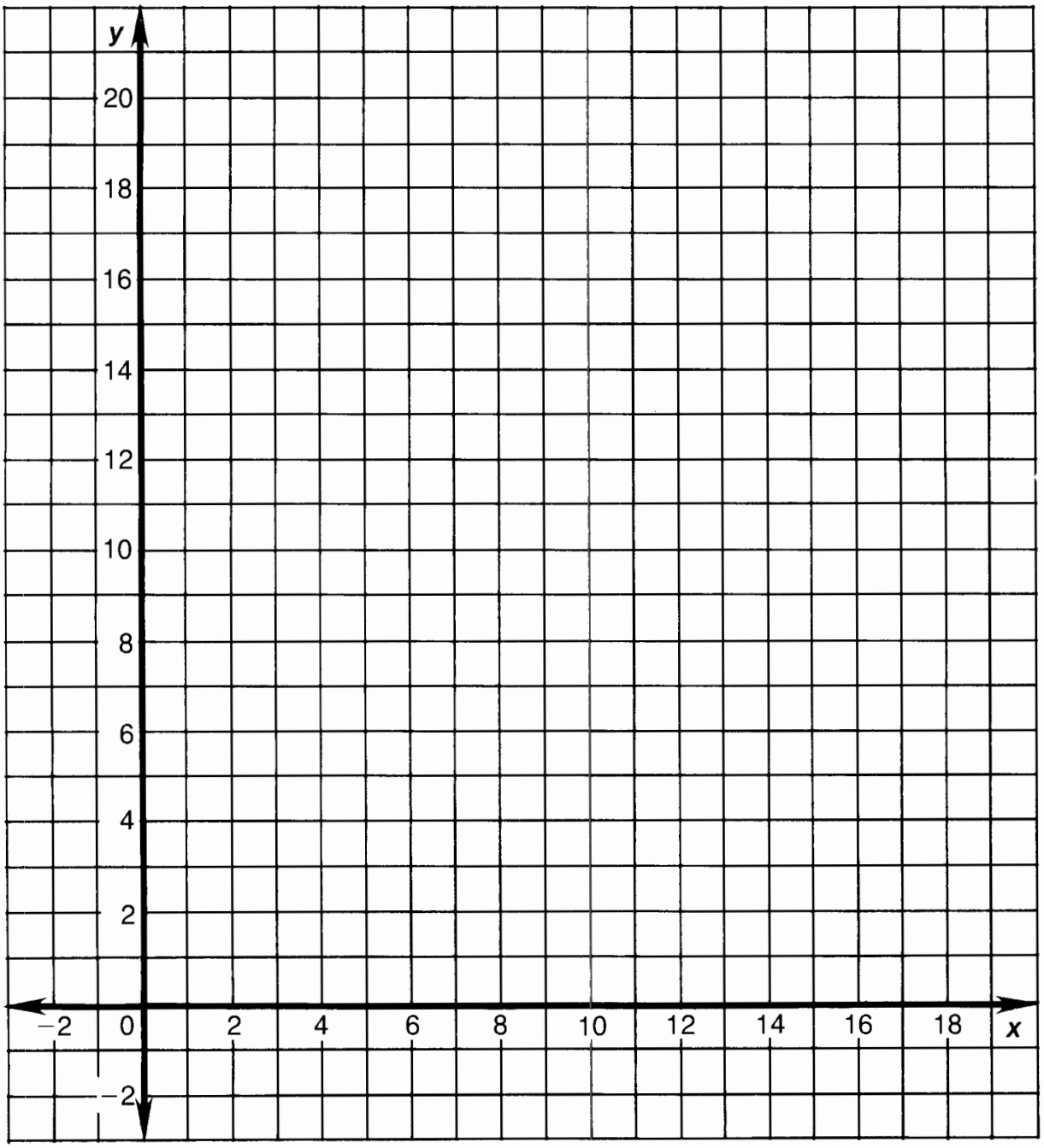
Direct Variation "Grafun"



1. Why does the graph of an equation expressing direct variation always pass through the origin?
2. As k increases from 0.15 to 10, what happens to the graph of $y = kx$? Describe the graph when k is negative.
3. What is the meaning or significance of k in the equation for Exercise 9? For Exercise 10? For Exercise 11?

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What Do You Have When a Teacher Tells Two Students to Stop Talking and Do Their Work?

Solve each problem and find your answer in the rectangle below. Cross out the box that contains your answer. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

1 The amount of money earned on a job is directly proportional to the number of hours worked. If \$36 is earned for 8 hours of work, how much is earned for 30 hours of work?

\$_____

2 The height that a ball bounces varies directly with the height from which it is dropped. A certain ball bounces 30 cm when dropped from a height of 50 cm. How high will the ball bounce if dropped from a height of 120 cm?

_____ cm

3 The amount that a spring stretches is directly proportional to the weight of the object attached to it. If a spring is stretched 10 cm by a weight of 8 kg, how much will it be stretched by a weight of 3 kg?

_____ cm

4 The number of calories in a container of milk is directly proportional to the amount of milk in the container. If there are 160 calories in an 8-ounce glass of milk, find the number of calories in a 15-ounce glass of milk.

_____ cal

5 The number of kilograms of water in a person's body varies directly as the person's mass. A person with a mass of 90 kg contains 60 kg of water. How many kilograms of water are in a person with a mass of 50 kg?

_____ kg

6 On a certain map, 25 km are represented by 2 cm. If two cities are 7 cm apart on the map, what is the actual distance between them?

_____ km

7 The amount of fertilizer needed for a lawn varies directly with the area of the lawn. If 4 pounds of fertilizer are needed for 500 square feet of lawn, how much is needed for Dr. Quagmire's lawn, which is rectangular in shape and measures 25 feet by 50 feet?

_____ lb

TW	A	TW	NO	OS	WO	RD
3.75	9.4	10	324	$33.\overline{3}$	72	76
ER	NE	ED	IT	PA	N	IR
$31.\overline{6}$	300	144	135	83.5	87.5	4.2

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Why Did Miss Muffet Need a Road Map?

Write an equation expressing inverse variation for each exercise below. Find your answer in the corresponding set of answer boxes, and print the letter of the exercise above it.

(O) y varies inversely as x, and $y = 25$ when $x = 3$.

(S) y varies inversely as x, and $y = 7$ when $x = 12$.

(E) y is inversely proportional to x, and $y = 3.5$ when $x = 8$.

(T) y is inversely proportional to x, and $y = 0.4$ when $x = 0.9$.

(L) The time, t, it takes to travel a certain distance varies inversely as the speed, s. Write an equation if $t = 10$ h when $s = 80$ km/h.

(H) The length, ℓ, of a rectangle with a constant area varies inversely as the width, w. Write an equation if $\ell = 7.2$ cm when $w = 5.0$ cm.

(S) The time, t, required to do a certain job is inversely proportional to the number of people, n, working. Write an equation if $t = 15$ h when $n = 6$.

$t = \frac{820}{s}$	$y = \frac{84}{x}$	$\ell = \frac{36}{w}$	$y = \frac{28}{x}$	$t = \frac{115}{\ell}$	$t = \frac{800}{s}$	$y = \frac{75}{x}$	$t = \frac{90}{n}$	$y = \frac{0.36}{x}$	$\ell = \frac{31}{w}$

(H) y varies inversely as x, and $y = -320$ when $x = -5$.

(E) y is inversely proportional to x, and $y = 0.125$ when $x = -100$.

(Y) y varies inversely as x, and $y = -9$ when $x = 28$.

(R) y is inversely proportional to x, and $y = 2.5$ when $x = 0.4$.

(H) The number of chairs, y, on a ski lift is inversely proportional to the distance, x, between them. Write an equation if $y = 40$ when $x = 30$ m.

(E) The force, F, needed to lift an object with a crowbar varies inversely with the length, ℓ, of the crowbar. Write an equation if $F = 200$ kg when $\ell = 1.4$ m.

(W) The frequency, f, of a sound wave is inversely proportional to the wavelength, ℓ. Write an equation if $f = 420$ Hz when $\ell = 0.8$ m.

$y = \frac{1800}{x}$	$y = \frac{1200}{x}$	$y = \frac{-12.5}{x}$	$y = \frac{1}{x}$	$f = \frac{324}{\ell}$	$f = \frac{336}{\ell}$	$y = \frac{1600}{x}$	$F = \frac{280}{\ell}$	$y = \frac{-252}{x}$	$F = \frac{264}{\ell}$

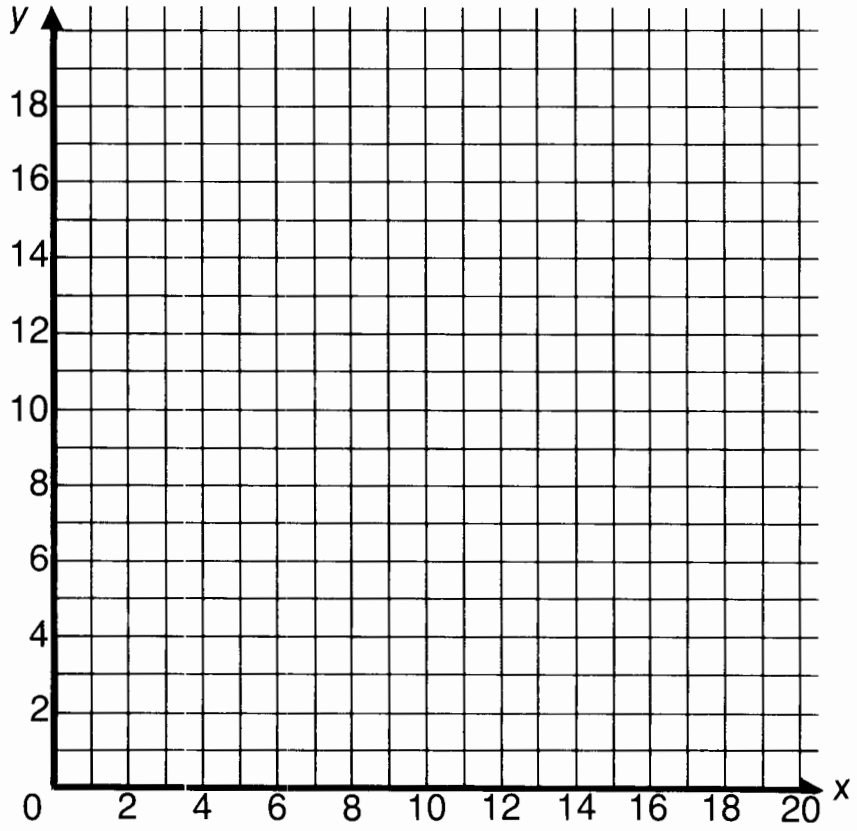
OBJECTIVE 1–i: To find the constant of variation and write an equation expressing inverse variation.

INVERSE VARIATION "GRAFUN"

Complete each table and graph the equation.

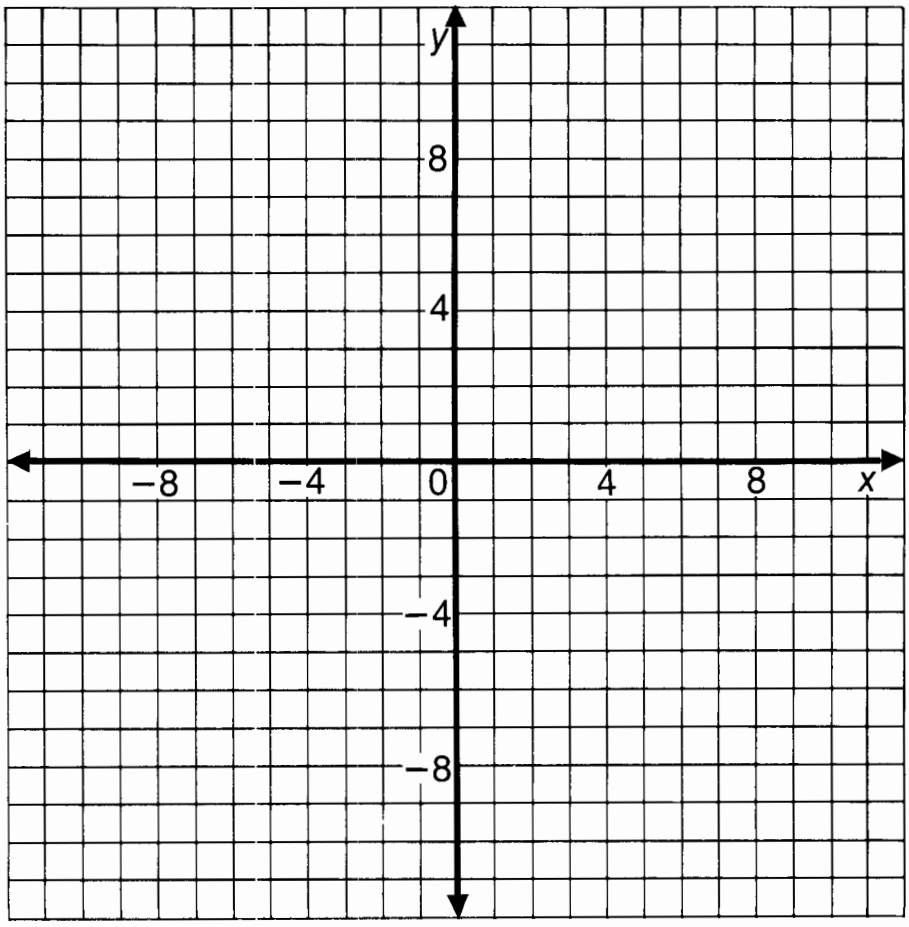
① $y = \frac{20}{x}$

x	y
1	
2	
4	
5	
10	
20	



② $y = \frac{12}{x}$

x	y
1	
2	
3	
4	
6	
12	
−1	
−2	
−3	
−4	
−6	
−12	



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How Did Everybody Find Out About the New Corduroy Pillow Covers ?

Solve each problem below. Find your answer in the answer column and notice the letters next to it. Write these letters in the boxes at the bottom of the page that contain the number of that exercise.

(1) For rectangles with the same area, the length varies inversely as the width. One rectangle has a length of 12 cm and a width of 5 cm. Find the length of another rectangle with the same area whose width is 4 cm.

_____ **cm**

(2) The current in an electrical circuit varies inversely as the amount of resistance in the circuit. The current is 10 amps when the resistance is 24 ohms. Find the current when the resistance is 30 ohms.

_____ **amps**

(3) The cost per person to rent a mountain cabin is inversely proportional to the number of people who share the rent. If the cost is $36 per person when 5 people share, what is the cost per person when 8 people share?

$_____

(4) The volume of a gas varies inversely as the pressure. A helium-filled balloon has a volume of 21 m^3 at sea level, where the pressure is 1 atmosphere. The balloon rises to an altitude where the pressure is 0.7 atmospheres. What is its volume?

_____ **m^3**

(5) The number of chairs on a ski lift is inversely proportional to the distance between them. A lift has 70 chairs when they are spaced 24 m apart. If 80 evenly-spaced chairs are used on the lift, how much space will be left between them?

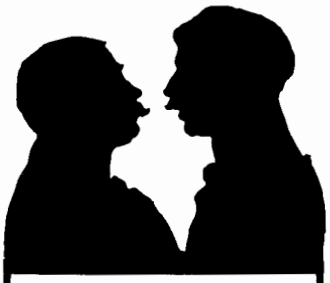
_____ **m**

(6) For piano wires under the same tension, the number of vibrations per second (frequency) of each wire is inversely proportional to the length of the wire. A wire 0.75 m long vibrates 480 times per second. How long is a wire that vibrates 300 times per second?

_____ **m**

(7) The time it takes to fly from Los Angeles to New York varies inversely as the speed of the plane. If the trip takes 6 h at 900 km/h, how long would it take at 800 km/h?

_____ **h**



DEH	1.2
EWS	36
MA	15
RTU	7.2
TH	22.50
EY	21
RKS	1.35
EA	8
DLI	6.75
IS	19
NES	30
IT	24.50

3	3	5	5	1	1	6	6	6	2	2	7	7	7	4	4	4

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KNOTTY RIDDLE

The old, old rope was tied,
Tied hanging from a ring.
What did its old knot say
When a hippo asked to swing?

TO ANSWER THE RIDDLE ABOVE:
For each exercise, write an equation expressing direct or inverse variation as a square. Use k as the constant of variation. Then solve the two problems under the exercise. Find each answer at the bottom of the page and write the problem letter above it.

1. The distance, d, that a free-falling body falls varies directly as the square of the time, t, that it falls. If $d = 36$ m when $t = 3$ sec,

   (D) Find the value of k. _____

   (A) Find d when $t = 5$ sec. _____ **m**

2. The amount of material, M, needed to cover a ball is directly proportional to the square of the radius, r. If $M = 60$ cm^2 when $r = 2$ cm,

   (T) Find the value of k. _____

   (E) Find M when $r = 7$ cm. _____ **cm^2**

3. The price, p, of a pizza varies directly as the square of its radius, r. If $p = \$6.00$ when $r = 10$ cm,

   (A) Find the value of k. _____

   (O) Find p when $r = 15$ cm. **$**_____

4. The brightness of illumination, I, of an object varies inversely as the square of its distance, d, from the source of illumination. If $I = 18$ luxes when $d = 4$ m,

   (I) Find the value of k. _____

   (K) Find I when $d = 3$ m. _____ **luxes**

5. The time, t, needed to fill the gas tank of a car varies inversely as the square of the diameter, d, of the hose. If $t = 5$ min when $d = 3$ cm,

   (M) Find the value of k. _____

   (F) Find t when $d = 2$ cm. _____ **min**

6. The electrical resistance, R, of a wire of a certain length is inversely proportional to the square of its diameter, d. If $R = 10$ ohms when $d = 0.6$ mm,

   (N) Find the value of k. _____

   (A) Find R when $d = 3$ mm. _____ **ohms**

7. The price, p, of a diamond is directly proportional to the square of its weight, w. If $p = \$2000$ when $w = 1$ carat,

   (Y) Find the value of k. _____

   (R) Find p when $w = 0.7$ carat. **$**_____

288	12.75	0.4	45	0.12	100	920	11.25	980	0.06	2000	735	4	2.5	32	3.6	13.50	15

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JOINT AND COMBINED VARIATION

Translate each statement into a formula. Use k as the constant of variation.

(1) V varies jointly as B and h. _____

(2) t varies directly as W and inversely as n. _____

(3) P varies directly as the square of V and inversely as R. _____

(4) h varies directly as W and inversely as the square of r. _____

(5) E varies jointly as m and the square of v. _____

(6) I varies jointly as A and H and inversely as T. _____

(7) The mass, m, of a cement block varies jointly as the length, ℓ, width, w, and thickness, t, of the block. _____

(8) The volume, V, of a gas varies directly as the temperature, T, and inversely as the pressure, P. _____

(9) The collision impact, I, of an automobile varies jointly as the mass, m, and the square of the speed, s. _____

(10) The intensity of a sound, i, varies directly as the amplitude, A, of the sound source, and inversely as the square of the distance, d, from the source. _____

(11) The safe load, s, for a beam, varies jointly as the breadth, b, and the square of the depth, d, and inversely as the length, ℓ, between supports. _____

(12) The gravitational force, g, between two objects varies jointly as the mass of the first, m_1, and the mass of the second, m_2, and inversely as the square of the distance, d, between them. _____

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What Happened When the Crossword Puzzle Champion Died?

Find the graph of the solution set of each inequality below in the corresponding column of graphs. Notice the letter next to it. Write this letter in each box containing the number of that exercise. Keep working and you will find out about this grave event.

(1) $x < 2$

(2) $x \leq 2$

(3) $x > 2$

(4) $x \geq 2$

(5) $x \neq 1$

(6) $x < -1$

(7) $x > -1$

(8) $x \leq -1$

(9) $x \geq -1$

(10) $x < 1$

(11) $1 < x$

(12) $-3 \leq x$

(13) $x > -3$

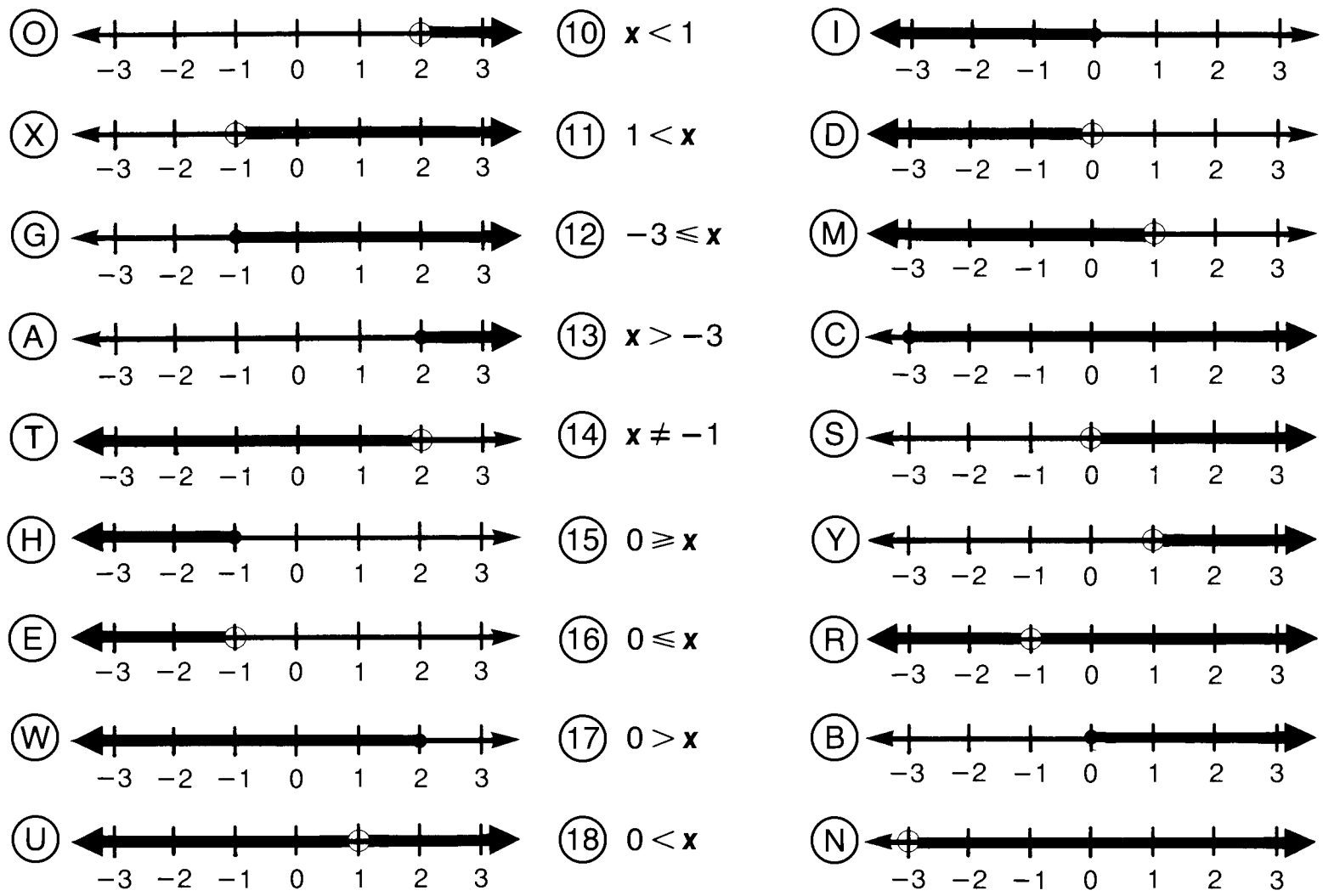
(14) $x \neq -1$

(15) $0 \geq x$

(16) $0 \leq x$

(17) $0 > x$

(18) $0 < x$



1	8	6	11	16	5	14	15	6	17	8	15	10	18	15	7	17	3	2	13	4	13	17	6	15	9	8	1	4	12	14	3	18	18

OBJECTIVE 2–a: To identify the graph of the solution set of an inequality.

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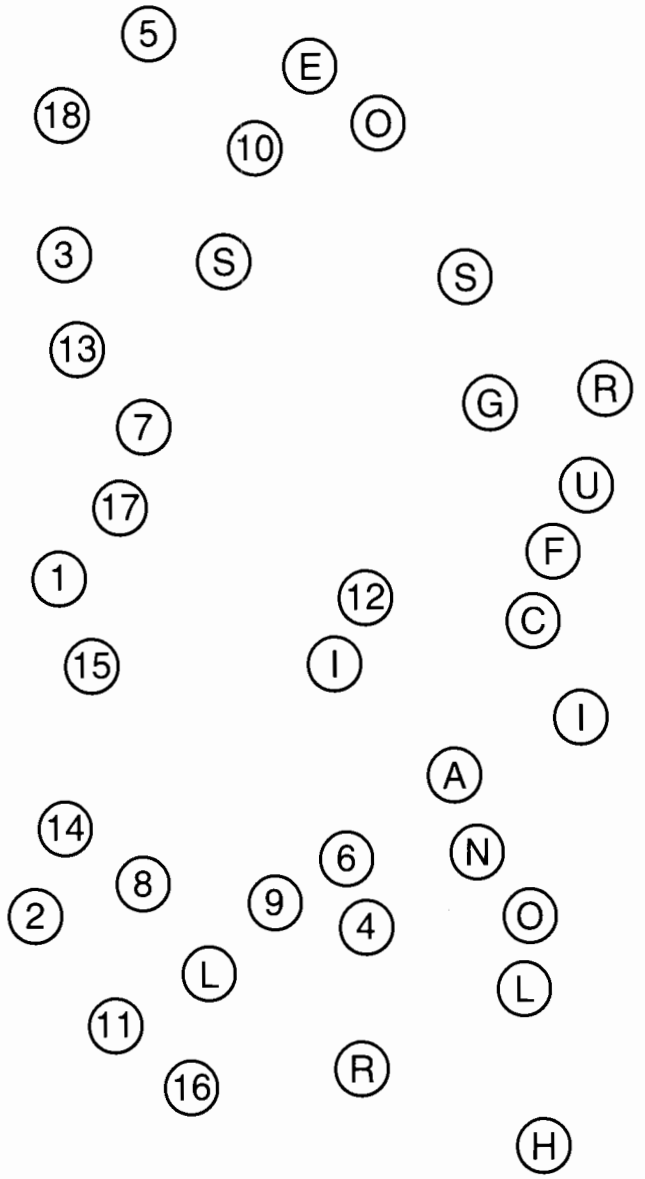
In Music, What Does "Allegro" Mean?

Solve each inequality below. Draw a straight line connecting it to the inequality that describes the solution set. The line will cross a number and a letter. Write the letter in the matching numbered box at the bottom of the page.

(1) $4x - 7 > 17$		• $x > 2$
(2) $2x + 36 < 4$		• $x \geq -4$
(3) $10 - 8x > 26$		• $x > 6$
(4) $-6x - 1 \leq 23$		• $x \leq -10$
(5) $6 + 11x > -60$		• $x < -6$
(6) $-9x + 5 \geq -58$		• $x < -16$
(7) $32 - 15x < 2$		• $x > -1$
(8) $42 > 3x + 3$		• $x < 2$
(9) $-26 < 4 - 5x$		• $x \leq 7$
(10) $26 \leq -7x - 2$		• $x \leq -4$
(11) $10x + 18 \geq -72$		• $x \leq 38$
(12) $12 > -14x - 2$		• $x < -2$
(13) $4x - 68 > -4$		• $x < 13$
(14) $37 \leq 17 - 2x$		• $x \geq -9$
(15) $-3 - 7x > -17$		• $x > -4$
(16) $14 < 5x + 34$		• $x > 16$
(17) $58 - x \geq 20$		• $x > -6$
(18) $6x - 4 < -40$		• $x < 6$



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

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OBJECTIVE 2–b: To solve inequalities of the form $ax + b > c$, where a is an integer.

What Do You Call Drilling 4,876 Holes?

Solve each inequality. Find the inequality that describes the solution set and cross out the box containing it. After completing all the exercises, print the letters from the remaining boxes in the spaces at the bottom of the page.

---

(1) $3x - 8 > 10$

(2) $-2x + 7 \leq 37$

(3) $30 - 8x < 6$

(4) $-28 \geq 12x - 4$

(5) $\frac{x}{4} < 11$

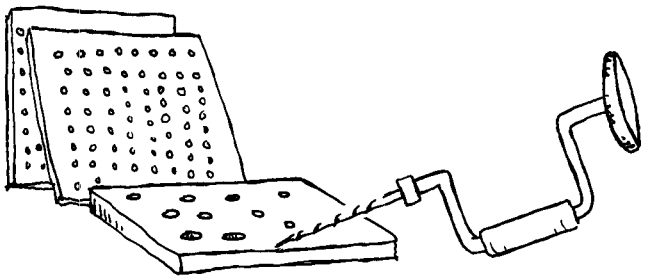
(6) $\frac{x}{5} - 9 > 3$

(7) $-\frac{x}{2} + 20 \leq 4$

(8) $7 - \frac{x}{10} \geq 12$

(9) $-18 > \frac{x}{6} - 10$

(10) $\frac{2}{3}x < 14$



(11) $\frac{2}{5}x - 5 \geq 3$

(12) $-\frac{3}{2}x + 9 \leq 24$

(13) $-12 \geq 8 - \frac{4}{3}x$

(14) $\frac{3}{10}x + 21 < 0$

(15) $30 - 6x \leq 0$

(16) $13 - \frac{3}{4}x > 13$

HO $x < -70$	DR $x < 44$	AD $x \leq -50$	IL $x > 6$	AB $x < -1$	LE $x \geq -10$	AD $x < 0$
IG $x < -48$	OR $x \geq 31$	BI $x > 3$	SP $x \geq 5$	TH $x > 60$	IN $x > 9$	TO $x \geq 20$
HO $x \geq 32$	GJ $x \leq -4$	LE $x \geq -15$	SL $x \geq 15$	OB $x < 19$	OW $x < 21$	LE $x \leq -2$

OBJECTIVE 2–c: To solve inequalities of the form $ax + b > c$, where a is an integer or fraction.

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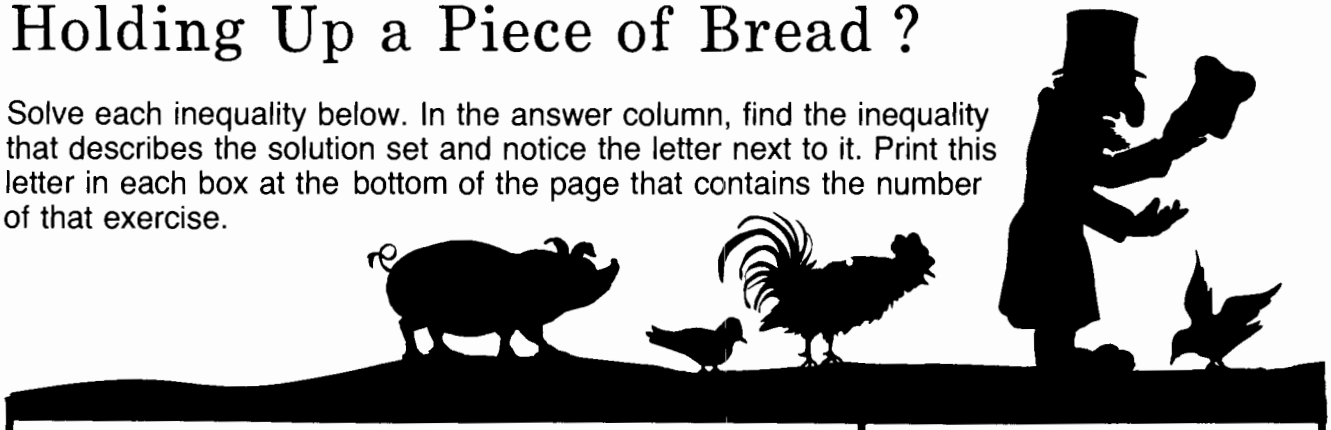
Why Was Professor Clabberhead Utterbunk Holding Up a Piece of Bread ?

Solve each inequality below. In the answer column, find the inequality that describes the solution set and notice the letter next to it. Print this letter in each box at the bottom of the page that contains the number of that exercise.



(1) $5x + 2 > 3x + 10$	(L) $n \geq 5$
(2) $8 + 2x \leq 6x - 20$	(G) $n \geq -6$
(3) $4x + 49 < 9 - x$	(A) $x < -8$
(4) $9x - 99 \geq 18x$	(O) $n < -3$
(5) $3(x - 4) > 15$	(R) $x > 4$
(6) $28 < 4(5 - 2x)$	(S) $x < -1$
(7) $3(2n + 1) \geq 4n + 9$	(U) $x < 10$
(8) $3n - 10 \leq 7(2 + n)$	(I) $x \leq -11$
(9) $-4(2n - 6) < n + 6$	(P) $n \geq 1$
(10) $2(7n - 1) \geq 3(5 - n)$	(N) $x \geq 7$
(11) $7n - 2(n + 5) < 3n - 16$	(T) $n < -2$
(12) $4(1 - 3n) - 14 > 4(2n + 3) - 9n$	(E) $n \geq 3$
	(W) $n > 2$
	(M) $n < -5$
	(H) $x > 9$

5	7	9	3	6	10	1	11	10	11	6	4	2	8	3	12	11	3	6	12

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OBJECTIVE 2–d: To solve inequalities containing parentheses and/or having the variable in both sides.

Who Discovered the World's Smallest Glacier?

Use the table below to specify each union or intersection. Then find the corresponding graph in the column of graphs. Write the letter of the graph in each box that contains the number of the exercise.

$A = \{x \mid x > -3\}$

$B = \{x \mid x < 2\}$

$C = \{x \mid x \geq 0\}$

$D = \{x \mid x \leq -1\}$

$E = \{x \mid x \leq 4\}$

$F = \{x \mid x > 2\}$

$G = \{x \mid x < 0\}$

(1) $A \cap C$

(2) $A \cup C$

(3) $B \cap D$

(4) $B \cup D$

(5) $A \cap B$

(6) $A \cup B$

(7) $E \cap G$

(8) $E \cup G$

(9) $C \cap D$

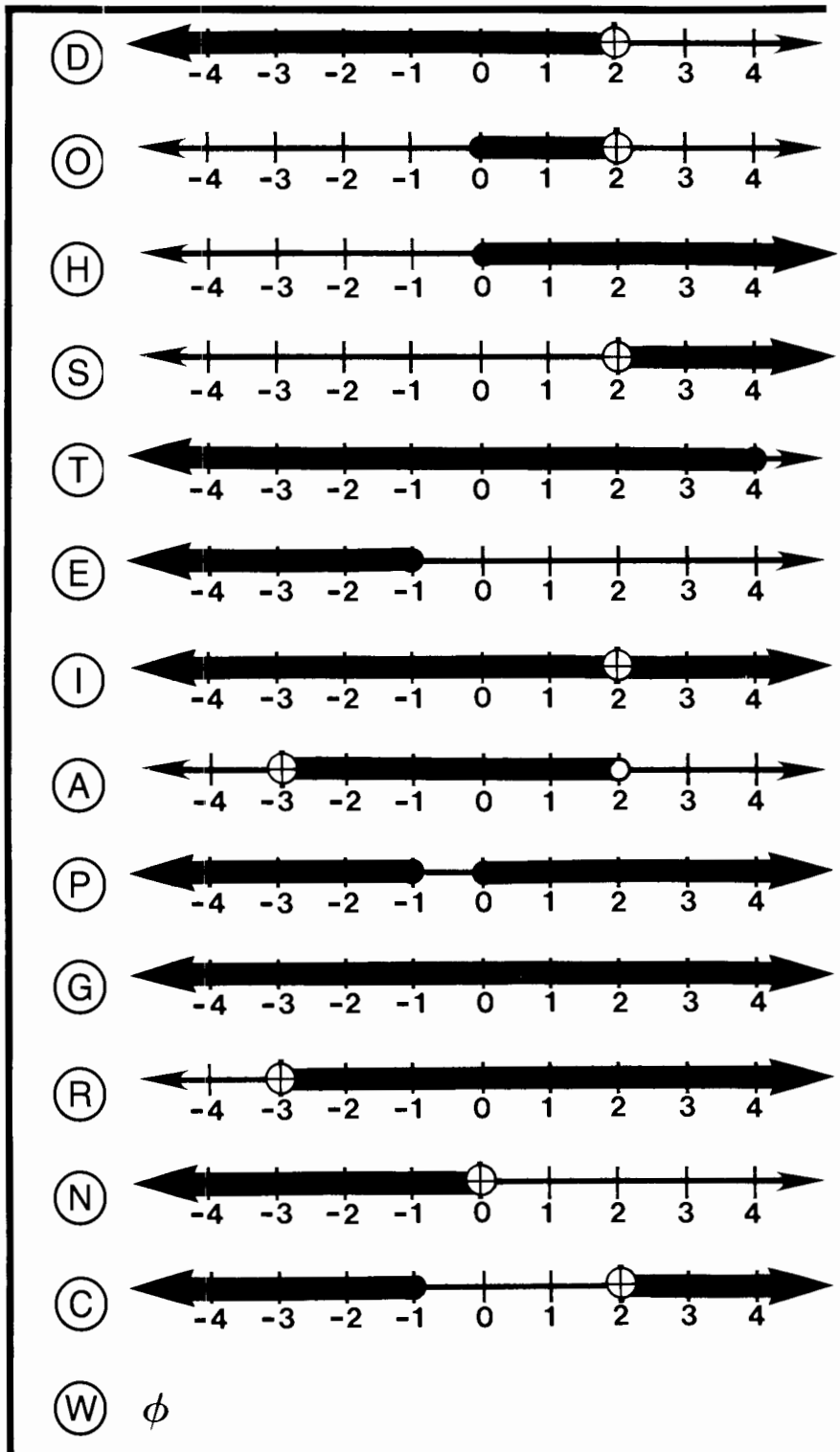
(10) $C \cup D$

(11) $B \cap C$

(12) $D \cup F$

(13) $A \cap F$

(14) $B \cup F$



5	10	3	2	13	11	7	9	14	8	1	6	11	11	4	14	12	3	13	14	6	1	8

OBJECTIVE 2–e: To identify the graph of the union or intersection of two sets expressed as inequalities.

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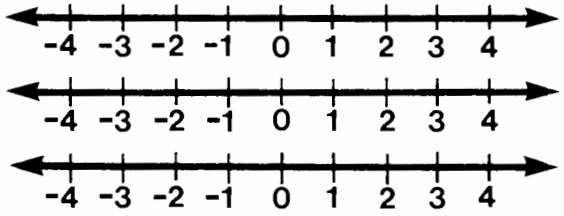
1



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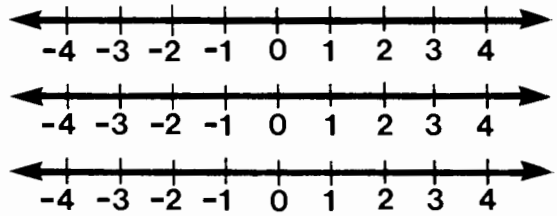

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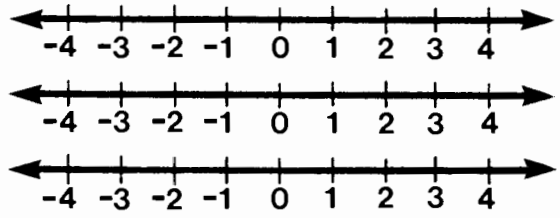

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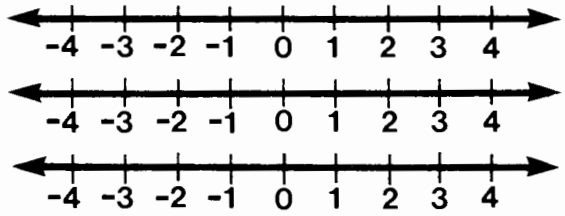

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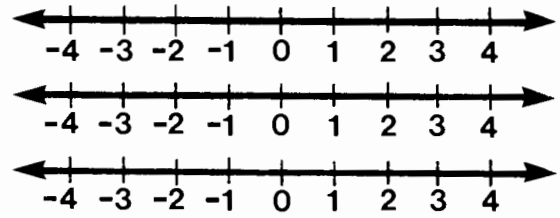

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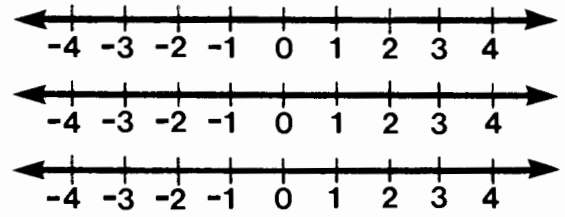

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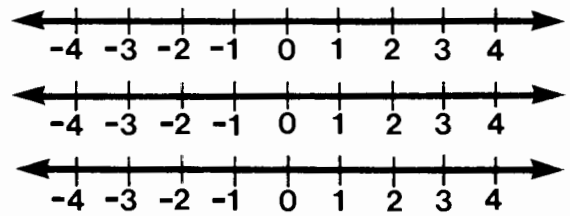

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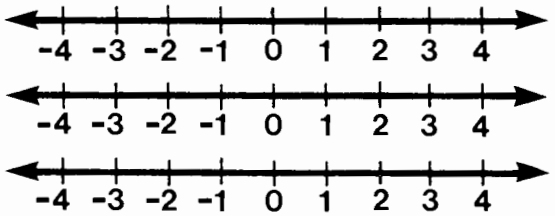

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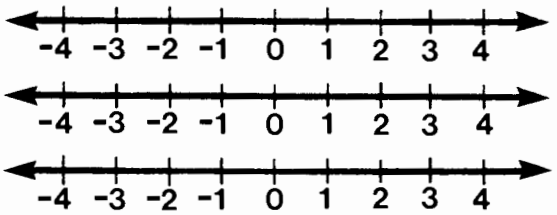

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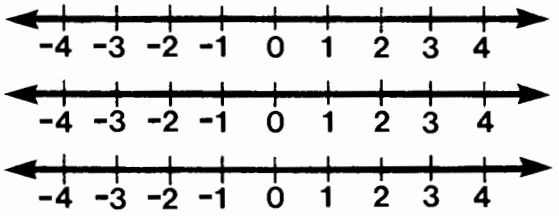

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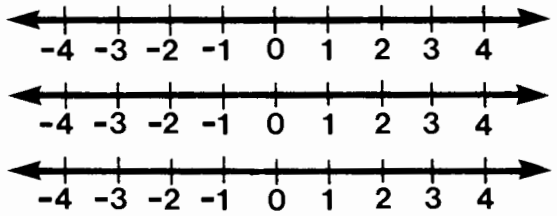

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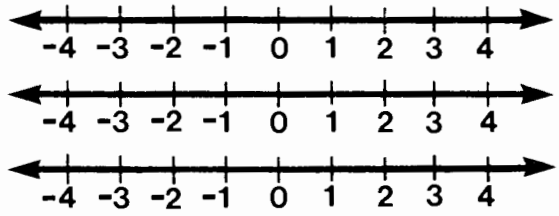

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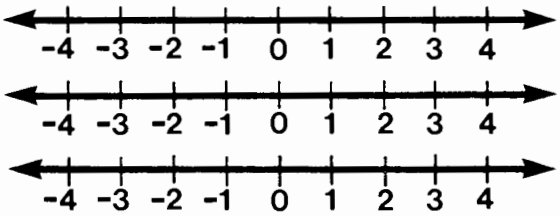

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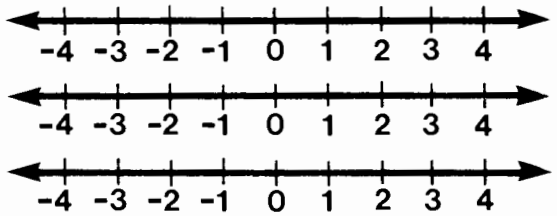

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OBJECTIVE 2–f: To identify the graph of the solution set of a combined inequality.

What Happened to the Glass Blower Who Inhaled?

Find the solution set of each combined inequality below. Then find the corresponding graph in the column of graphs. Write the letter of the graph in each box that contains the number of that exercise.

(1) $x > -4$ and $x \leq -1$

(2) $x + 5 > 4$ and $x - 2 < 2$

(3) $y \leq -2$ or $y > 3$

(4) $-3t > 12$ or $5t \geq 10$

(5) $2n + 5 > 1$ and $3n + 4 > 7$

(6) $-4u + 9 > 1$ and $7u - 13 \leq -6$

(7) $32 \leq 3x + 20$ or $17 > 1 - 8x$

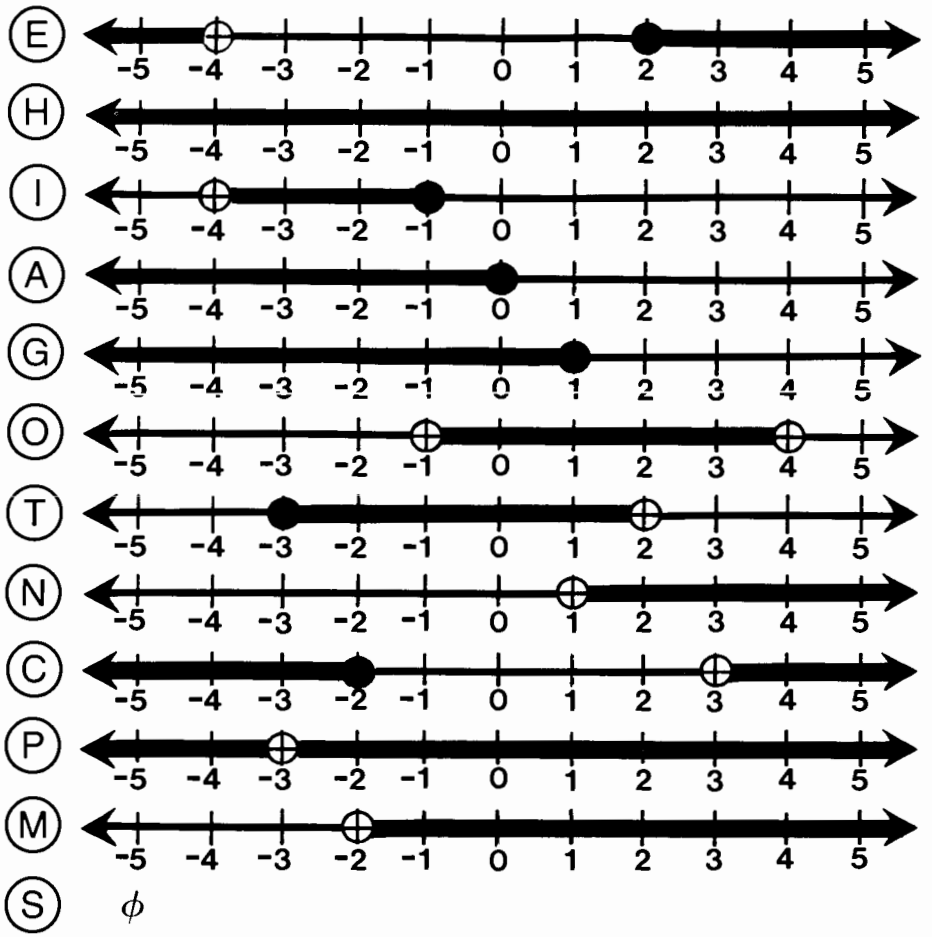
(8) $-2k + 8 < 14$ or $3k + 1 < 1$

(9) $5(w + 4) \geq 5$ and $2(w + 4) < 12$

(10) $3(6 - y) \leq 6$ and $6 - y \geq 8$

(11) $3x < 2x - 3$ or $7x > 4x - 9$

(12) $\frac{x}{2} \leq -2$ or $-\frac{x}{2} \geq 0$



8	4	6	2	9	12	11	12	5	4	1	5	8	1	10	10	9	2	7	12	3	8

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ALGEBRA WITH PIZZAZZ!
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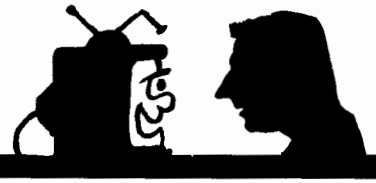
According to Famous TV Critic Bube Tube, Why Is Television Called a Communications "Medium"?



Solve each open sentence. Find your answer below and notice the two letters next to it. Write these letters in the two boxes above the exercise number at the bottom of the page.

(1) $|x + 2| = 7$

(2) $|3x - 6| = 15$

(3) $|9 + 4x| = 1$

(4) $|20 - 7x| = 8$

Answers:

(ET) $1\frac{1}{2}$, 6

(EN) 7, −3

(EI) 5, −9

(WE) $1\frac{5}{7}$, 4

(SM) 9, −4

(HE) $-2, -2\frac{1}{2}$

(5) $|n| > 3$

(6) $|n| < 4$

(7) $|n - 6| \geq 7$

(8) $|n + 3| \leq 10$

Answers:

(IT) $-4 < n < 4$

(LA) $n \geq 3$ or $n \leq -13$

(AR) $-13 \leq n \leq 7$

(BE) $n \geq 13$ or $n \leq -1$

(US) $n > 3$ or $n < -3$

(EA) $4 \leq n \leq 13$

(9) $|2d - 8| > 12$

(10) $|5d + 5| < 20$

(11) $|3d + 18| \leq 6$

(12) $|5 - 2d| > 7$

Answers:

(AP) $-6 \leq d \leq 4$

(TS) $d > 10$ or $d < -2$

(CA) $d < -1$ or $d > 6$

(NE) $-5 < d < 3$

(OR) $-8 \leq d \leq -4$

(PA) $d < -3$ or $d > 7$

(13) $6|y + 1| = 60$

(14) $3|y - 8| + 15 = 21$

(15) $9|2y - 4| \geq 36$

(16) $|7y + 14| - 5 < 30$

Answers:

(AB) 8, −5

(RR) $-7 < y < 3$

(NE) 10, 6

(RE) $y \geq 7$ or $y \leq 2$

(DO) 9, −11

(LL) $y \geq 4$ or $y \leq 0$

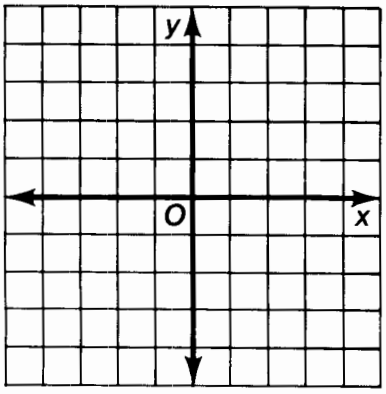
7	12	5	1	9	14	6	3	16	8	2	11	4	15	13	10

OBJECTIVE 2–g: To solve equations and inequalities involving absolute value.

What Is the Proper Thing to Say When You Introduce a Hamburger?

Graph each inequality below. Then read the two statements under the coordinate grid for that exercise. Circle the letter of the statement that correctly describes the location of the graph. Print this letter in each box at the bottom of the page that contains the exercise number.

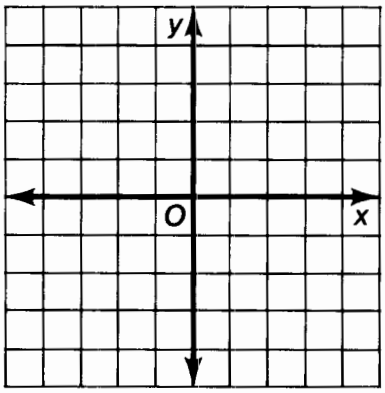
① $y \leq x + 2$



A All four quadrants; includes boundary line.

I Quadrants I, II, IV; includes boundary line.

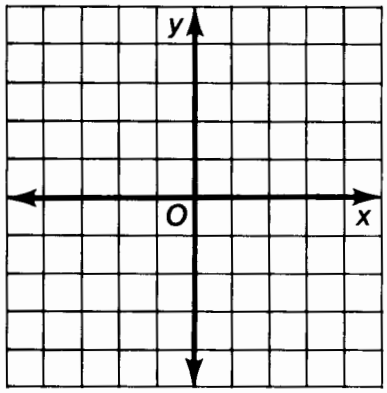
② $y < \frac{2}{3}x - 1$



N Quadrants I, II, IV; excludes boundary line.

Y Quadrants I, III, IV; excludes boundary line.

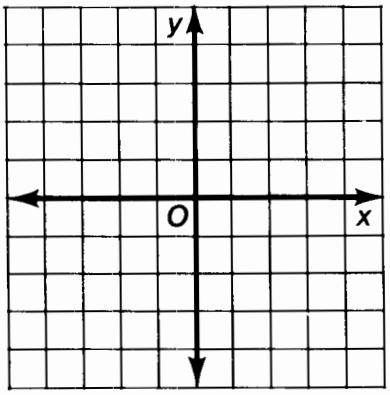
③ $y \geq -2x - 3$



R Quadrants I, III, IV; includes boundary line.

P All four quadrants; includes boundary line.

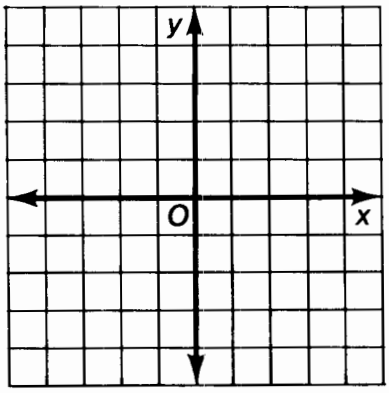
④ $y > -\frac{1}{2}x + 1$



O Quadrants I, II, IV; includes boundary line.

E Quadrants I, II, IV; excludes boundary line.

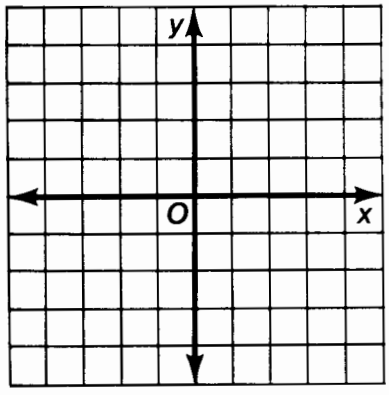
⑤ $y < \frac{5}{4}x - 2$



M Quadrants I, III, IV; excludes boundary line.

S Quadrants I, II, IV; excludes boundary line.

⑥ $y \geq -x + 3$



L All four quadrants; includes boundary line.

T Quadrants I, II, IV; includes boundary line.

5	4	4	6	3	1	6	6	2

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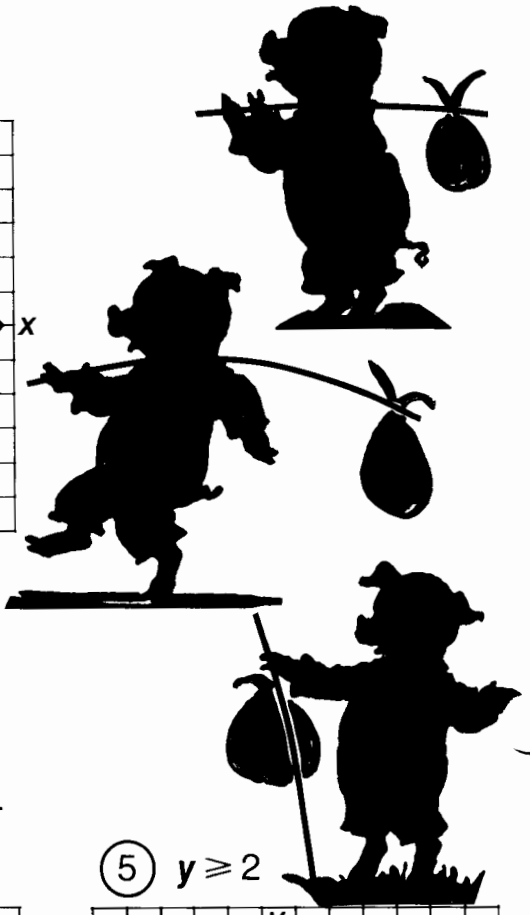
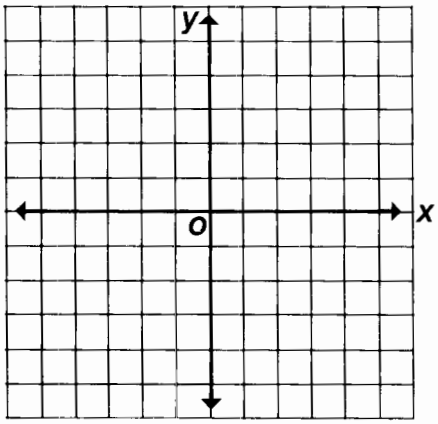
Why Did the Three Pigs Leave Home?

Graph each inequality below. Circle the letter of the statement that correctly describes the location of the graph. Print this letter in each box at the bottom of page 31 that contains the number of the exercise.



(1) $y \geq \frac{1}{2}x - 3$

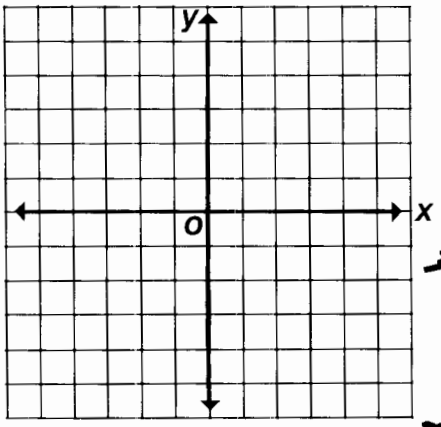


D Quadrants I, II, IV; includes boundary line.

E All four quadrants; includes boundary line.

I Quadrants I, III, IV; excludes boundary line.

(2) $x + y > 1$

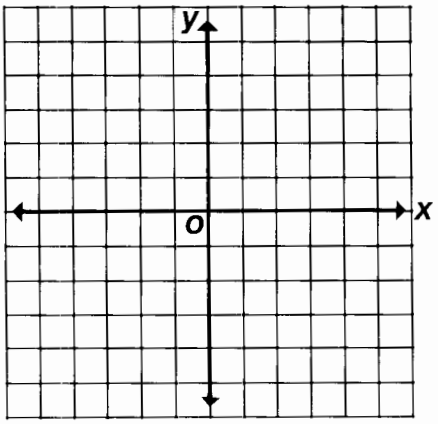


S Quadrants I, II, IV; excludes boundary line.

B All four quadrants; includes boundary line.

F Quadrants I, III, IV; excludes boundary line.

(3) $y \leq 2x - 2$

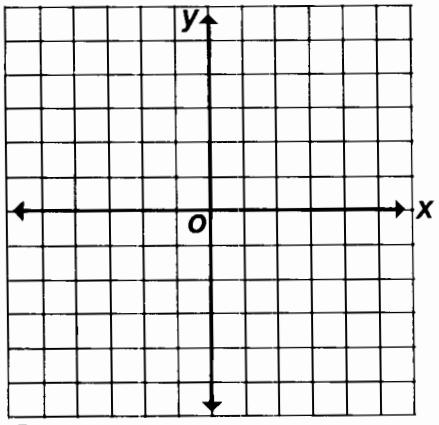


L Quadrants I, II, IV; includes boundary line.

T Quadrants I, III, IV; includes boundary line.

V All four quadrants; excludes boundary line.

(4) $3x + 2y < 6$

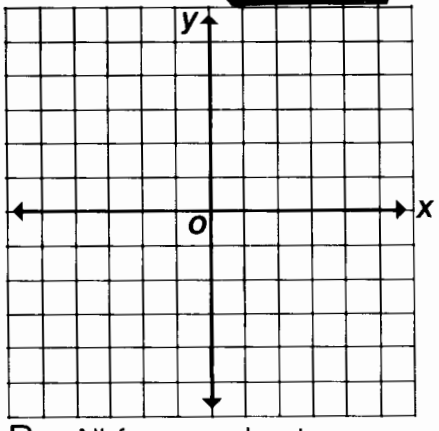


C Quadrants II, III, IV; excludes boundary line.

M Quadrants I, II, IV; includes boundary line.

O All four quadrants; excludes boundary line.

(5) $y \geq 2$



R All four quadrants; excludes boundary line.

U Quadrants II, III; includes boundary line.

H Quadrants I, II; includes boundary line.

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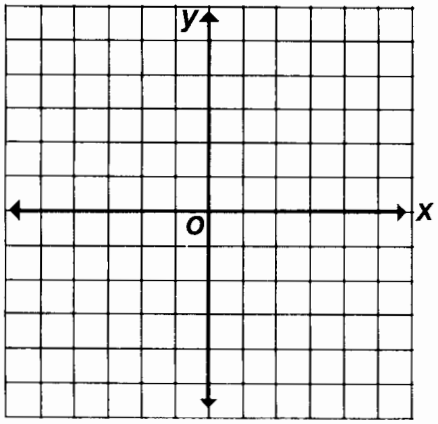
OBJECTIVE 2–i: To graph linear inequalities in two variables (inequalities are not necessarily solved for y).

(6) $x < -3$

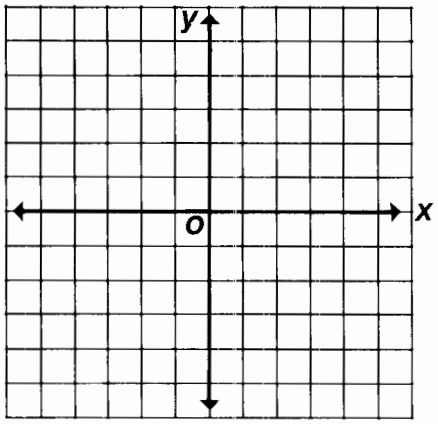


L Quadrants I, II; excludes boundary line.

W Quadrants II, III; excludes boundary line.

G Quadrants I, III; excludes boundary line.

(7) $2x - 3y \leq 12$

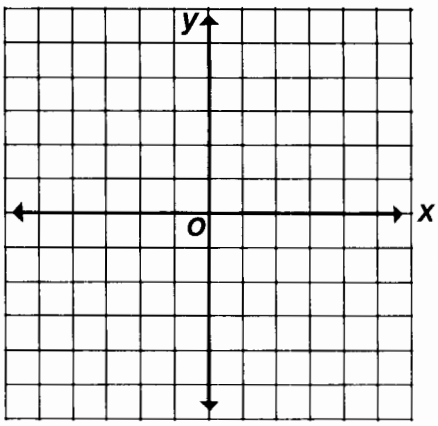


K Quadrants I, III, IV; excludes boundary line.

U Quadrants II, III, IV; includes boundary line.

I All four quadrants; includes boundary line.

(8) $5x + 3y < x + 6$

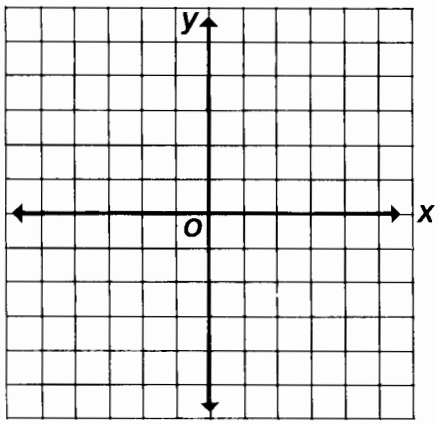


F All four quadrants; excludes boundary line.

P Quadrants I, II, III; excludes boundary line.

M Quadrants I, III, IV; excludes boundary line.

(9) $3x + y > 0$

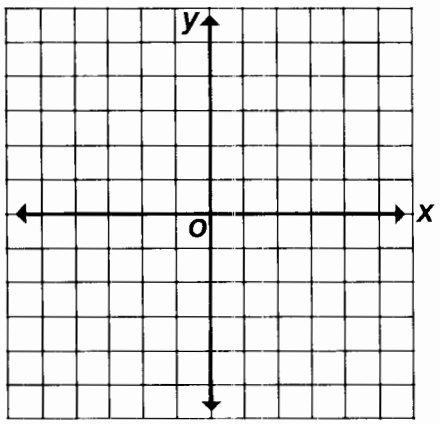


R Quadrants I, II, IV; excludes boundary line.

L All four quadrants; includes boundary line.

M Quadrants I, III, IV; excludes boundary line.

(10) $2(x - y) \geq 5$

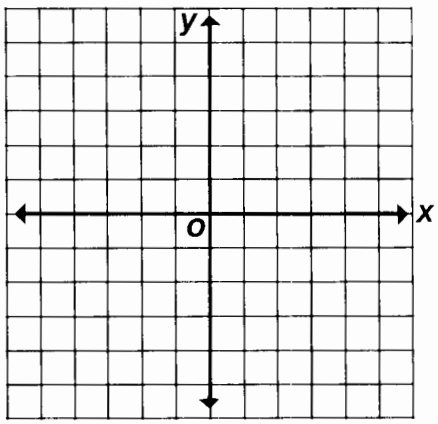


Y All four quadrants; excludes boundary line.

U Quadrants II, III, IV; includes boundary line.

A Quadrants I, III, IV; includes boundary line.

(11) $5y - 2 \geq 3x - 7$



N Quadrants I, III, IV; excludes boundary line.

B All four quadrants; includes boundary line.

D Quadrants I, II, IV; includes boundary line.

3	5	1	7	9	8	10	3	5	1	9	6	10	2	10	11	4	10	9

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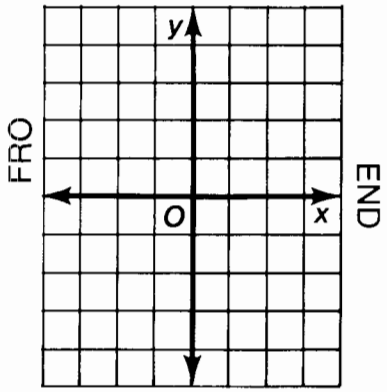
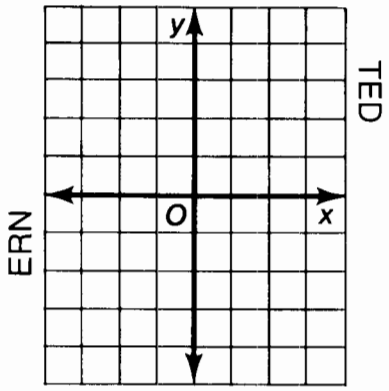
What Did the Toothless Old Termite Say When He Entered a Tavern ?

Graph each pair of inequalities below and indicate the solution set of the system with crosshatching or shading. The crosshatching or shading, if extended, would cover a set of three letters. Print these letters in the three boxes at the bottom of the page that contain the exercise number.

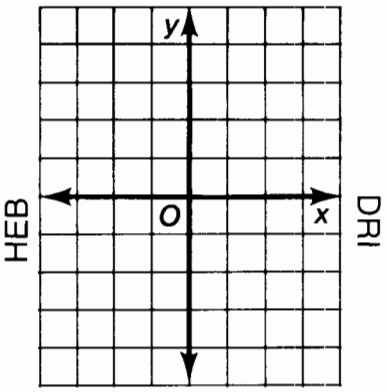
① $y \leq x - 1$
$y \geq -3$



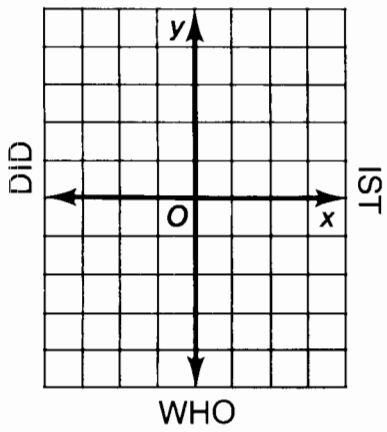
② $x \leq 2$
$y \leq \frac{2}{3}x - 1$



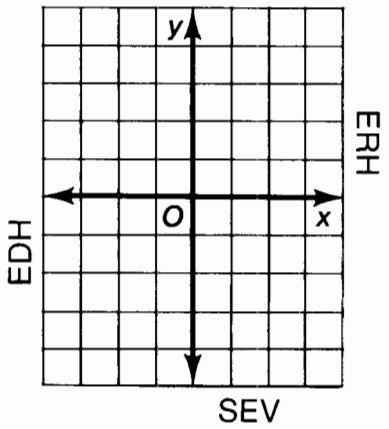
③ $y < -x + 1$
$y > \frac{1}{2}x - 2$



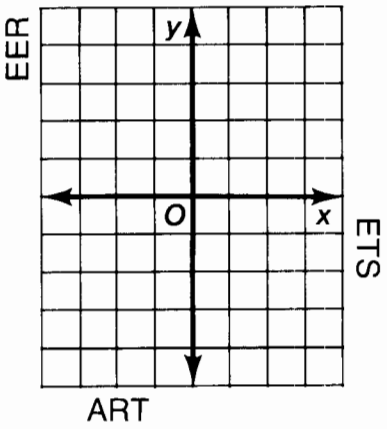
④ $y < x$
$3x + 2y > 4$



⑤ $x - 3y \leq 12$
$x > 2$



⑥ $y \leq 1$
$2x + y < 1$



4	4	4	3	3	3	6	6	6	1	1	1	5	5	5	2	2	2

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OBJECTIVE 2–j: To solve systems of linear inequalities in two variables by graphing.

Famous Last Word

	$\frac{1}{130}$			$-\frac{1}{12}$	$\frac{8}{9}$		$-0.\overline{571428}$				$0.418\overline{3}$	$-\frac{7}{33}$
									$-\frac{5}{27}$			
$-0.2\overline{27}$				0.064	$0.\overline{7}$			$-\frac{2}{11}$				2.75
$\frac{1}{8}$		$0.\overline{27}$					$-\frac{2}{15}$		$\frac{5}{6}$			
	$\frac{4}{3}$			$-0.22\overline{3}$	$0.41\overline{6}$		0.0625			$\frac{1}{111}$	$-0.\overline{5717}$	0.375

A FAMOUS LAST WORD IS HIDDEN IN THE RECTANGLE ABOVE. TO FIND IT:
Express each fraction below as a repeating or terminating decimal. Express each decimal as a fraction in lowest terms. Find your answers in the rectangle. Shade in each area containing a correct answer.

Express as a repeating or terminating decimal:

1. $\frac{7}{9}$
2. $\frac{3}{8}$
3. $\frac{5}{12}$
4. $\frac{11}{4}$
5. $\frac{3}{11}$
6. $-\frac{5}{22}$
7. $\frac{1}{16}$
8. $-\frac{4}{7}$

Express as a fraction in lowest terms:

9. $0.\overline{8}$
10. $-0.\overline{18}$
11. $1.\overline{3}$
12. $-0.\overline{21}$
13. 0.125
14. $0.8\overline{3}$
15. $-0.083\overline{1}$
16. $0.\overline{009}$

OBJECTIVE 3–a: To express a fraction as a repeating or terminating decimal; to express a repeating decimal as a fraction in lowest terms.

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Why Does Mrs. Snuggle Call Her Sons' Ranch "SOLAR FOCUS"?

Simplify each expression below and find your answer in the corresponding set of answer boxes. Print the letter of that exercise in the box containing the answer.

(S) $\sqrt{49}$
(T) $\sqrt{1}$
(H) $\sqrt{100}$
(I) $\sqrt{900}$

(S) $-\sqrt{64}$
(E) $-\sqrt{225}$
(I) $-\sqrt{10{,}000}$
(T) $\sqrt{\frac{9}{16}}$

(O) $\sqrt{9^2}$
(E) $\sqrt{15^2}$
(R) $(\sqrt{11})^2$
(W) $(\sqrt{60})^2$

(E) $\sqrt{25}-\sqrt{16}$
(T) $\sqrt{25-16}$
(H) $\sqrt{36+64}$
(P) $\sqrt{36}+\sqrt{64}$

30	1	−12	−100	7	1000	$\frac{3}{4}$	10	−15	$\frac{2}{3}$	−8	14	9	3	12	60	10	15	11	1

(H) $\sqrt{10^2-\sqrt{8^2}}$
(S) $\sqrt{10^2-8^2}$
(O) $\sqrt{10^2-6^2}$
(R) $\sqrt{13^2-12^2}$

(E) $\sqrt{400}$
(T) $-\sqrt{8100}$
(N) $-\sqrt{14{,}400}$
(S) $\sqrt{\frac{1}{9}}$

(E) $-\sqrt{\frac{81}{4}}$
(A) $\sqrt{0.25}$
(I) $-\sqrt{0.49}$
(E) $\sqrt{0.01}$

(A) $-\sqrt{1.44}$
(T) $\sqrt{0.0004}$
(S) $-\sqrt{0.0121}$
(M) $\left(\sqrt{\frac{2}{3}}\right)^2$

−90	2	20	−200	$\frac{1}{3}$	8	−120	6	14	5	−1.2	−0.7	−0.11	$-\frac{9}{2}$	−0.9	$\frac{2}{3}$	0.1	0.5	0.02

OBJECTIVE 3–b: To find the square roots of numbers and expressions that have rational square roots.

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What Do Sea Monsters Eat?

Complete each statement below with one of the answers at the bottom of the page. Write the letter of each statement above its correct answer.

S	A number that can be written as a fraction $\frac{a}{b}$, where a and b are integers and $b \neq 0$, is a _____.
I	A fraction can be changed to a decimal by dividing the _____ _____.
A	When a fraction is changed to a decimal and the remainder is zero, the decimal is called a _____.
D	When a fraction is changed to a decimal and the remainder is NOT zero, a digit or block of digits will eventually start to repeat. Such a decimal is called a _____ _____.
S	Thus, since a rational number is a number that can be written as a fraction, every rational number can be expressed as either a _____ decimal.
H	The reverse is also true. Every terminating or repeating decimal represents a rational number and can be changed to a _____.
F	A number that CANNOT be expressed as a fraction $\frac{a}{b}$, where a and b are integers, is an _____.
H	Terminating and repeating decimals represent rational numbers. Therefore, the decimals for irrational numbers neither terminate nor _____.
I	Instead, the decimal for an irrational number is an endless string of digits that never repeats and never _____.
N	An example of an irrational number is _____.
P	The union of the set of rational numbers and the set of irrational numbers is called the set of _____.
S	Every decimal represents a real number, and every real number can be represented as a _____.

irrational number	terminates	rational number	fraction	0.121212121212 . . .	terminating decimal	0.121221222221 . . .	repeating decimal	integer	decimal	repeat	numerator by the denominator	real numbers	terminating or repeating

OBJECTIVE 3–c: To demonstrate understanding of basic concepts and vocabulary related to the set of real numbers.

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Why Didn't Krok Like to Go Sailing With the Baseball Uniform Designer?

Simplify each expression below and find your answer in the corresponding answer column. Write the letter of the exercise in the box that contains the number of the answer.

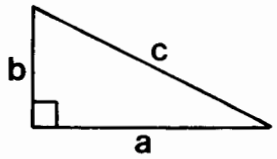
(L) $\sqrt{8}$	(18) $7\sqrt{2}$	(S) $5\sqrt{18}$	(19) $6\sqrt{7}$
(I) $\sqrt{45}$	(14) $5\sqrt{5}$	(U) $3\sqrt{28}$	(13) $24\sqrt{3}$
(A) $\sqrt{50}$	(12) $2\sqrt{2}$	(A) $2\sqrt{1000}$	(3) $24\sqrt{2}$
(T) $\sqrt{12}$	(4) $5\sqrt{2}$	(P) $\sqrt{1,000,000}$	(9) $15\sqrt{2}$
(O) $\sqrt{98}$	(28) $4\sqrt{3}$	(E) $3\sqrt{128}$	(5) $16\sqrt{5}$
(S) $\sqrt{48}$	(20) $2\sqrt{3}$	(K) $8\sqrt{27}$	(23) 1000
(E) $\sqrt{125}$	(25) $3\sqrt{5}$	(L) $4\sqrt{80}$	(16) $20\sqrt{10}$
(A) $\sqrt{20}$	(8) $3\sqrt{7}$	(H) $-3\sqrt{54}$	(10) $-8\sqrt{6}$
(S) $\sqrt{72}$	(1) $6\sqrt{2}$	(A) $-7\sqrt{40}$	(21) $30\sqrt{3}$
(Y) $\sqrt{63}$	(7) $10\sqrt{2}$	(B) $-8\sqrt{121}$	(11) $-14\sqrt{10}$
(E) $\sqrt{144}$	(6) $4\sqrt{2}$	(S) $2\sqrt{500}$	(24) $20\sqrt{5}$
(W) $\sqrt{32}$	(22) $2\sqrt{5}$	(T) $-4\sqrt{24}$	(26) $15\sqrt{7}$
(D) $\sqrt{75}$	(27) 12	(Z) $3\sqrt{175}$	(2) $-9\sqrt{6}$
(A) $\sqrt{200}$	(15) $5\sqrt{3}$	(C) $5\sqrt{108}$	(17) -88

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

OBJECTIVE 3–d: To simplify square roots of numbers that have perfect square factors.

What Is the Title of This Picture?

For each exercise below, find the missing length. (Refer to the diagram at the right.) Find your answer in the answer column and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it. Keep working and you will decode the title of the picture.



(1) $a = 8$, $b = 6$, $c =$ _____

(2) $a = 4$, $b = 9$, $c =$ _____

(3) $a = 12$, $b = 12$, $c =$ _____

(4) $a = 7$, $b = \sqrt{20}$, $c =$ _____

(5) $a = \sqrt{175}$, $b = 15$, $c =$ _____

(6) $a =$ _____, $b = 5$, $c = 10$

(7) $a = 12$, $b =$ _____, $c = 13$

(8) $a =$ _____, $b = \sqrt{56}$, $c = 14$

(9) $a = 1.5$, $b =$ _____, $c = 2.5$

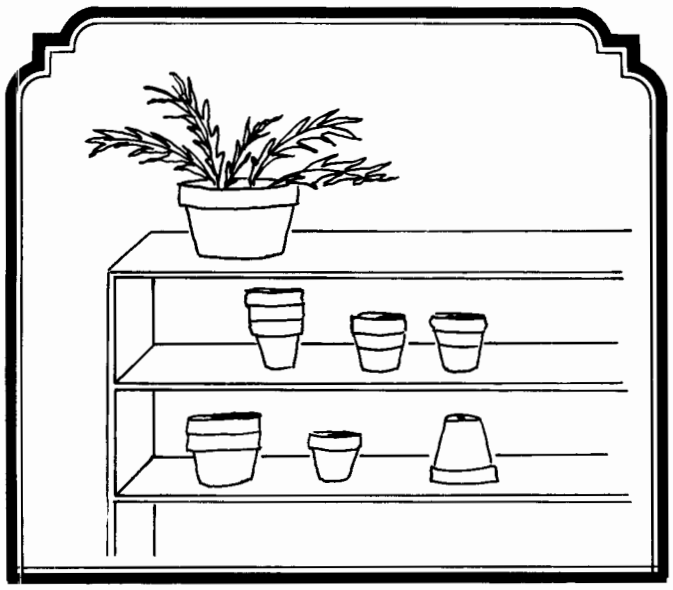
(10) $a = \sqrt{85}$, $b = \sqrt{59}$, $c =$ _____

(11) $a =$ _____, $b = 6$, $c = \sqrt{70}$

(12) $a = 40$, $b =$ _____, $c = 41$

(13) $a = 1$, $b = 1$, $c =$ _____

(14) $a =$ _____, $b = \sqrt{2}$, $c = \sqrt{3}$



CODED TITLE:

11	14	5	10	8	5	11	4	13	2	14	6

14	13	1	14	12	3	2	13	7	9	11	5

(E) $\sqrt{400} = 20$	(P) $\sqrt{81} = 9$	(N) $\sqrt{25} = 5$
(R) $\sqrt{67} \doteq 8.19$	(G) $\sqrt{100} = 10$	(I) $\sqrt{2} \doteq 1.41$
(S) $\sqrt{34} \doteq 5.83$	(O) $\sqrt{288} \doteq 16.97$	(W) $\sqrt{69} \doteq 8.31$
(T) $\sqrt{97} \doteq 9.85$	(L) $\sqrt{144} = 12$	(U) $\sqrt{4} = 2$
(V) $\sqrt{140} \doteq 11.83$	(H) $\sqrt{1} = 1$	(A) $\sqrt{75} \doteq 8.66$

OBJECTIVE 3–e: To find the length of a side of a right triangle using the Pythagorean property.

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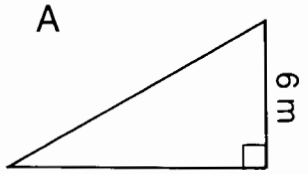
How Do You Write a Song That Will Knock Over a Cow ?

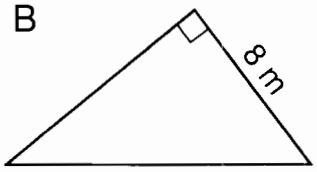
Solve each problem below. Cross out the box that contains your answer. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

(1) For each right triangle, find the length of the side that is not given:

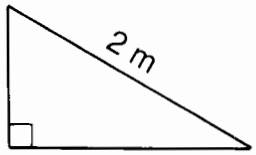
A



B

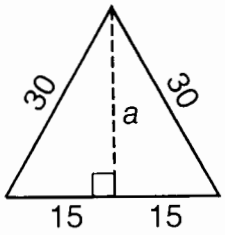


C



(2) A rectangle is 7 cm wide and 10 cm long. Find the length of a diagonal of the rectangle.

(3) Each side of an equilateral triangle measures 30 cm. Find the length of an altitude, *a*, of the triangle.

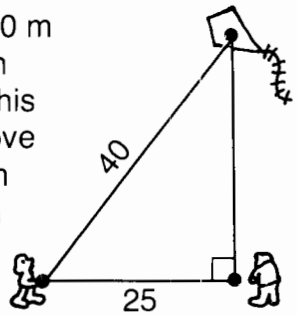


(4) A television set may be described in terms of the diagonal measure of its screen. If a TV screen is 16 inches by 12 inches, what is the length of its diagonal?

(5) A 20-foot ladder is leaned against a wall. If the base of the ladder is 8 feet from the wall, how high up on the wall will the ladder reach?

(6) The bases of a softball diamond are 60 feet apart. How far is it from home plate to second base?

(7) Jack has let out 40 m of kite string when he observes that his kite is directly above Jill. If Jack is 25 m from Jill, how high is the kite?



BY	IN	SO	TH	BE	AT	ER
$\sqrt{7200}$ ft	$\sqrt{123}$ m	$\sqrt{105}$ m	$\sqrt{675}$ cm	$\sqrt{6400}$ ft	$\sqrt{975}$ m	$\sqrt{149}$ cm
$\doteq$84.9 ft	$\doteq$11.1 m	$\doteq$10.2 m	$\doteq$26.0 cm	$=$80 ft	$\doteq$31.2 m	$\doteq$12.2 cm
EF	OR	NG	FL	IT	BE	AT
$\sqrt{850}$ m	$\sqrt{336}$ ft	$\sqrt{157}$ m	$\sqrt{425}$ cm	$\sqrt{1}$ m	$\sqrt{400}$ in.	$\sqrt{380}$ in.
$\doteq$29.2 m	$\doteq$18.3 ft	$\doteq$12.5 m	$\doteq$20.6 cm	$=$1 m	$=$20 in.	$\doteq$19.5 in.

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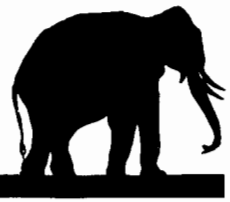
Do Elephants Know How to Gamble?



Simplify each expression below. Assume that all variables represent nonnegative numbers. Find your answer in the corresponding set of answer boxes. Print the letter of the exercise in the box above the answer.

(T) $\sqrt{9x^2}$	(H) $\sqrt{12x^2}$	(E) $-\sqrt{28x^4}$	(D) $\sqrt{7x^2y}$
(E) $-\sqrt{49x^2}$	(O) $-\sqrt{45x^2}$	(Y) $\sqrt{16xy^2}$	(H) $\sqrt{9x^2y^4}$
(A) $\sqrt{4x^2y^2}$	(T) $\sqrt{25y^4}$	(V) $-\sqrt{20xy^2}$	(N) $\sqrt{24x^4y^2}$

$5y^2$	$2x\sqrt{3}$	$-7x$	$4y\sqrt{x}$	$2xy\sqrt{6y}$	$x\sqrt{7y}$	$-3x\sqrt{5}$	$2x^2y\sqrt{6}$	$3x$	$3x^2y^3$	$3xy^2$	$2xy$	$-2y\sqrt{5x}$	$-2x^2\sqrt{7}$

(E) $\sqrt{a^3}$	(E) $\sqrt{75a^2b^3}$	(S) $\sqrt{18a^6b^2}$	(V) $2\sqrt{50ab^5}$
(T) $-\sqrt{40a^3}$	(I) $\sqrt{144b^6}$	(H) $\sqrt{15a^8b^3}$	(D) $8\sqrt{300a^4b^6}$
(A) $\sqrt{54a^3b^2}$	(E) $-\sqrt{1000a^6}$	(A) $\sqrt{a^5b^8}$	(G) $5\sqrt{98a^{20}b^3}$

$-2a\sqrt{10a}$	$a^4b\sqrt{15b}$	$-10a^3\sqrt{10}$	$40ab^3\sqrt{3}$	$10b^2\sqrt{2ab}$	$a\sqrt{a}$	$35a^{10}b\sqrt{2b}$	$3ab\sqrt{6a}$	$3a^3b\sqrt{2}$	$a^2b^2\sqrt{5}$	$12b^3$	$80a^2b^3\sqrt{3}$	$5ab\sqrt{3b}$	$a^2b^4\sqrt{a}$

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Do Elephants Know How to Gamble?

Simplify each expression below. Assume that each radicand is nonnegative. Find your answer in the corresponding set of answer boxes. Print the letter of the exercise in the box above the answer.

(T) $\sqrt{9x^2}$
(E) $-\sqrt{49x^2}$
(A) $\sqrt{4x^2y^2}$

(H) $\sqrt{12x^2}$
(O) $-\sqrt{45x^2}$
(T) $\sqrt{25y^4}$

(E) $-\sqrt{28x^4}$
(Y) $\sqrt{16xy^2}$
(V) $-\sqrt{20xy^2}$

(D) $\sqrt{7x^2y}$
(H) $\sqrt{9x^2y^4}$
(N) $\sqrt{24x^4y^2}$

$5y^2$	$2\lvert x\rvert\sqrt{3}$	$-7\lvert x\rvert$	$4\lvert y\rvert\sqrt{x}$	$2xy\sqrt{6y}$	$\lvert x\rvert\sqrt{7y}$	$-3\lvert x\rvert\sqrt{5}$	$2x^2\lvert y\rvert\sqrt{6}$	$3\lvert x\rvert$	$3x^2y^3$	$3\lvert x\rvert y^2$	$2\lvert xy\rvert$	$-2\lvert y\rvert\sqrt{5x}$	$-2x^2\sqrt{7}$

OBJECTIVE 3–h: To simplify square roots with variables in the radicand (assuming that all radicands, but not necessarily all variables, are nonnegative).

(E) $\sqrt{a^3}$
(T) $-\sqrt{40a^3}$
(A) $\sqrt{54a^3b^2}$

(E) $\sqrt{75a^2b^3}$
(I) $\sqrt{144b^6}$
(E) $-\sqrt{1000a^6}$

(S) $\sqrt{18a^6b^2}$
(H) $\sqrt{15a^8b^3}$
(A) $\sqrt{a^5b^8}$

(V) $2\sqrt{50ab^5}$
(D) $8\sqrt{300a^4b^6}$
(G) $5\sqrt{98a^{20}b^3}$

$-2a\sqrt{10a}$	$a^4b\sqrt{15b}$	$-10\lvert a^3\rvert\sqrt{10}$	$40\lvert ab^3\rvert\sqrt{3}$	$10b^2\sqrt{2ab}$	$a\sqrt{a}$	$35a^{10}b\sqrt{2b}$	$3a\lvert b\rvert\sqrt{6a}$	$3\lvert a^3b\rvert\sqrt{2}$	$a^2b^2\sqrt{5}$	$12\lvert b^3\rvert$	$80a^2\lvert b^3\rvert\sqrt{3}$	$5\lvert a\rvert b\sqrt{3b}$	$a^2b^4\sqrt{a}$

What Do You Call a Group of Factory Foremen Who Sing While Drinking Tab Cola and Eating Crab Apples ?

Simplify each expression below. Assume that all variables represent nonnegative numbers. Find your answer in the corresponding answer column. Write the letter of the exercise in the box that contains the number of the answer.

(E) $\sqrt{5}\cdot\sqrt{3}$	(7) $2x^2\sqrt{6}$	(N) $5\sqrt{2}\cdot 4\sqrt{3}$	(25) $30\sqrt{2}$
(H) $\sqrt{6}\cdot\sqrt{2}$	(2) $10\sqrt{2}$	(B) $-7\sqrt{3}\cdot 2\sqrt{10}$	(11) $5a^2\sqrt{3b}$
(O) $\sqrt{3}\cdot\sqrt{6}$	(3) $12x^5$	(I) $2\sqrt{6}\cdot 5\sqrt{3}$	(8) $-14\sqrt{15}$
(A) $\sqrt{5}\cdot\sqrt{10}$	(9) $\sqrt{15}$	(A) $4\sqrt{10}\ (-3\sqrt{2})$	(4) $36ab\sqrt{6b}$
(R) $\sqrt{27}\cdot\sqrt{3}$	(12) $x\sqrt{6}$	(R) $2\sqrt{8}\cdot\sqrt{18}$	(17) $-24\sqrt{5}$
(H) $\sqrt{10}\cdot\sqrt{20}$	(5) $3\sqrt{2}$	(L) $-10\sqrt{3}\ (-2\sqrt{21})$	(15) $18ab$
(E) $\sqrt{90}\cdot\sqrt{40}$	(1) $3x^2\sqrt{10}$	(M) $-\sqrt{6}\cdot 7\sqrt{10}$	(22) $40a^2b^4\sqrt{6a}$
(A) $\sqrt{2x}\cdot\sqrt{3x}$	(23) $2\sqrt{3}$	(N) $3\sqrt{ab}\cdot 6\sqrt{ab}$	(6) 24
(D) $\sqrt{6x}\cdot\sqrt{2x}$	(26) 9	(P) $\sqrt{2ab^2}\cdot\sqrt{14ab^2}$	(10) $20\sqrt{6}$
(T) $\sqrt{30x^2}\cdot\sqrt{3x^2}$	(21) 60	(T) $-\sqrt{15a^2b}\ (-\sqrt{5a^2})$	(19) $2ab^2\sqrt{7}$
(E) $\sqrt{3x}\cdot\sqrt{8x^3}$	(18) $20x\sqrt{x}$	(O) $\sqrt{8ab^2}\ (-\sqrt{10a^3b^4})$	(13) $-14\sqrt{30}$
(P) $\sqrt{40x^2}\cdot\sqrt{10x}$	(14) $5\sqrt{2}$	(F) $2\sqrt{18a^2b}\cdot 6\sqrt{3b^2}$	(24) $-4a^2b^3\sqrt{5}$
(E) $\sqrt{12x^5}\cdot\sqrt{12x^5}$	(16) $2x\sqrt{3}$	(C) $5\sqrt{2a^3b^8}\cdot 4\sqrt{12a^2}$	(20) $60\sqrt{7}$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

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What Should You Do If Nobody Will Sing With You?

Simplify each expression. Find your answer below the exercise and notice the letter next to it. Write this letter in the box at the bottom of the page that contains the number of that exercise.

(1) $2\sqrt{5}+4\sqrt{5}$

(2) $7\sqrt{3}-3\sqrt{3}$

(3) $2\sqrt{6}-7\sqrt{6}$

(4) $5\sqrt{x}+\sqrt{x}$

(5) $9\sqrt{5}-8\sqrt{5}$

(L) $4\sqrt{5}$ (E) $4\sqrt{3}$

(I) $6\sqrt{x}$ (R) $3\sqrt{x}$

(T) $6\sqrt{5}$ (N) $6\sqrt{3}$

(A) $\sqrt{5}$ (U) $-5\sqrt{6}$

(6) $5\sqrt{10}+4\sqrt{10}-\sqrt{10}$

(7) $2\sqrt{3}-6\sqrt{3}-3\sqrt{3}$

(8) $6\sqrt{7}+3\sqrt{3}-2\sqrt{7}$

(9) $\sqrt{2}-4\sqrt{6}+5\sqrt{2}+\sqrt{6}$

(10) $3\sqrt{a}+9\sqrt{b}-\sqrt{b}-2\sqrt{a}$

(H) $8\sqrt{3}$ (S) $4\sqrt{2}-\sqrt{6}$

(E) $8\sqrt{10}$ (F) $4\sqrt{7}+3\sqrt{3}$

(R) $\sqrt{a}+8\sqrt{b}$ (A) $3\sqrt{a}+7\sqrt{b}$

(T) $-7\sqrt{3}$ (Y) $6\sqrt{2}-3\sqrt{6}$

(11) $3\sqrt{12}+4\sqrt{3}$

(12) $8\sqrt{5}-2\sqrt{45}$

(13) $7\sqrt{18}+2\sqrt{50}$

(14) $6\sqrt{24}-5\sqrt{54}$

(15) $-\sqrt{27}+4\sqrt{48}$

(R) $-3\sqrt{6}$ (E) $10\sqrt{3}$

(S) $-4\sqrt{3}$ (L) $2\sqrt{6}$

(T) $2\sqrt{5}$ (N) $13\sqrt{3}$

(E) $24\sqrt{2}$ (O) $31\sqrt{2}$

(16) $5\sqrt{8}+\sqrt{98}-2\sqrt{18}$

(17) $2\sqrt{90}-3\sqrt{20}+\sqrt{40}$

(18) $4\sqrt{63}-9\sqrt{28}+2\sqrt{44}$

(19) $2\sqrt{27x}+\sqrt{75x}+5\sqrt{12x}$

(20) $-6\sqrt{9x}+3\sqrt{64x}-\sqrt{50x}$

(B) $8\sqrt{3x}$ (U) $6\sqrt{x}-5\sqrt{2x}$

(L) $11\sqrt{2}$ (S) $-6\sqrt{7}+4\sqrt{11}$

(S) $\sqrt{10}-9\sqrt{5}$ (D) $8\sqrt{10}-6\sqrt{5}$

(K) $21\sqrt{3x}$ (P) $3\sqrt{7}+\sqrt{11}$

10	2	15	7	5	17	20	11	1	9	13	3	14	18	6	16	8	19	4	12

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Did you hear about...

A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P ?

Rationalize the denominator and simplify each expression below. Find your answer in the adjacent answer column and notice the word next to it. Write this word in the box containing the letter of that exercise. Keep working and you will hear about a mistake.

Ⓐ $\frac{5}{\sqrt{3}}$

Ⓑ $\frac{2}{\sqrt{7}}$

Ⓒ $\frac{20}{\sqrt{5}}$

Ⓓ $\frac{14}{\sqrt{2}}$

Ⓔ $\frac{3}{\sqrt{6}}$

Ⓕ $\frac{4}{\sqrt{10}}$

Ⓖ $\frac{11}{\sqrt{11}}$

Ⓗ $\frac{3}{\sqrt{12}}$

Ⓘ $\frac{30}{\sqrt{18}}$

Ⓙ $\frac{8}{\sqrt{20}}$

Ⓚ $\frac{9}{2\sqrt{45}}$

Ⓛ $\frac{\sqrt{7}}{\sqrt{3}}$

Ⓜ $\frac{\sqrt{5}}{\sqrt{10}}$

Ⓝ $\frac{3\sqrt{6}}{\sqrt{2}}$

Ⓞ $\frac{\sqrt{3}}{2\sqrt{6}}$

Ⓟ $\frac{2\sqrt{3}}{\sqrt{15}}$

Answers A–H:

$\sqrt{11}$	TO
$\frac{\sqrt{5}}{2}$	WAS
$\frac{\sqrt{2}}{6}$	HUG
$\frac{2\sqrt{10}}{5}$	TRIED
$4\sqrt{5}$	SAD
$\frac{5\sqrt{3}}{3}$	THE
$\frac{3\sqrt{5}}{10}$	BIG
$\frac{\sqrt{6}}{2}$	WHO
$\frac{\sqrt{3}}{2}$	KISS
$\frac{2\sqrt{7}}{7}$	VERY
$7\sqrt{2}$	GUY
$\frac{2\sqrt{6}}{3}$	GIRL

Answers I–P:

$\frac{3\sqrt{2}}{4}$	BUT
$\frac{\sqrt{2}}{4}$	AND
$\frac{\sqrt{21}}{3}$	IN
$\frac{4\sqrt{5}}{5}$	GIRL
$\frac{6\sqrt{2}}{5}$	LOST
$3\sqrt{3}$	FOG
$\frac{3\sqrt{5}}{10}$	FRIEND
$\frac{\sqrt{2}}{2}$	THE
$5\sqrt{2}$	HIS
$\frac{2\sqrt{2}}{5}$	A
$\frac{2\sqrt{5}}{5}$	MIST
$\frac{9\sqrt{3}}{10}$	TODAY

OBJECTIVE 3–k: To simplify quotients containing radicals by rationalizing the denominator.

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What Did Bimbo Airhead Reply When Asked, "What Is the Difference Between Ignorance and Apathy?"

Simplify each expression below. Assume that all variables represent nonnegative numbers. Cross out the box that contains your answer. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

(1) $\sqrt{3} \cdot \sqrt{15}$

(2) $\sqrt{10x} \cdot \sqrt{5x^3}$

(3) $7\sqrt{3} + \sqrt{48}$

(4) $\dfrac{24}{\sqrt{6}}$

(5) $-5\sqrt{3} \cdot 4\sqrt{6}$

(6) $\sqrt{2xy^2} \cdot \sqrt{10xy}$

(7) $8\sqrt{x} + 3\sqrt{y} - \sqrt{x}$

(8) $\dfrac{12}{\sqrt{30}}$

(9) $\dfrac{\sqrt{5}}{\sqrt{40}}$

(10) $\sqrt{3nt^5} \cdot \sqrt{12n^2t}$

(11) $5\sqrt{24} - 8\sqrt{150}$

(12) $\dfrac{4\sqrt{10}}{\sqrt{6}}$

(13) $3\sqrt{2n^3t^5} \cdot 5\sqrt{14n^5}$

(14) $7\sqrt{12} - 5\sqrt{27} + 6\sqrt{300}$

(15) $4\sqrt{44} + 2\sqrt{22} + 9\sqrt{99}$

(16) $\dfrac{3\sqrt{2}}{2\sqrt{75}}$

Answers for exercises 1–8:

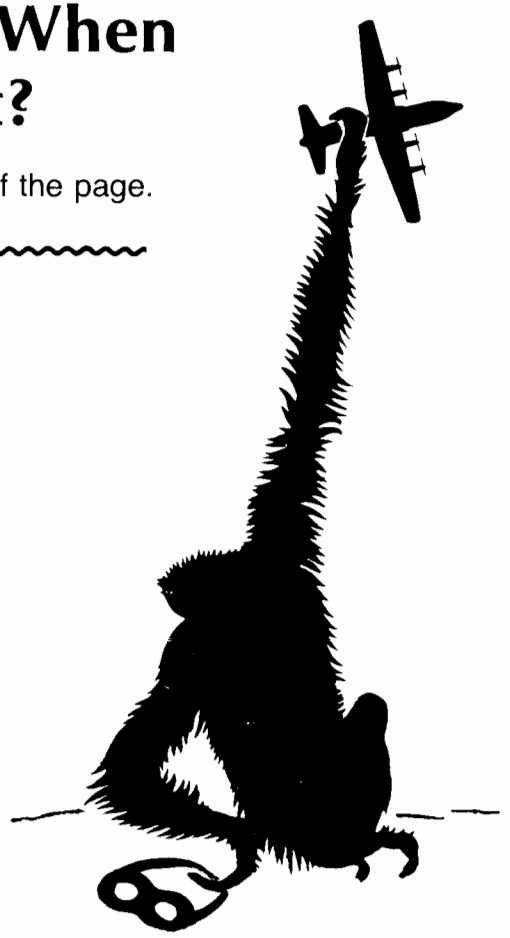
TH	IDO	ERE	THE
$2xy\sqrt{5y}$	$\dfrac{3\sqrt{30}}{10}$	$4\sqrt{6}$	$\dfrac{2\sqrt{30}}{5}$
SO	DUM	NOW	BAS
$7\sqrt{x} + 3\sqrt{y}$	$11\sqrt{3}$	$9\sqrt{2xy}$	$3\sqrt{5}$
ON	TOP	IT	TCA
$-30\sqrt{3}$	$-60\sqrt{2}$	$5x^2\sqrt{2}$	$9\sqrt{6}$

Answers for exercises 9–16:

ONE	WA	NTK	ISS
$30n^4t^2\sqrt{7t}$	$-30\sqrt{6}$	$\dfrac{2\sqrt{30}}{3}$	$\dfrac{\sqrt{6}}{10}$
AN	AS	AYS	DID
$24n^2t^3\sqrt{2t}$	$6nt^3\sqrt{n}$	$59\sqrt{3}$	$42\sqrt{11}$
USE	ME	RE	ST
$35\sqrt{11} + 2\sqrt{22}$	$\dfrac{\sqrt{2}}{4}$	$36\sqrt{3}$	$\dfrac{4\sqrt{15}}{3}$

What Do You Call King Kong When He Dresses Up Like a Pilot?

Simplify each expression below and find your answer at the bottom of the page. Print the letter of that exercise in the box above the answer.



(S) $\sqrt{\frac{3}{7}}$

(E) $\sqrt{\frac{5}{12}}$

(I) $\sqrt{\frac{9}{20}}$

(O) $\sqrt{\frac{8}{27}}$

(S) $\sqrt{\frac{18}{5}}$

(E) $\sqrt{\frac{2}{3}} \cdot \sqrt{\frac{3}{4}}$

(A) $\sqrt{\frac{10}{3}} \cdot \sqrt{\frac{9}{5}}$

(F) $\sqrt{\frac{5}{6}} \cdot \sqrt{\frac{5}{2}}$

(R) $\sqrt{\frac{3}{5}} \cdot \sqrt{\frac{1}{10}}$

(E) $\sqrt{\frac{3}{7}} \cdot \sqrt{\frac{7}{12}}$

(T) $\sqrt{2\frac{2}{3}} \cdot \sqrt{1\frac{1}{5}}$

(S) $\sqrt{1\frac{1}{8}} \cdot \sqrt{3\frac{1}{3}}$

(M) $2\sqrt{\frac{5}{24}}$

(K) $5\sqrt{2\frac{7}{10}}$

(D) $4\sqrt{2\frac{3}{16}} \cdot \sqrt{1\frac{2}{5}}$

$\frac{\sqrt{30}}{6}$	$\frac{\sqrt{21}}{7}$	$\frac{\sqrt{2}}{2}$	$\frac{2\sqrt{2}}{5}$	$\frac{5\sqrt{3}}{6}$	7	$\frac{\sqrt{3}}{10}$	$\frac{3\sqrt{30}}{2}$	$\frac{1}{2}$	
$\sqrt{6}$	$\frac{4\sqrt{5}}{5}$	$\frac{\sqrt{6}}{10}$	$\frac{2\sqrt{6}}{9}$	$\frac{15}{2}$	$\frac{\sqrt{15}}{6}$	$\frac{\sqrt{15}}{2}$	$\frac{3\sqrt{5}}{10}$	$\frac{3\sqrt{10}}{5}$	

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Why Was the Pail Pale?

Simplify each expression. Find your answer below and notice the letter next to it. Write this letter in each box containing the number of that exercise.

(1) $7\sqrt{2}+\sqrt{50}-2\sqrt{18}$

(2) $\sqrt{7}+\frac{\sqrt{7}}{2}$

(3) $\sqrt{3}+\sqrt{\frac{1}{3}}$

(4) $3\sqrt{\frac{1}{2}}+\sqrt{2}$

(5) $2\sqrt{5}+3\sqrt{\frac{1}{5}}$

(6) $10\sqrt{\frac{3}{5}}-24\sqrt{\frac{5}{3}}$

(7) $\sqrt{\frac{3}{2}}+3\sqrt{\frac{1}{6}}$

(8) $5\sqrt{\frac{1}{2}}-2\sqrt{\frac{1}{8}}$

(9) $\sqrt{\frac{3}{8}}+\sqrt{\frac{2}{3}}$

(10) $\sqrt{\frac{3}{4}}+\sqrt{12}$

(11) $7\sqrt{10}-2\sqrt{90}+4\sqrt{\frac{1}{10}}$

(12) $3\sqrt{\frac{2}{9}}+\frac{1}{2}\sqrt{32}+\sqrt{\frac{9}{8}}$

Answers:

(C) $\frac{5\sqrt{2}}{2}$

(A) $\frac{4\sqrt{3}}{3}$

(R) $\frac{7\sqrt{2}}{3}$

(E) $\frac{13\sqrt{5}}{5}$

(S) $6\sqrt{2}$

(D) $9\sqrt{5}$

(N) $-6\sqrt{15}$

(U) $\frac{3\sqrt{7}}{2}$

Answers:

(F) $\frac{7\sqrt{2}}{2}$

(K) $\frac{5\sqrt{3}}{2}$

(T) $\frac{7\sqrt{6}}{12}$

(H) $3\sqrt{10}$

(W) $\frac{15\sqrt{2}}{4}$

(L) $\frac{7\sqrt{10}}{5}$

(I) $\sqrt{6}$

(B) $2\sqrt{2}$

7	9	12	3	1	6	9	3	12	5	11	11	8	2	4	10	5	9

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OBJECTIVE 3–n: To simplify sums and differences of radicals with fractional radicands.

What Do You Get When You Cross. . .

1. A thief with a cement truck?

5	14	5	12	9	2	13	2	9	11	12	15	7	15	13	5	10

2. A supermarket with a jungle?

11	14	2	11	4	1	8	3	10	15	1	13	6

Express each product below in simplest form. Find your answer and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it. Keep working and you will discover the result of each "double cross."

(1) $(5-\sqrt{2})(5+\sqrt{2})$
(2) $(7+\sqrt{3})(7-\sqrt{3})$
(3) $(\sqrt{10}-6)(\sqrt{10}+6)$
(4) $(\sqrt{10}-\sqrt{6})(\sqrt{10}+\sqrt{6})$
(5) $(\sqrt{2}+8)(\sqrt{2}+3)$

(K) 4
(G) -14
(E) 46
(A) $26+11\sqrt{2}$
(P) $30+9\sqrt{2}$
(O) 23
(T) -26

★★★

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Why Is a Duplicate Key Like a Small Cake ?

Solve each equation below. (Be sure to check each apparent solution in the original equation.) Cross out the box that contains your solution. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

(1) $\sqrt{x} = 8$

(2) $\sqrt{4y} = 10$

(3) $\sqrt{6x} = 12$

(4) $\sqrt{\frac{x}{5}} = 3$

(5) $\sqrt{\frac{a}{3}} = 10$

(6) $\sqrt{x} + 7 = 11$

(7) $\sqrt{3x - 1} = 5$

(8) $\sqrt{5y} + 3 = 7$

(9) $\sqrt{2b + 4} = 8$

(10) $\sqrt{6x + 1} + 9 = 16$

(11) $\sqrt{3n + 8} - 5 = 0$

(12) $\sqrt{4t - 7} + 4 = 1$

(13) $\sqrt{\frac{x}{6}} + 2 = 7$

(14) $\sqrt{\frac{2m}{3}} + 6 = 9$

(15) $\sqrt{x} = 7\sqrt{2}$

(16) $\sqrt{4y - 3} = \sqrt{41}$

(17) $\sqrt{5x - 7} = \sqrt{3x + 3}$

(18) $4\sqrt{a} = \sqrt{4a + 27}$

Answers for exercises 1–6:

TH	BE	IT	CA
25	16	no solution	300
RE	RY	WI	TH
45	64	35	24

Answers for exercises 7–12:

HA	IS	US	AT
8	28	12	$\frac{5}{3}$
SH	TH	LD	LL
$\frac{16}{5}$	no solution	30	$\frac{17}{3}$

Answers for exercises 13–18:

OP	EA	TH	AS
$\frac{27}{2}$	5	98	150
NK	DE	SK	EY
32	$\frac{9}{4}$	11	no solution

OBJECTIVE 3–p: To solve radical equations (solving a quadratic equation is not required).

What Is the Advantage of Having Nuclear Physics ?

Solve each equation and problem below. (Be sure to check each apparent solution in the original equation.) Find your answer and notice the two letters next to it. Write these letters in the two boxes above the exercise number at the bottom of the page.

(1) $\sqrt{\frac{x}{5}} + 4 = 14$

(2) $\sqrt{\frac{3a}{2}} - 1 = 5$

(3) $\sqrt{8y} = \frac{1}{2}$

(4) $\sqrt{3n} = \frac{2}{5}$

(5) The square root of one fourth of a number is 6. Find the number.

Answers:

AB	$\frac{8}{25}$	BE	24
ND	144	EN	180
AN	500	ET	28
EO	$\frac{4}{75}$	DY	$\frac{1}{32}$

(6) $\sqrt{5k + 2} + 8 = 11$

(7) $\sqrt{7d - 9} = \sqrt{2d + 21}$

(8) $\sqrt{x^2 + 3x} = 2$

(9) $\sqrt{3w + 10} - w = 0$

(10) When 11 is subtracted from twice a number, the square root of the result is 4. Find the number.

Answers:

ST	9	TH	$\{1, -4\}$
IT	6	IS	$\frac{27}{2}$
CL	5	AF	$\{2, -3\}$
CH	$\frac{13}{5}$	ER	$\frac{7}{5}$

(11) $\sqrt{x - 3} = x - 3$

(12) $x + 2 = \sqrt{18 - x}$

(13) $y = 5 + \sqrt{3y - 5}$

(14) $\sqrt{7m + 25} - m = 1$

(15) Three times the square root of a number is the same as 4 less than the number. Find the number.

Answers:

OU	8	FI	-7
ND	25	TH	$\{3, 4\}$
TT	10	LD	16
KI	2	AT	$\{5, -3\}$

7	10	2	13	6	11	1	8	4	15	9	14	3	12	5

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Moving Words

Solve each equation in the top block and find the solution set in the bottom block. (One equation has no solution.) Transfer the word from the top box to the corresponding bottom box.

$x^2 = 81$ (1) TO	$y^2 - 49 = 0$ (6) MAKE	$4x^2 - 200 = -20$ (11) THE	$(x - 2)^2 = 28$ (16) STUDENTS
$a^2 = 20$ (2) WAS	$x^2 - 16 = 8$ (7) ONCE	$7y^2 + 18 = 4$ (12) THERE	$3(x - 5)^2 = 12$ (17) TEACHER
$3n^2 = 45$ (3) IN	$b^2 + 11 = 86$ (8) TEN	$(x - 1)^2 = 9$ (13) LAUGH	$5(n + 1)^2 = 40$ (18) TEN
$7x^2 = 84$ (4) WHO	$2x^2 - 3 = 15$ (9) NO	$(a + 3)^2 = 25$ (14) TOLD	$(2x - 3)^2 = 81$ (19) JOKES
$2v^2 = 180$ (5) BUT	$5w^2 + 8 = 58$ (10) A	$(t - 4)^2 = 7$ (15) DID	$(4t + 1)^2 = 49$ (20) PUN

no solution	$\{\pm 2\sqrt{6}\}$	$\{\pm 2\sqrt{5}\}$	$\{\pm \sqrt{10}\}$	$\{7, 3\}$
$\{\pm 2\sqrt{3}\}$	$\{2, -8\}$	$\{\pm 5\sqrt{3}\}$	$\{6, -3\}$	$\{\pm 9\}$
$\{\pm 7\}$	$\{\pm 2\sqrt{3}\}$	$\{2 \pm 2\sqrt{7}\}$	$\{4, -2\}$	$\{\pm 3\sqrt{10}\}$
$\{\pm 3\}$	$\{\frac{3}{2}, -2\}$	$\{\pm\sqrt{15}\}$	$\{-1 \pm 2\sqrt{2}\}$	$\{4 \pm \sqrt{7}\}$

OBJECTIVE 4–b: To solve quadratic equations using perfect squares (more challenging exercises).

What Do You Get When You Cross a Cooking Utensil With a Mathematical Formula?

Solve each equation below. Find the solution set at the bottom of the page and cross out the letter above it. When you finish, the answer to the title question will remain.

1. $(x-4)^2 = 25$
2. $5(x+7)^2 = 5$
3. $3(x-2)^2 = 36$
4. $x^2 - 10x + 25 = 9$
5. $x^2 - 6x + 9 = 49$
6. $x^2 + 2x + 1 = 64$
7. $x^2 - 18x + 81 = 24$
8. $x^2 + 12x + 36 = 75$
9. $\left(x - \frac{1}{2}\right)^2 = 1$
10. $\left(x - \frac{3}{2}\right)^2 = \frac{7}{4}$
11. $\left(x + \frac{5}{2}\right)^2 = \frac{15}{4}$
12. $2x^2 = 5$
13. $\left(x - \frac{1}{2}\right)^2 = \frac{3}{2}$
14. $\left(x - \frac{3}{5}\right)^2 = \frac{4}{5}$
15. $3\left(x + \frac{7}{3}\right)^2 = 1$

S	T	C	A	H	S	P	E	A	O	L	I	T	I	P	A	D	N	I	X	H
$\{2, 8\}$	$\{9 \pm 2\sqrt{6}\}$	$\{-8, -6\}$	$\left\{\frac{\sqrt{30}}{6}, \pm\right\}$	$\{-1, 9\}$	$\left\{\frac{-7 \pm \sqrt{3}}{3}\right\}$	$\left\{\frac{1 \pm 4\sqrt{5}}{5}\right\}$	$\{-6 \pm 5\sqrt{3}\}$	$\left\{\frac{3 \pm 2\sqrt{5}}{5}\right\}$	$\left\{\frac{-7 \pm \sqrt{6}}{2}\right\}$	$\{-4, 10\}$	$\left\{-\frac{1}{2}, \frac{3}{2}\right\}$	$\{-3, 5\}$	$\left\{\frac{\sqrt{10}}{2}, \pm\right\}$	$\{-6 \pm 2\sqrt{7}\}$	$\left\{\frac{-5 \pm \sqrt{15}}{2}\right\}$	$\{2 \pm 2\sqrt{3}\}$	$\left\{\frac{3 \pm \sqrt{7}}{2}\right\}$	$\{9 \pm 3\sqrt{5}\}$	$\left\{\frac{1 \pm \sqrt{6}}{2}\right\}$	$\{-9, 7\}$

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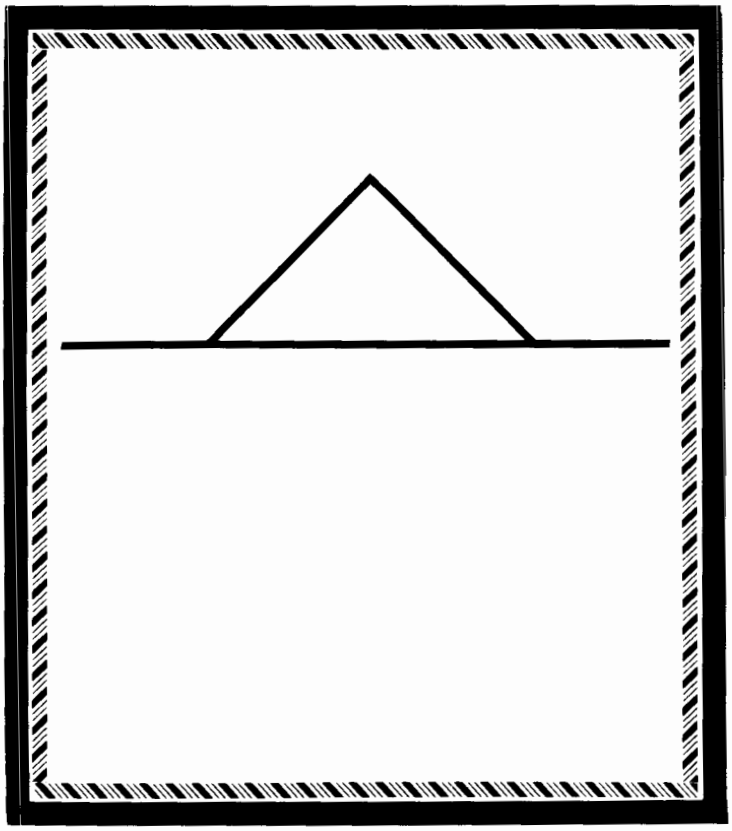
What Is the Title of This Picture?

Solve each equation below by completing the square. Find the solution set in the answer list and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it. Keep working and you will decode the title of the picture.



(1) $x^2 + 6x = 16$

(2) $a^2 + 10a = -21$

(3) $x^2 - 8x = 33$

(4) $n^2 - 4n = 11$

(5) $b^2 + 20b = -80$

(6) $x^2 - 12x = 39$

(7) $m^2 - 6m - 1 = 0$

(8) $t^2 - 8t - 20 = 0$

(9) $x^2 + 12x + 18 = 0$

(10) $y^2 + 2y - 80 = 0$

(11) $x^2 - 10x - 7 = 3$

(12) $k^2 + 16k + 60 = 5$

(13) $x^2 - 24x + 70 = -30$

(14) $y^2 + 30y - 75 = 100$

CODED TITLE:

11	12	3	14	4	12	7	13	13	8	2	13

5	10	13	8	1	5	14	2	12	6	14	13	12	1	9

(B) $\{5 \pm \sqrt{35}\}$	(R) $\{2, -8\}$	(W) $\{6 \pm 5\sqrt{3}\}$
(C) $\{2 \pm \sqrt{15}\}$	(F) $\{8, -10\}$	(O) $\{-5, -11\}$
(S) $\{5, -35\}$	(Y) $\{11, -3\}$	(A) $\{-10 \pm 2\sqrt{5}\}$
(N) $\{-3, -7\}$	(E) $\{10, -2\}$	(L) $\{5 \pm 3\sqrt{10}\}$
(U) $\{3 \pm \sqrt{10}\}$	(T) $\{12 \pm 2\sqrt{11}\}$	(M) $\{-6 \pm 3\sqrt{2}\}$

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What Is a Metaphor?

Solve each equation below using the quadratic formula. Cross out the box that contains the solution set. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

(1) $x^2 + 4x + 3 = 0$

(2) $x^2 - 7x + 10 = 0$

(3) $x^2 + 5x + 6 = 0$

(4) $x^2 - 3x - 4 = 0$

(5) $y^2 + 2y - 8 = 0$

(6) $x^2 - 5x + 2 = 0$

(7) $d^2 + 3d - 7 = 0$

(8) $2x^2 - 5x + 2 = 0$

(9) $2n^2 - 3n - 5 = 0$

(10) $3x^2 + 5x + 1 = 0$

(11) $3y^2 - 2y - 8 = 0$

ONE $\{5, 2\}$	ATH $\left\{\frac{-5 \pm \sqrt{13}}{6}\right\}$	TOK $\left\{-4, \frac{1}{2}\right\}$	ING $\left\{\frac{5}{2}, -1\right\}$	ICK $\left\{\frac{-3 \pm \sqrt{37}}{2}\right\}$
ASL $\{-2, -3\}$	EEP $\left\{\frac{3 \pm \sqrt{15}}{2}\right\}$	MET $\{2, -4\}$	BOW $\left\{2, -\frac{4}{3}\right\}$	COW $\left\{\frac{2 \pm \sqrt{30}}{6}\right\}$
BOY $\left\{2, \frac{1}{2}\right\}$	RIT $\{-1, -3\}$	SIN $\{6, 1\}$	GLE $\left\{\frac{5 \pm \sqrt{17}}{2}\right\}$	ING $\{4, -1\}$

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What Do You Call It When Somebody Spends 20 Years in the 24th Row of a Theater?

Solve each equation below using the quadratic formula. Find the solution set at the bottom of the page and print the letter of the exercise above it.

(I) $2x^2 - 7x + 5 = 0$

(N) $2x^2 + x - 6 = 0$

(S) $3n^2 - 2n - 5 = 0$

(A) $w^2 + 7w + 4 = 0$

(I) $5x^2 + 3x - 3 = 0$

(G) $6x^2 - x = 2$

(E) $2y^2 + 2 = 9y$

(I) $x^2 - 6x + 4 = 0$

(L) $t^2 + 4t - 2 = 0$

(N) $3x^2 + 10x + 5 = 0$

(V) $4x^2 - 3x = 1$

(L) $2d^2 + 4 = 5d$

(X) $2x = 7 - x^2$

(I) $y^2 + 9 = -9y$

$\{-2 \pm \sqrt{6}\}$	$\left\{\frac{-3 \pm \sqrt{69}}{10}\right\}$	$\left\{1, -\frac{1}{4}\right\}$	$\{3 \pm \sqrt{5}\}$	$\{3, -2\}$	$\left\{2, -\frac{1}{2}\right\}$	$\{-1 \pm 3\sqrt{5}\}$	$\{2.5, 1\}$	$\left\{\frac{-5 \pm \sqrt{10}}{3}\right\}$	$\left\{\frac{-9 \pm \sqrt{30}}{2}\right\}$	$\{-1 \pm 2\sqrt{2}\}$	$\left\{2, -\frac{3}{2}\right\}$	$\left\{\frac{-7 \pm \sqrt{33}}{2}\right\}$	$\left\{\frac{-9 \pm 3\sqrt{5}}{2}\right\}$	$\left\{3, -1\right\}$	no solution	$\left\{\frac{9 \pm \sqrt{65}}{4}\right\}$

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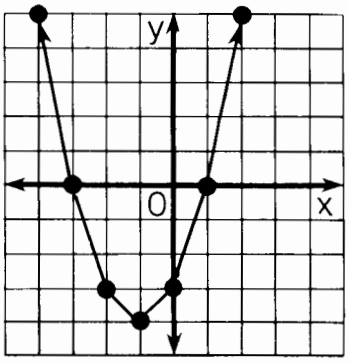
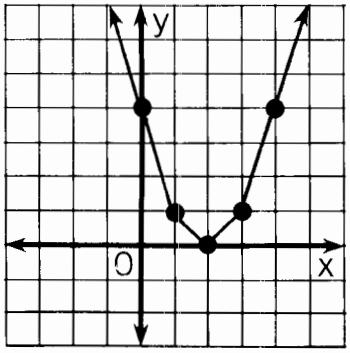
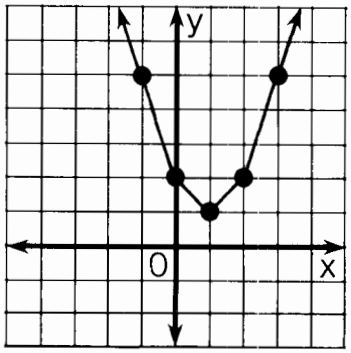
How Can You Help Control Soil Erosion?

Use the related graph or the discriminant of each equation to determine how many real-number solutions it has. Circle the letter of the correct choice and write this letter in the box containing the exercise number.







(1) $x^2 + 2x - 3 = 0$
(D) two solutions
(E) one solution
(M) no solutions

(2) $x^2 - 4x + 4 = 0$
(C) two solutions
(A) one solution
(W) no solutions

(3) $x^2 - 2x + 2 = 0$
(H) two solutions
(D) one solution
(O) no solutions

	two solutions	one solution	no solutions
(4) $x^2 + 5x + 4 = 0$	K	B	G
(5) $x^2 - 3x = 2$	U	O	A
(6) $y^2 + 10y + 25 = 0$	V	A	I
(7) $2x^2 = 4x - 3$	F	C	H
(8) $4x^2 + 9 = 12x$	S	P	N
(9) $-3n^2 + 5n - 2 = 0$	N	R	S
(10) $\frac{1}{2}x^2 + 3x + 8 = 0$	R	P	L
(11) $\frac{1}{3}t^2 + 3 = 2t$	Y	B	T

7	3	10	1	5	8	2	11	6	9	4

OBJECTIVE 4–f: To use the related graph or the discriminant of a equation to determine how many real-number solutions it has.

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Did You Hear About...

A	B	C	D
E	F	G	H ?

Solve each problem below. If an irrational root occurs, round to the nearest tenth. Find your answer in the answer column and notice the word next to it. Write this word in the box containing the letter of the exercise. Keep working and you will hear about a joint joint.

(A) The length of a rectangle is 4 m more than the width. The area of the rectangle is 45 m^2. Find the length and width.

(B) The length of a rectangle is three times the width. The area is 108 cm^2. Find the dimensions of the rectangle.

(C) The length of a photograph is 1 cm less than twice the width. The area is 28 cm^2. Find the dimensions of the photograph.

(D) A square field had 3 m added to its length and 2 m added to its width. The field then had an area of 90 m^2. Find the length of a side of the original field.

(E) The length of a rectangular mural is 2 m greater than the width. The area is 20 m^2. Find the dimensions of the mural.

(F) The length of a rectangle is 6 cm more than the width. The area is 11 cm^2. Find the length and width.

(G) The length of a rectangular garden is 4 m greater than the width. The area is 71 m^2. Find the dimensions of the garden.

(H) The length of a rectangular park is 2 km less than twice the width. The area is 9 km^2. Find the dimensions of the park.

2 cm by 14 cm	JOINT
4 cm by 7 cm	WHO
2.1 km by 4.3 km	BONES
3.6 m by 5.6 m	NOTHING
1.8 cm by 7.8 cm	MORE
8 m	WAS
5 m by 9 m	THE
2.7 km by 3.4 km	TALK
7 m	GOT
5.2 m by 9.2 m	SORE
1.5 cm by 7.5 cm	BUT
6 cm by 18 cm	CHIROPRACTOR
3.3 cm by 5.3 cm	EVERYBODY
6.7 cm by 10.7 cm	BACK
5 cm by 15 cm	BROKEN

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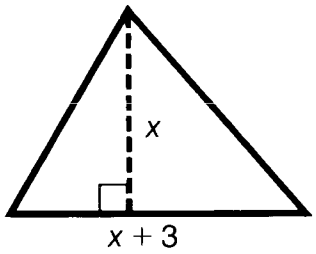
Once upon a time a mother skunk had two baby skunks, named In and Out. When Out was in, In was out. One day, In went out and Out came in, and the mother skunk sent Out out to bring In in. How did Out find In?

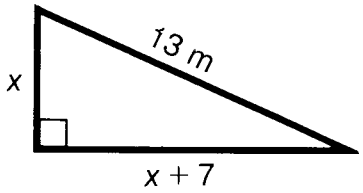
Solve each problem below. If an irrational root occurs, round to the nearest tenth. Find your answer at the bottom of the page and cross out the letter above it. When you finish, the answer to the title question will remain.

(1) The base of a triangle is 3 cm longer than its altitude. The area of the triangle is 35 cm^2. Find the altitude. (Hint: The area of a triangle equals ½ · base · altitude.)



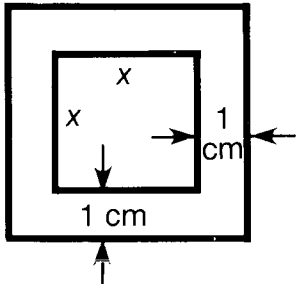
(2) The altitude of a triangle is 2 cm shorter than its base. The area is 15 cm^2. Find the base of the triangle.

(3) A flower garden is in the shape of a right triangle. The longest side of the triangle measures 13 m. One of the shorter sides is 7 m longer than the other. Find the length of the shortest side. (Hint: Use the Pythagorean Theorem: $a^2 + b^2 = c^2$.)



(4) The diagonal measure of a movie screen is 6 m. The length of the screen is 2 m greater than the height. Find the dimensions of the screen.

(5) A square picture is mounted in a frame 1 cm wide. The area of the picture is $\frac{2}{3}$ of the total area. Find the length of a side of the picture.



(6) A rectangular pond measures 3 m by 5 m. A concrete walk of uniform width is constructed around the pond. If the walk and pond together cover an area of 39 m^2, how wide is the walk?

(7) A rectangular counter is covered with 600 square tiles. The counter could have been covered with 400 tiles 1 cm longer on a side. Find the length of a side of the smaller tile.

O	I	T	N	S	A	T	H	I	N	O	W	C	U	T
1.2 m	4.8 cm	6.6 cm	8.2 cm	1.8 m	4.4 cm	4 m	3.1 m by 5.1 m	8 cm	7.7 cm	8.9 cm	7 cm	3.7 m by 5.7 m	5 m	5.6 cm

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Why Was the Mural Painter in the News?

Solve each formula below for the indicated letter. Assume that all variables represent nonnegative numbers. CIRCLE the letter next to the correct answer. Write this letter in the box at the bottom of the page that contains the number of that exercise.

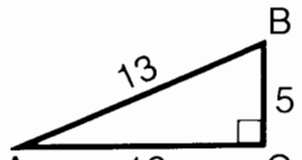
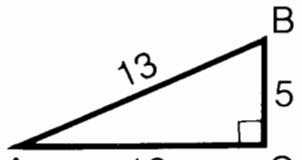
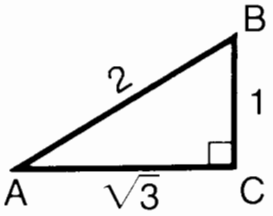
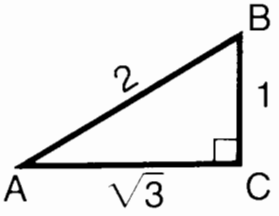
$A = s^2$; s (E) $s = \sqrt{A}$ ① (R) $s = 2A$	$r = \sqrt{\frac{A}{\pi}}$; A (O) $A = 2\pi r$ ⑤ (U) $A = \pi r^2$	$s = \frac{at^2}{2}$; t (L) $t = 2\sqrt{sa}$ ⑨ (D) $t = \sqrt{\frac{2s}{a}}$	$v = \sqrt{\frac{Fr}{m}}$; F (P) $F = \frac{mv^2}{r}$ ⑬ (R) $F = \frac{mr}{v^2}$	$c = \sqrt{a^2 + b^2}$; a (U) $a = \sqrt{c + b^2}$ ⑰ (I) $a = \sqrt{c^2 - b^2}$
$E = mc^2$; c (P) $c = \sqrt{Em}$ ② (N) $c = \sqrt{\frac{E}{m}}$	$I = \sqrt{\frac{P}{R}}$; P (G) $P = IR^2$ ⑥ (C) $P = I^2R$	$k = \frac{1}{2}mv^2$; v (H) $v = \sqrt{\frac{2k}{m}}$ ⑩ (B) $v = \sqrt{\frac{2m}{k}}$	$d = \sqrt{\frac{4A}{\pi}}$; A (I) $A = \frac{\pi d^2}{4}$ ⑭ (U) $A = 2\pi d^2$	$a = \sqrt{x^2 + y^2}$; y (B) $y = \sqrt{a^2 - x^2}$ ⑱ (S) $y = \sqrt{(a + x)^2}$
$s = 16t^2$; t (M) $t = \sqrt{\frac{s}{8}}$ ③ (C) $t = \frac{\sqrt{s}}{4}$	$I = \sqrt{\frac{P}{R}}$; R (A) $R = PI^2$ ⑦ (E) $R = \frac{P}{I^2}$	$V = \frac{\pi r^2 h}{3}$; r (L) $r = \sqrt{\frac{3V}{\pi h}}$ ⑪ (F) $r = \sqrt{3\pi Vh}$	$h = 3\sqrt{2k}$; k (A) $k = \frac{h^2}{18}$ ⑮ (I) $k = 9h^2$	$r = \frac{1}{2}\sqrt{\frac{S}{\pi}}$; S (F) $S = \frac{\pi r^2}{2}$ ⑲ (M) $S = 4\pi r^2$
$V = \pi r^2 h$; r (A) $r = \sqrt{\frac{V}{\pi h}}$ ④ (L) $r = \sqrt{\frac{Vh}{\pi}}$	$w = \sqrt{\frac{V}{h}}$; h (N) $h = \frac{V}{w^2}$ ⑧ (T) $h = \frac{w}{V}$	$s = \frac{kbd^2}{\ell}$; d (T) $d = \sqrt{\frac{ks}{\ell b}}$ ⑫ (E) $d = \sqrt{\frac{\ell s}{kb}}$	$T = 2\pi\sqrt{\frac{\ell}{g}}$; ℓ (T) $\ell = 4\pi g T^2$ ⑯ (S) $\ell = \frac{gT^2}{4\pi^2}$	$F = \frac{km_1m_2}{d^2}$; d (E) $d = \sqrt{\frac{km_1m_2}{F}}$ ⑳ (I) $d = \sqrt{Fkm_1m_2}$

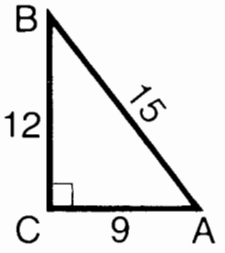
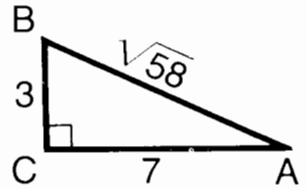
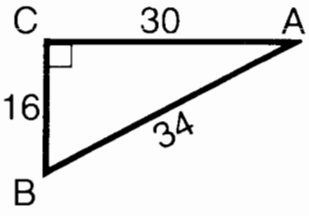
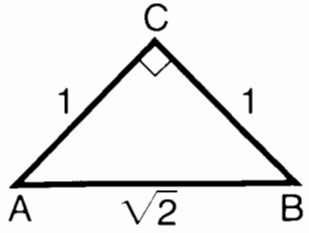
OBJECTIVE 4–I: To solve a formula for a given letter (either squaring both sides or taking the square root of both sides is necessary).

	10	7	19	15	9	1	4	16	6	20	2	12	17	8	13	5	18	11	14	3

What Did Mrs. Margarine Think About Her Sister's Husband?

For each exercise, select the correct ratio from the four choices given. Write the letter of the correct choice in the box that contains the number of that exercise.

(1) sin A (2) cos A (3) tan A	(I) $\frac{12}{13}$ (R) $\frac{5}{13}$ (E) $\frac{5}{12}$ (N) $\frac{13}{5}$		(13) sin A (14) cos A (15) tan A
(4) sin B (5) cos B (6) tan B	(L) $\frac{13}{5}$ (T) $\frac{5}{13}$ (A) $\frac{12}{13}$ (S) $\frac{12}{5}$		(16) sin B (17) cos B (18) tan B
(7) sin A (8) cos A (9) tan A	(E) $\frac{\sqrt{3}}{2}$ (I) $\frac{1}{2}$ (U) 2 (R) $\frac{1}{\sqrt{3}}$		(19) sin A (20) cos A (21) tan A
(10) sin B (11) cos B (12) tan B	(I) $\sqrt{3}$ (U) $\frac{1}{2}$ (A) $\frac{\sqrt{3}}{2}$ (P) $\frac{1}{\sqrt{3}}$		(22) sin A (23) cos A (24) tan A

(13) sin A (14) cos A (15) tan A	(D) $\frac{5}{3}$ (H) $\frac{3}{5}$ (F) $\frac{4}{3}$ (E) $\frac{4}{5}$		
(16) sin B (17) cos B (18) tan B	(I) $\frac{3}{\sqrt{58}}$ (A) $\frac{3}{7}$ (N) $\frac{7}{\sqrt{58}}$ (W) $\frac{7}{3}$		
(19) sin A (20) cos A (21) tan A	(R) $\frac{15}{17}$ (C) $\frac{8}{17}$ (S) $\frac{17}{8}$ (L) $\frac{8}{15}$		
(22) sin A (23) cos A (24) tan A	(T) $\frac{1}{\sqrt{2}}$ (T) $\frac{1}{\sqrt{2}}$ (B) 1 (N) $\sqrt{2}$		

14	3	17	6	10	23	8	1	20	12	15	7	19	24	11	5	22	13	9	2	16	21	4	18

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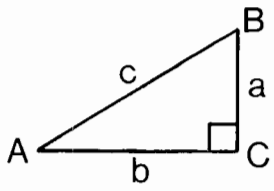
What Did the Prince Do Whenever He Found a Girl Who Might Be Cinderella?

Use the table of trigonometric ratios to do each exercise. Find each answer at the bottom of the page and write the letter of the exercise above it.

Find the following:

(T) sin 25° (H) tan 35° (E) cos 10° (E) cos 80° (O) sin 70° (A) tan 45°

Use the figure at the right for the remaining exercises.



(W) If $m\angle A = 20°$, then $\frac{a}{c} =$

(O) If $\frac{a}{c} = 0.5736$, then $m\angle A =$

(E) If $m\angle A = 75°$, then $\frac{b}{c} =$

(N) If $\frac{b}{c} = 0.5000$, then $m\angle A =$

(E) If $m\angle A = 55°$, then $\frac{a}{b} =$

(T) If $\frac{a}{b} = 0.8391$, then $m\angle A =$

(D) If $m\angle B = 5°$, then $\frac{a}{c} =$

(W) If $\frac{a}{c} = 0.4226$, then $m\angle B =$

(T) If $m\angle B = 30°$, then $\frac{b}{a} =$

(N) If $\frac{b}{a} = 5.6713$, then $m\angle B =$

(F) If $m\angle B = 50°$, then $\frac{b}{c} =$

(D) If $\frac{b}{c} = 0.2588$, then $m\angle B =$

Angle	Sin	Cos	Tan
0°	0.0000	1.0000	0.0000
5°	.0872	.9962	.0875
10°	.1736	.9848	.1763
15°	.2588	.9659	.2679
20°	.3420	.9397	.3640
25°	.4226	.9063	.4663
30°	.5000	.8660	.5774
35°	.5736	.8192	.7002
40°	.6428	.7660	.8391
45°	.7071	.7071	1.0000
50°	.7660	.6428	1.1918
55°	.8192	.5736	1.4281
60°	.8660	.5000	1.7321
65°	.9063	.4226	2.1445
70°	.9397	.3420	2.7475
75°	.9659	.2588	3.7321
80°	.9848	.1736	5.6713
85°	.9962	.0872	11.4301
90°	1.0000	.0000	------

0.7002	0.2588	65°	0.9848	80°	0.4226	15°	0.9397	0.3420	60°	0.5774	35°	0.9962	0.1736	0.7660	1.4281	1.0000	40°	

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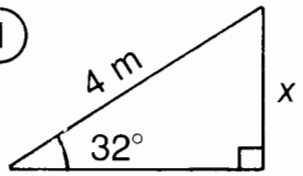
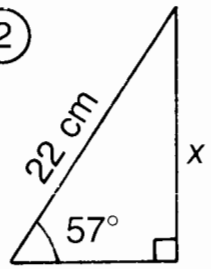
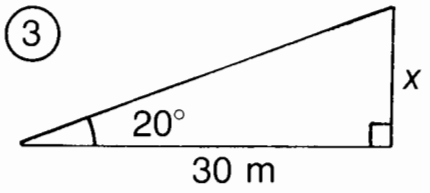
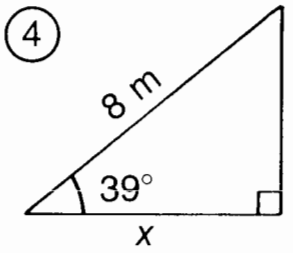
What Do They Call the Big Grass Field on an Orbiting Satellite?

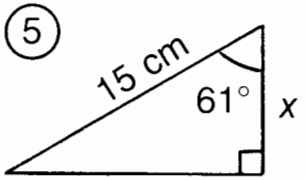
For the first eight exercises, find the length x. For the remaining exercises, find the length needed to solve the problem. Round each answer to the nearest tenth. Cross out each box that contains a correct answer. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

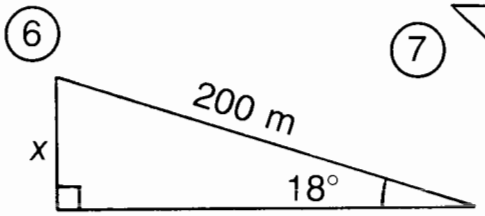
(1) 

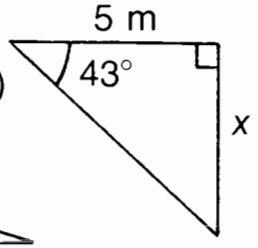
(2) 

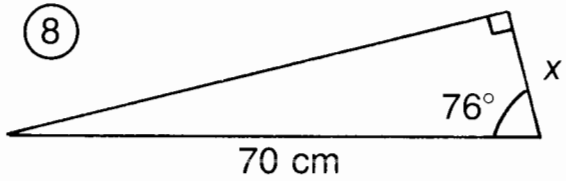
(3) 

(4) 

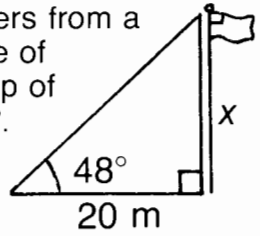
(5) 

(6) 

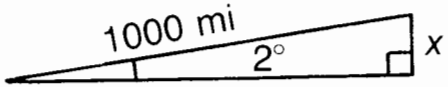
(7) 

(8) 

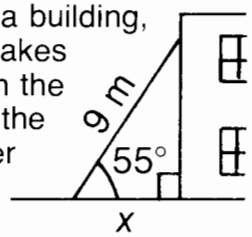
(9) At a point 20 meters from a flagpole, the angle of elevation of the top of the flagpole is 48°. How tall is the flagpole?



(10) If a rocket flies 2° off course for 1000 miles, how far from the correct path will the rocket be?



(11) As it leans against a building, a 9-meter ladder makes an angle of 55° with the ground. How far is the bottom of the ladder from the base of the building?



TH	AP	ET	E	AR	UN	A	KI	SS
4.7 m	5.4 m	5.2 m	2.1 m	23.5 m	6.2 m	22.2 m	28.7 mi	61.8 m
RU	NS	TO	P	UP	A	KY	NI	CE
18.5 cm	3.2 m	7.3 cm	63.6 m	34.9 mi	15.3 cm	10.9 m	16.9 cm	17.1 cm

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• DAFFYNITION DECODER •

EUROPE:

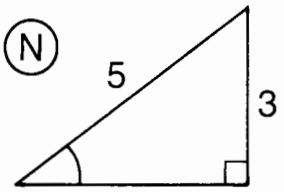
30°	42°	21°	24°	74°	2°	21°	24°	37°	49°	2°	42°	17°	32°	5°	2°

UNDERGROUND GARAGE:

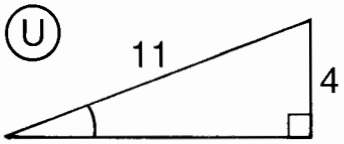
46°	5°	9°	9°	28°	2°	42°	7°	46°	5°	9°	9°	7°	51°	5°	24°	68°	34°	2°

TO DECODE THE TWO DAFFYNITIONS ABOVE: For the first nine exercises, find the measure of the angle indicated. For the remaining exercises, find the angle measure needed to solve the problem. Round to the nearest degree. Each time the answer appears in the code, write the letter of the exercise below it.

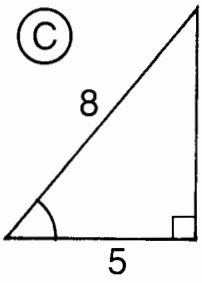
(N)



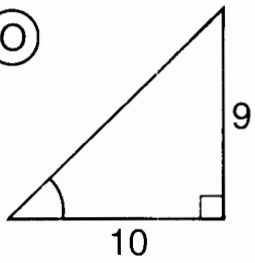
(U)



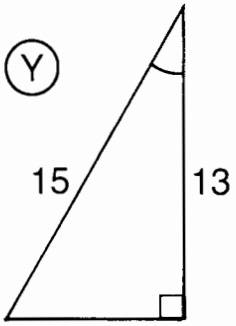
(C)



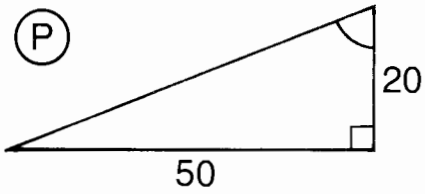
(O)



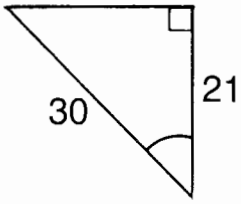
(Y)



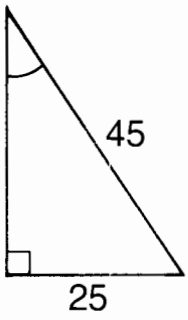
(P)



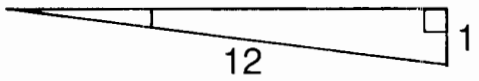
(W)



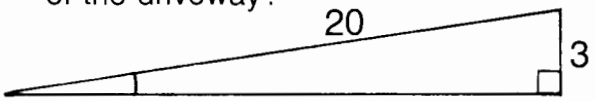
(I)



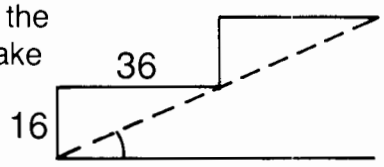
(A)



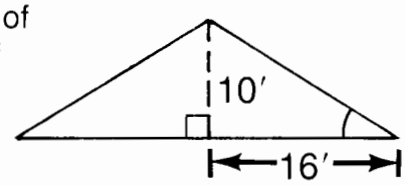
(L) A driveway is built on an incline so that it rises 3 m over a distance of 20 m. What is the angle of elevation of the driveway?



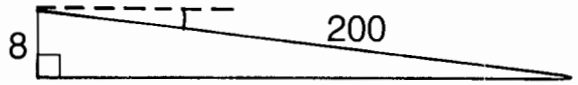
(R) Each step of a stairway rises 16 cm for a tread width of 36 cm. What angle does the stairway make with the floor?



(B) A roof is constructed as shown in the diagram. Find the pitch (angle of elevation) of the roof.



(T) A train decreases its altitude by 8 m when traveling along 200 m of track. Find the angle of depression of the track.



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When Should You Use the Fact That $(a+b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$?

For each exercise, find a word (or words) that has the given meaning and also fits in the adjacent set of boxes. Fill in the boxes and then notice which letters are in numbered boxes. Write each of these letters in the matching numbered box at the bottom of the page.

(1) A set of two elements in which the order is specified.

(2) Two perpendicular number lines, or axes, used for graphing ordered pairs of numbers.

(3) An ordered pair that satisfies an equation (or inequality) in two variables.

(4) The set of all points whose coordinates satisfy an equation (or inequality).

(5) The steepness of a line as defined by the ratio:
$$\frac{\text{difference of } y\text{-coordinates}}{\text{difference of } x\text{-coordinates}}$$

(6) The y-coordinate of a point where a graph intersects the y-axis.

(7) The form of a linear equation $y = mx + b$, where m is the slope and b is the y-intercept.

(8) A set of equations in the same variables.

(9) A set of ordered pairs in which no two ordered pairs have the same first element.

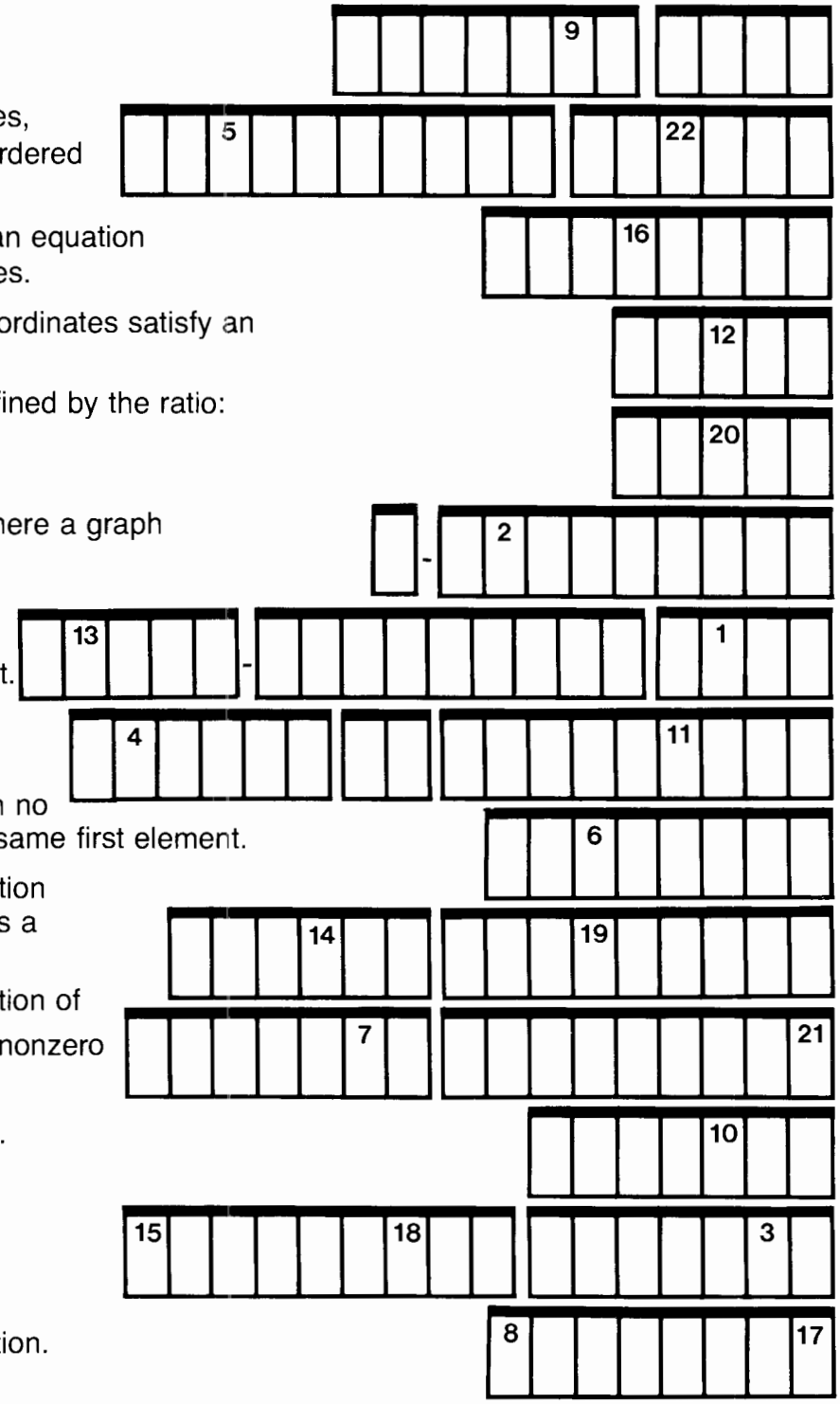
(10) A function defined by an equation of the form $y = kx$, where k is a nonzero constant.

(11) A function defined by an equation of the form $y = \frac{k}{x}$, where k is a nonzero constant.

(12) An expression of the form $\sqrt{a}$.

(13) If $ax^2 + bx + c = 0$, $a \neq 0$, then
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

(14) The graph of a quadratic function.



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

OBJECTIVE 6–a: To demonstrate knowledge of basic vocabulary used in second- semester algebra.

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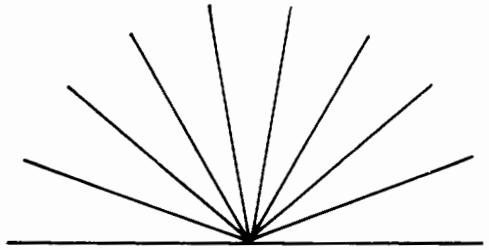
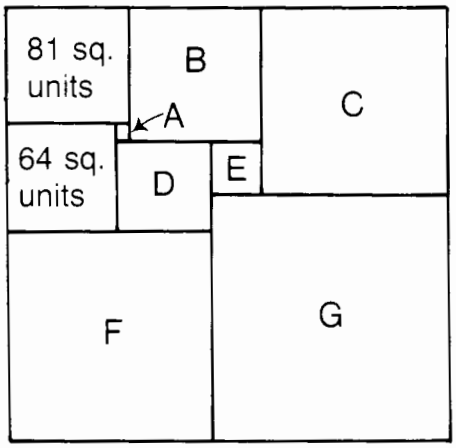
TEST OF GENIUS

(1) Each of Bork's bags contains the same number of marbles. He has twice as many bags as he has marbles in each bag. If he has 32 marbles in all, how many are in each bag?

(2) How many angles (less than 180°) are in the figure below?



(3) The rectangle below is divided into square regions. Using the information given, find the area of each of these regions. Is the outside rectangle a square also?

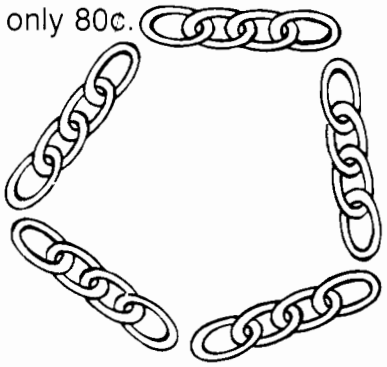


(4) Show that two WRONG's can make a RIGHT. Replace each different letter in the addition below with a different digit. It is required that O = zero.

$$\begin{array}{r} \text{WRONG} \\ +\ \text{WRONG} \\ \hline \text{RIGHT} \end{array}$$

(5) Jennifer's brother Matthew has one more brother than he has sisters. How many more brothers than sisters does Jennifer have?

(6) Rolex has five pieces of chain, each containing four links. He wants to join the pieces to form a circle. If it costs 10¢ to open a link, and 10¢ to close a link, find a way he can do this for only 80¢.



(7) A, B, and C decide to play poker. They agree that when a player loses a hand, he will pay each of the others an amount equal to the amount each player already has. A loses the first hand and pays B and C the amount of money each has; B loses the second hand and pays A and C the amount of money each has; C loses the third hand and pays A and B the amount of money each has. At this point, each player has $8. How much did each player start with?

(8) Leather shoes are worn in bowling and rubber-soled sneakers in tennis. In what sport are all-metal shoes worn?

SCORING KEY
7 or 8 — *Foremost Genius*
5 or 6 — *Fabulous Genius*
3 or 4 — *Frequent Genius*
1 or 2 — *Future Genius*

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SOLUTIONS

Page 1

1. A TUNNEL WITH LEAKS
2. A BIG ELECTRIC BILL

H. 60
A. 20
W. 7
S. 26
E. 62
U. 22
B. 100
G. 8
R. 5
T. 0
K. 24
N. 81
C. 90
I. 32
L. 1

Page 2

I. 37
T. 76
U. 28
O. 33
E. 26
G. 31
A. 12
T. 62
Y. 83
I. 53
O. 27
R. 0
I. 27
C. 49
H. 3
O. 64
M. 62
V. 16
P. 7
G. 17
K. 140
H. 12
P. 10

IT MIGHT GIVE YOU A PORK CHOP

It might give you a pork chop.

Page 3

E. 35
I. 51
A. 70
Y. 18
T. 43
E. 7
P. 19
A. 6
O. 60
T. 16
H. 20
E. 1
D. 41
W. 24
K. 11
N. 72
L. 8
U. 30
W. 10
O. 0

HE WANTED TO WAKE UP OILY

He wanted to wake up oily (early).

Page 4

1. T
2. I
3. S
4. A
5. I
6. E
7. N
8. T
9. A
10. N
11. I
12. O
13. U
14. T
15. H
16. S
17. T
18. N

IN A TENTHS SITUATION

In a tenths (tense) situation

Page 5

A. $7b$
R. $4x$
Y. 27
S. $24x$
O. $4a$
E. xy
I. $8y$
D. $30x$
W. ax
E. $2ay$
T. 5
R. $6y$
O. y
T. a
W. 4
H. 3
E. x
A. u
F. m
M. $3/4$
S. $2y$
T. k
R. $3a$

THEY ARE MADE FOR TWO WRISTS

They are made for two wrists (tourists).

Page 6

E. $8x - 9$
S. $3x + 11$
O. $9x + 8$
L. $11x - 9$
A. $6x$
F. $10x - 8$
E. $7x + 7$
O. $9t + 4u$
A. $8t + 12u + 4$
I. $9t + 6u + 7$
P. $7t + 13u$
E. $4t - 8u + 4$
M. $16t + 4u$
F. $8t + u + 13$
L. $8x + 5y - 7$
E. $8x + 9y - 9$
D. $12x - 15y$
O. $10x - 7y + 13$
M. $9y + 8$
H. $12x + 17y$
T. $x + 6y$
E. $n + 4w$
M. $n + 18w + 3$
O. $3n + 10w + 12$
C. $16n - 5w$
H. $n + 10w + 6$
L. $11n - 7w + 2$
P. $7n - 2w$

HE MADE A COMPLETE POOL OF HIMSELF

(fool of himself)

Page 7

1. $19x + 18$
2. $21x + 22$
3. $20x + 29$
4. $3x + 36$
5. $29x + 6$
6. $25x + 42$
7. $13x + 30$
8. $42x + 46$
9. $20x + 53$
10. $12m + 22$
11. $13m + 49$
12. $10m + 10$
13. $15m + 35$
14. $23m + 33$
15. $19m + 54$
16. $43m + 24$
17. $39m + 73$
18. $66m + 18$

OH LAY Oh lay (olé).

Page 8

THE CLEVER COUPLE WHO GAVE THEIR BABY DAUGHTER THE NAME MARGARINE BECAUSE THEY DIDN'T HAVE ANY BUT HER
A. 81
B. 500
C. 18
D. 36
E. 150
F. 900
G. 64
H. 54
I. 48
J. 7
K. 343
L. 144
M. 324
N. 1000
O. 32
P. 360
Q. 225
R. 242

Page 9

You may wish to have students show on a separate paper how they substitute the given value for each variable and determine if it is a solution.

1. P
2. A
3. A
4. R
5. I
6. N
7. N
8. E
9. T
10. D
11. I
12. N
13. G
14. E
15. A
16. S
17. I
18. S
19. E
20. L
21. L
22. E
23. Y

PAINTING IS LEARNED EASELY

Painting is learned easely (easily).

Page 10

E. 3
O. 18
S. 25
R. 19
A. 5
I. 12
N. 15
A. 9
S. 1
G. 16
N. 24
O. 27
I. 14
R. 8
S. 6
A. 20
H. 2
O. 22
C. 13
T. 11
W. 4
T. 28
F. 17
P. 7
O. 23
C. 10
H. 26
M. 21

SHE WAS PRACTICING FOR A MOON SHOT

She was practicing for a moon shot.

Page 11

You may wish to have students write an equation for each exercise, such as $-5 + -3 = -8$.

U. -8
E. 4
H. 3
A. -20
I. -7
E. -11
S. 20
T. -45
E. 7
R. -13
B. -2
S. 0

HE IS A SURE BET

He is a sure bet (sherbet).

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Page 12

1. −8
2. 4
3. −3
4. 9
5. −11
6. 7
7. 12
8. −8
9. −3
10. 1
11. −8
12. 4
13. −3
14. −15
15. 6
16. −20
17. −5
18. −3
19. −8
20. −2
21. 4
22. 7
23. 0
24. −3
25. 7
26. −15
27. −15
28. −3
29. 7
30. 16

THEY WANTED THE PRIZE TO HAVE APPEAL

They wanted the prize to have appeal (a peel).

Page 13

W. 14
A. 11
N. −7
D. −16
O. −6
N. 17
E. 3
U. −9
G. 10
N. −2
T. 7
O. 33
R. 15
N. 0
R. 22

ONE WRONG TURN AND

I. −5
O. −6
E. 9
R. 19
E. −8
O. 3
A. −1
Y. 12
R. −20
U. −11
N. 7
T. 17
H. −10
W. −4
T. −24

YOU'RE IN HOT WATER

Page 14

1. −2
2. −37
3. 23
4. −41
5. 14
6. −662
7. 179
8. −282
9. −4
10. 0
11. −5822
12. −34 yd
13. $192.75
14. $40,200
15. −286 m
16. 17

A BAD GOLFER

Page 15

Y. −12
E. 40
O. −63
R. 48
O. −48
E. −40
S. 12
E. −64
N. −100
V. 100
L. −24
O. 24
U. −60
D. 60
U. −27
O. −120
W. 360
S. −165
T. 120
H. 0

SO EVERYONE WOULD SHOUT

E. −2400
T. 1600
O. −720
T. −64
A. −96
H. 84
L. 150
S. 64
O. −84
K. −1600
A. 600
O. −600
R. −720
C. 800
G. 720

LOOK AT THE S CAR GO

So everyone would shout: Look at the S car go (escargot).

Page 16

UNASSEMBLED SANDPAPER

D. −80
U. 189
E. −480
B. −360
A. 144
R. −125
L. −216
N. 64
M. −72
P. 10,000
S. 1500

DOORKNOB WEARING BIKINI

E. −120
G. 81
O. 130,000
A. −32
K. −900
W. −729
B. 288
D. −400
I. 400
R. −648
N. 98

Page 17

JUST BEFORE THE SET CAVED IN

H. −6
A. −60
O. 14
S. 24
I. −20
R. 66
D. −7
J. −64
C. −22
B. 10
N. −5
T. 4
U. −61
E. −1
F. 2
V. 0

IT ALWAYS GETS PUSHED AROUND

U. 7
Y. −24
E. −18
I. 16
D. −26
L. −4
O. 250
H. 21
T. −2
W. 400
N. −54
G. −8
R. 15
S. −28
P. 50
A. −9
T. −9

Page 18

E. −11
A. 5
H. −9
T. 2
E. 22
B. 9
A. −18
I. −5
E. −30
N. 17
R. 13
E. −21
A. 28
D. 10
S. 0
E. −8
I. 15
H. −32
E. −1
S. 35
T. −10
B. −6
M. −14
E. 12
G. −2
B. −24
T. 19
G. −3
C. −20
X. 25
L. 4
M. 7
Y. 11

HE BECAME THE BIGGEST LAMB DYER IN TEXAS

He became the biggest lamb dyer in Texas

Page 19

1. −5
2. −10
3. 12
4. −6
5. 20
6. −7
7. −10
8. −19
9. 4
10. −5
11. −10
12. 9
13. 2
14. −8
15. −1
16. 9
17. −7
18. 2
19. 4
20. −17
21. 0
22. −10
23. 2
24. −12
25. 9
26. −6
27. −12
28. 4
29. −3
30. −68

IT WASNT QUITE OLD ENOUGH TO BE A BUCK

It wasn't quite old enough to be a buck.

Page 20

S. −25
U. 4
E. −20
M. 26
E. 9
U. −49
L. 210
E. 16
N. −72
D. −4
W. −530
R. 6
R. −17
O. −29
A. −9
L. 900
N. −36
F. 8
S. −10
E. −81
H. −96
T. 18
N. −11
O. 2
E. 140
U. −15
Y. −1
Y. −64
S. 20
N. −5
R. −40
O. −60

WHEN YOUR NOSE RUNS AND YOUR FEET SMELL

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Page 21

A WOODEN PANCAKE

LOOKING AT MILK

WIZARD OF GAUZE

D. −34
E. −17
F. −54
I. 49
R. −5
A. −22
P. 13
L. 336
T. −29
U. −360
G. −12
M. 18
Z. −45
K. 1328
C. −144
O. −2
N. 25
W. 11

Page 22

1. $6x$
2. $-8y$
3. $-5x$
4. $11y$
5. $-9x$
6. $16y$
7. $9x$
8. $5y + 4$
9. $-3x + 7$
10. $-6y - 4$
11. $10x - 6$
12. $8x - 3y$
13. $6x + y - 3$
14. $-x - 2y + 7$
15. $6x + 7y + 9$
16. $x - y - 12$
17. $5x - 10y + 6$
18. $-4x + 4y - 9$
19. $-3x - 4y + 11$
20. $-3x + 4y - 7$
21. $7x - 6y + 9$

A LOWHA

a low ha (aloha)

Page 23

This puzzle is designed to encourage students to simplify the expression *before* evaluating it. You might need to help them with the directions.

1. 24
2. 17
3. −41
4. 20
5. 48
6. −58
7. −52
8. 40
9. 64
10. −12
11. −32
12. 43
13. −25
14. −16

A WRECKED TANGLE

A wrecked tangle (rectangle)

Page 24

1. E
2. H
3. Y
4. T
5. O
6. N
7. W
8. L
9. C
10. A
11. L
12. M
13. I
14. H
15. X
16. A
17. Y
18. R

THEY NOW CALL HIM X RAY

They now call him x Ray.

Page 25

1. $11x - 8$
2. $-7x + 4$
3. $3x - 21$
4. $3x - 9$
5. $17x - 38$
6. $7x - 29$
7. $-4x + 68$
8. $-40x + 23$
9. $-16x - 30$
10. $17x + 12$
11. $-23x - 32$
12. $13x + 15$
13. $4x + 27$
14. $-12x + 4$

SIGN A PARTITION

Sign a partition (petition).

Page 26

This puzzle is designed to encourage students to simplify the expression *before* evaluating it. You might need to help them with the directions.

1. E.6
2. A.31
3. T.−41
4. A.50
5. 1.11
6. T.54
7. A.−42
8. T.−8
9. W.68
10. H.−48
11. T.49
12. C.26
13. L.24
14. C.48

WITH A CATTLE ACT

With a cattle act (Cadillac)

Page 27

You may wish to discuss the meaning and/or derivation of some of these formulas with your students.

1. 416
2. 210
3. 47
4. 170
5. 620
6. 78.4
7. 288
8. 378

VERY RUGGED

Very rugged

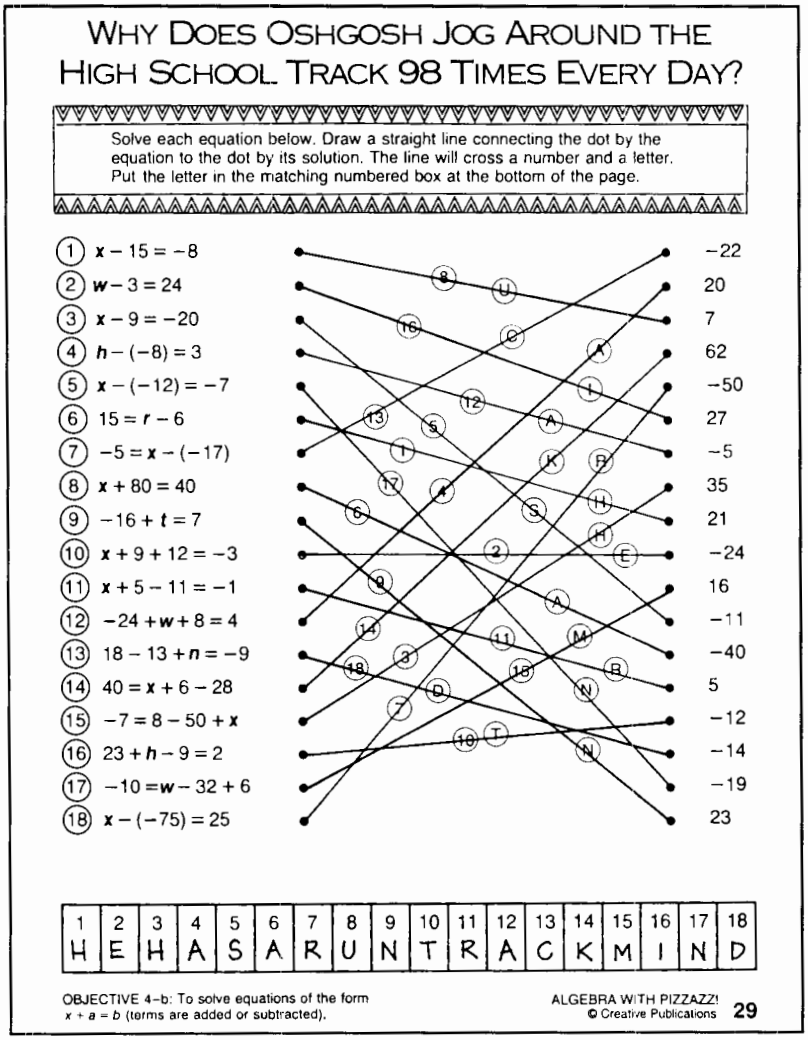
Page 28

1. −11
2. 18
3. 4
4. −5
5. 24
6. −9
7. −6
8. 12
9. 22
10. 46
11. 80
12. −17
13. 39
14. −24
15. −65
16. 75
17. 27
18. −13
19. 100
20. −30

HAVE YOU SEEN THE NEW PEN THAT WRITES UNDER-WATER, UPSIDE DOWN, IN OUTER SPACE, AND ALSO LOTS OF OTHER WORDS?

Page 29

He has a run track mind
(one-track).



Page 30

1. 12
2. 9
3. −8
4. −15
5. 33
6. −36
7. 44
8. 14
9. 27 ft
10. 23
11. $580
12. 11° C
13. 29
14. −35 m

QUESTIONABLE
Question a bull

Page 31

THE LADY WHO SPENT TEN THOUSAND DOLLARS ON A FUR COAT BECAUSE SHE WANTED TO BE THE MISS IN LYNX

A. 32
B. 55
C. −18
D. −70
E. 3
F. 7
G. −11
H. −25
I. 16
J. 27
K. −9
L. 64
M. −78
N. 36
O. 5
P. −4
Q. 6
R. −8
S. −20
T. 10

Page 32

EN 5 2/3
NG −2 1/2
AL 63
BS −180
IN 48
GH 2/5
LY −13
HE −7
YS 3/4
RE −1/10
TC 5/6
JO 90
SW 10
NI −1 2/3
GI −18
LU −3 3/10

HE REALLY ENJOYS SWINGING NIGHTCLUBS

Page 33

1. VINYL RESTING PLACE
2. CHEEPERS BY THE DOZEN

R. −7
O. −45
I. −72
B. 4 1/4
S. −2 6/7
C. −8 1/3
G. 4 4/9
A. 18
T. −6 2/3
D. −5 1/3
V. 8 3/4
H. −7 1/2
L. −10 1/2
Z. 2 1/3
Y. −2/3
N. 2/15
E. −2/7
P. −1 1/10

Page 34

JIMMY D LOCK
EVA LU SHUN
PHIL T HANS

O. 6
A. −2
S. −6
P. −9
Y. −25
I. −13
N. 12
C. 5
E. −1
K. −4
U. 17
J. 10
V. −11
M. −7
D. 8
H. 25
T. −8
L. 72

Page 35

1. 1/3
2. −3/5
3. 1 1/4
4. −2 1/2
5. 1 2/3
6. 5 1/2
7. −3/4
8. −8 1/3
9. −2 2/5
10. 1/6
11. 3 1/5
12. −2 2/3
13. 7 1/2
14. −1/4
15. 8

(HE) BURNED HIS LIPS ON (THE) EXHAUST PIPE
He burned his lips on the exhaust pipe.

Page 36

1. 12
2. 56
3. −36
4. 2 1/5
5. −2 1/2
6. −14
7. −55
8. −1 2/3
9. −3 3/4
10. −48
11. 10
12. 84
13. −1 3/5
14. 64
15. 0
16. 3 1/3

HE WAS CHILLING TWO BIRDS WITH ONE CONE
He was chilling (killing) two birds with one cone (stone).

Page 37

1. 15
2. −21
3. 60
4. −36
5. −3
6. 96
7. 35
8. 11
9. 22
10. 12
11. 76
12. 320
13. 72

LOOK AT THE ORANGE MAMA LAID
Look at the orange Mama laid (marmalade).

Page 38

I see ivy.

Page 39

THE COMEDIAN WHO INCORPORATED HIMSELF AND BECAME A LAUGHING STOCK

A. 13.5
B. 540
C. 65
D. 5/6
E. 35
F. 30
G. 83
H. 43.6
I. 13
J. 21 1/3

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Page 40

1. 4
2. -3
3. 10
4. -2
5. 5
6. 8
7. -1
8. -7
9. 3
10. 6
11. 2
12. -4
13. -9
14. 40

SMA LLM EDI UMA TLA RGE

Small medium at large

Page 41

1. HE IS DECOMPOSING
2. BUOY MEETS GULL
3. BUSHED

O. 7
N. 3
E. 6
T. -2
I. -4
G. 21
H. 16
D. -3
P. -5
L. 11
Y. -8
C. -9
M. 20
U. 9
B. -36
S. 10

Page 42

E. 3
N. -6
A. 4
H. 10
E. -5
I. -8
T. 2
A. -16
Y. 7
S. -1
T. -12
F. 29
C. 1

THEY FASCINATE

They fascinate (fasten eight).

Page 43

1. 10, 40
2. 36, 48
3. 18, 27
4. 25, 55
5. 16, 47
6. 81, 11
7. 142
8. $48, $144
9. 12, 66
10. 87 min

ROLLING IN THE ISLES

Rolling in the isles (aisles)

Page 44

1. 11, 66
2. 13, 23
3. 69
4. 20, 159
5. 33 m, 51 m
6. 1.6 kg
7. 35 kg, 65 kg
8. 9, 45, 7
9. 16, 32, 36
10. $237
11. 35°, 60°, 85°

HES ALL RIGHT NOW

He's all right now.

Page 45

1. 12 cm, 36 cm
2. 35 m, 40 m
3. 33 cm, 45 cm
4. 4 cm, 26 cm
5. 30 cm, 15 cm, 31 cm
6. 3 m, 11 m, 12 m
7. 10 m, 6 m, 9 m
8. 150 m, 150 m, 270 m

TAKE THE SHORTEST ROOT.

Take the shortest root (route).

Page 46

1. 9 m by 27 m
2. 30 cm by 36 cm
3. 15 m by 23 m
4. 16 cm, 21 cm, 32 cm
5. 29 cm, 18 cm, 33 cm
6. 36 m by 54 m

IT WAS AN ACHER

(an acre).

Page 47

E. 22, 23
A. -15, -14
B. 15, 16, 17
O. -50, -49, -48
E. 32, 34
A. 22, 24, 26
K. -45, -43
H. 11, 13, 15, 17
O. 20, 22
T. 16, 18, 20
K. 9, 11, 13
R. 24, 25, 26

HE TOOK A BRAKE

Page 48

Students often need extra help understanding the method used in exercises K and T.

1. INTENTLY
2. FLUENTLY
3. WICKEDLY

D. 3
E. -5
U. -1
C. 8
Y. 2
W. -7
I. -9
K. 20
T. 10
F. 90
L. 50
N. 12

Page 49

These problems are challenging. You may wish to use them as class exercises.

1. 13, 21, 36
2. 14, 9, 29
3. 32
4. 31, 62
5. 95
6. 24, 20

THAT IS NOT TEA

That is not tea (naughty).

Page 50

1. 16, 32
2. 15, 28
3. 7, 21
4. 5, 13
5. 34, 10
6. 10, 14
7. 24, 18
8. 30, 60

ALUNATICK

A luna tick

Page 51

1. 15
2. 8
3. 6
4. 31, 17
5. 22
6. 4, 20
7. 3, 7, 14

HE KEPT POPPING OUT OF BED

Page 52

1. 48 cm
2. S126
3. 270
4. 15 m, 53 m
5. 5, 7, 9
6. 3, 14
7. 75, 120
8. 34 cm
9. 12
10. -6, -5
11. 40 cm

MINDING THEIR MANORS

Minding their manors (manners)

Page 53

S. -44
N. 16
I. -66
S. -1000
L. 250
E. 12
A. 18
S. -8
T. -720
E. 4900
I. -20
S. -1
A. -50
S. 360
H. -36
R. -125
Y. -48
G. 3
I. -144
E. 999
W. -2
K. -14
T. 33
R. 1

SHE IS ALWAYS STRIKING TREES

She is always striking trees.

Page 54

THE FROG WHO MOVED TO PARIS JUST SO HE COULD ORDER A HAMBURGER WITH FRENCH FLIES

A. 2/3
B. -4/5
C. 1 1/2
D. 3 1/5
E. -1 1/3
F. 2 2/9
G. -4 1/2
H. 6
I. 1/7
J. 2 3/4
K. -1 3/5
L. 1 5/6
M. -4
N. -3 1/3
O. -1/8
P. 0

Page 55

1. -1 2/5
2. 2/3
3. 18
4. -88
5. 15
6. -8
7. 3 1/2
8. -6 2/3
9. -84
10. 1/3
11. -2 3/4
12. 30
13. 1 5/6
14. -10 1/2
15. 35
16. -1

YOU CANT HAVE YOUR KAYAK AND HEAT IT TOO

You can't have your kayak (cake) and heat (eat) it, too.

Page 56

1. 2
2. -15
3. 4
4. 9
5. -6
6. -3
7. 12
8. -1
9. -5
10. 16
11. -8
12. 7
13. 0

IT IS TACKS FREE

It is tacks free (tax free).

Page 57

1. 9, 63
2. 16, 27
3. 64
4. 60, 160
5. 112 cm, 88 cm
6. $7320
7. 21, 168, 18
8. 12, 72, 77
9. 17 km
10. 27, 20, 40

HE GOT BUCK TEETH.

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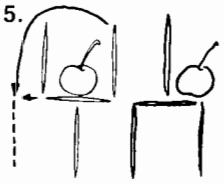
Page 58

You may prefer to use these questions one at a time.

1. Jerry, Barry, Terry
2. 20 pounds
3. 64
4. 7
5. 
6. 39°
7. 288
   × 2

   576
8. 40 chickens, 30 pigs

Page 59

1. E
2. N
3. S
4. T
5. E
6. U
7. R
8. E
9. I
10. T
11. H
12. U
13. F
14. T
15. T
16. N

IN THE FUTURE TENTS

In the future tents (tense)

Page 60

1. L
2. A
3. S
4. E
5. D
6. U
7. M
8. C
9. H
10. T
11. B
12. V
13. O
14. R

SO HE COULD BECOME A TRAVEL BURRO

So he could become a travel burro (bureau)

Page 61

You may wish to have students write exercises T–S in vertical format.

T. $7x \cdot 8$
I. $8x \quad 11$
O. $9x^2 \quad 2x + 8$
S. $x^2 - 6x + 3$
N. $9x^2 + 8x + 7$
U. $5x^2 - 3x \quad 11$
I. $9x^3 - 8x^2 - 4x$
T. $4x^3 + 5x^2 + 5x - 11$
O. $x^2 + 3x + 8$
S. $-4x^4 \cdot 2x^2 - 10$
N. $-4x^4 - 6x^3 - 6x - 1$
J. $5x^2 - 5xy - 3y^2$
A. $8x^2y + 6xy^2$
T. $3x^3y - 6x^2y^2 + xy^3$

ITS JUST A NOTION

It's just an ocean.

Page 62

1. AN ITALIAN INSECT
2. A HAPPY CONTAINER

1. L
2. H
3. E
4. R
5. C
6. Y
7. O
8. I
9. P
10. S
11. A
12. T
13. N

Page 63

For the puzzles on pages 63–66 encourage students to write each answer BEFORE trying to locate it in the answer column.

E. x^7
O. $3x^3$
T. $6x^3$
I. x^6
A. $-3x^6$
H. $4x^3$
E. x^9
R. a^3b^3
A. $6a^4b^2$
G. $-4a^2b^4$
E. $5a^6b^4$
T. $-4a^4b^4$
N. $-12a^3b^7$
O. $12a^2b^8$
T. $6u^3v^3$
E. u^4v^4
I. $-8u^6v^4$
A. $6u^5v^3$
L. $6u^7v^7$
G. $8u^6v^2$
V. u^3v^7
L. $9a^2b^5$
Y. $-9a^2bc^3$
E. $-a^3b^3c^3$
O. $9a^2b^2c^2$
T. $-a^3b^5c^2$
H. $9a^3b^3c^5$
N. ab^3c^2

THEY ARE GOING TO HAVE A LITTLE ONE

Page 64

1. H
2. E
3. G
4. E
5. T
6. S
7. S
8. P
9. L
10. I
11. N
12. T
13. E
14. R
15. S
16. I
17. N
18. H
19. I
20. S
21. T
22. O
23. N
24. G
25. U
26. E

HE GETS SPLINTERS IN HIS TONGUE

He gets splinters in his tongue

Page 65

T. 13
N. 5
S. 16
I. 1
L. 8
A. 18
E. 11
T. 6
Y. 19
D. 2
I. 15
A. 9
I. 3
T. 12
W. 17
D. 4
H. 14
N. 10
P. 7

I DIDNT PLANET THIS WAY

I didn't planet (plan it) this way.

Page 66

SH EM IS LA ID IT

She mislaid it.

Page 67

1. ED
2. EC
3. OU
4. SW
5. OR
6. HE
7. LD
8. TB
9. OU
10. RN
11. EH
12. ND
13. WA
14. EF
15. AR
16. OU
17. TU
18. IP

HE WAS WIPED OUT BEFORE HE COULD TURN AROUND

He was wiped out before he could turn around.

Page 68

Encourage students to write out each answer BEFORE trying to locate it in the answer column.

1. S
2. L
3. U
4. A
5. R
6. G
7. H
8. A
9. L
10. E
11. Y
12. N
13. E
14. I
15. F

HES REALLY A FUNGI

He's really a fungi (fun guy).

Page 68

1. E
2. U
3. B
4. A
5. N
6. S
7. O
8. R
9. E
10. T
11. N
12. I
13. N
14. I
15. D
16. R
17. A
18. T

ITSACHEW

It's a chew (achoo)

Page 70

1. 6
2. 12
3. 5
4. 15
5. 4 cm by 7 cm
6. 10 cm by 12 cm
7. 6 m by 10 m
8. 18 cm by 20 cm
9. 8 cm by 14 cm

BOT HCR EWS WER EMA ROO NED

Both crews were marooned.

Page 71

You may wish to discuss the meaning and/or derivation of some of these formulas with your students.

1. 288
2. 252
3. 600
4. 260
5. 100
6. 2.4
7. 376.8

MT RU SH MO RE

Mt. Rushmore

Page 72

For additional practice, you may wish to have students solve these formulas for other letters.

1. O
2. I
3. T
4. S
5. L
6. I
7. E
8. B
9. T
10. K
11. U
12. F
13. U
14. Y
15. R
16. E
17. A
18. Y
19. W
20. D

BUY A DEW IT YOURSELF KIT

Buy a dewit (do it) yourself kit.

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Page 73

1. 18, 6
2. 9, 12
3. 22, 8
4. 14, 22
5. 7, 9
6. 12, 20
7. 210, 130
8. 9, 4, 2

SH EP AS SE DT HE BU CK

She passed the buck.

Page 74

1. 3 h
2. 4 1/2 h
3. 2 1/2 h
4. 2 h
5. 10 h
6. 8 h
7. 1 h
8. 30 km

AN ON IO NR OL LS

An onion Rolls

Page 75

A. 6 h
O. 1.5 h
N. 3 h
C. 54 km
A. 84 km/h
Y. 850 km/h
S. 48 km
U. 1200 km
C. 45 km

O SAY CAN UC

Page 76

1. T
2. H
3. E
4. Y
5. A
6. R
7. E
8. T
9. H
10. I
11. N
12. G
13. S
14. T
15. O
16. A
17. D
18. O
19. R
20. E

THEY ARE THINGS TO ADORE

They are things to adore (a door).

Page 77

1. O
2. 2
3. 4
4. S
5. A
6. B
7. L
8. 8
9. N
10. A
11. E
12. O
13. N
14. R
15. S

THE TUBA 4

The tuba 4 (two-by-four)

Page 78

1. x^3
2. $4x^3$
3. $-4x$
4. $-5x^5$
5. a^3b^5
6. $2ab^4$
7. $5a^3b^3$
8. $-12a^5b$
9. x^3y^3
10. $3x^2y^6$
11. $-2x^7$
12. $3y^2$
13. $-3u^2v$
14. $-2uv^3$
15. $11v^2$
16. $-3u^2v^{11}$

HE HAD A LOCOMOTIVE

He had a loco motive.

Page 79

1.	2n	$-4n^3$
2.	$-6xy$	$3x^2y^2$
3.	$-12ab$	a^3b
4.	$2u^2v^4$	$-4uv^3$
5.	pq^2	$-2pq^3$
6.	$24k^2w^2$	$-8w^2$
7.	$30m$	$-6mn^5$
8.	$-3xyz$	$9xy^2z^3$
9.	$-abc^3$	$9bc^2$

IT HAD A YACHT TO OFFER

It had a yacht (lot) to offer.

Page 80

For all factoring puzzles, encourage students to write out each answer BEFORE trying to locate it in the answer column.

1. A
2. O
3. E
4. F
5. D
6. A
7. O
8. M
9. F
10. R
11. G
12. N
13. R
14. P
15. W

FROM A FROG PAWNED

From a frog pawned (pond)

Page 81

1. EXTRA DRUMSTICKS
2. A COAT OF ARMS

1. U
2. D
3. O
4. K
5. E
6. I
7. C
8. X
9. F
10. M
11. T
12. A
13. S
14. R

Page 82

1. H
2. E
3. H
4. A
5. D
6. A
7. L
8. O
9. V
10. E
11. L
12. Y
13. F
14. I
15. N
16. I
17. S
18. H

HE HAD A LOVELY FINISH

Page 83

You may wish to have students write the correct product for each false statement.

3-S
9-A
16-E
6-T
14-O
7-I
12-E
1-Y
5-U
11-T
4-B
2-E
8-C
15-P
10-N
13-L

YES BUT I CANT ELOPE

Yes, but I can't elope (cantaloupe).

Page 84

I. 6
D. 15
E. 13
N. 24
A. 4
O. 17
E. 2
A. 8
N. 18
H. 1
I. 20
E. 10
S. 5
I. 22
W. 3
E. 11
O. 23
N. 7
T. 21
C. 16
W. 9
D. 19
K. 12
N. 14

HE WAS IN A WEEKEND CONDITION

He was in a weekend (weakened) condition.

Page 85

8-S
13-E
10-A
18-G
14-D
20-A
2-E
4-L
5-W
15-A
1-H
6-A
11-N
7-Y
21-C
3-A
12-T
16-B
9-W
22-K
17-I
19-M

HE ALWAYS WANTED A BIG MACK

Page 86

E. 9
O. 2
S. 13
L. 6
T. 10
U. 12
O. 18
E. 15
U. 3
L. 7
Y. 1
W. 4
S. 21
I. 5
D. 16
O. 19
G. 8
M. 20
H. 14
R. 17
M. 11

YOU WILL GET MUSHED ROOMS

You will get mushed rooms (mushrooms).

Page 87

1. HE
2. SF
3. ST
4. NT
5. HE
6. DS
7. HI
8. OR
9. WA
10. IN
11. AV
12. OD

HE WANTS THE ODDS IN HIS FAVOR

Page 88

For all factoring puzzles, encourage students to write out each answer BEFORE trying to locate it in the answer column.

1. S
2. T
3. E
4. G
5. A
6. O
7. L
8. E
9. F
10. A
11. U
12. T
13. G
14. O
15. N
16. I
17. T
18. R

BUYNOMEAL

Buy no meal (binomial).

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Page 89

THE CAT WHO JOINED THE RED CROSS BECAUSE IT WANTED TO BE A FIRST AID KIT

Page 90

1. W
2. H
3. E
4. N
5. H
6. E
7. S
8. I
9. T
10. S
11. O
12. N
13. T
14. H
15. E
16. T
17. H
18. R
19. O
20. W
21. N

WHEN HE SITS ON THE THROWN

When he sits on the thrown (throne)

Page 91

For each exercise, students must find one factor in each column of binomials. This format discourages "working backwards" from the answers. Students may need some help getting started.

1. $(3x + 1)(x + 2)$
2. $(2x + 3)(x + 1)$
3. $(3x - 1)(x - 5)$
4. $(7x - 2)(x - 1)$
5. $(2u + 1)(3u + 1)$
6. $(8u - 1)(u - 1)$
7. $(2u + 3)(5u + 1)$
8. $(3u - 2)(3u - 1)$
9. $(5u + 6)(u + 1)$
10. $(3n - 1)(n + 1)$
11. $(5n + 1)(n - 1)$
12. $(2n - 1)(n + 3)$
13. $(7n + 1)(n - 2)$
14. $(3t - 1)(t + 5)$
15. $(4t - 7)(t - 1)$
16. $(6t - 1)(t + 1)$
17. $(3t + 1)(t - 7)$

ROOMERS WERE FLYING

Roomers (rumors) were flying.

Page 92

You might emphasize to students that they should cross out TWO boxes for each exercise.

1. $(6x + 1)(x + 3)$
2. $(5x + 1)(x - 2)$
3. $(3x + 1)(3x + 4)$
4. $(7x + 8)(x - 1)$
5. $(2x - 5)(x - 8)$
6. $(5m + 3)(3m + 2)$
7. $(8m + 3)(m - 1)$
8. $(4m - 9)(m - 2)$
9. $(14m - 11)(m + 2)$
10. $(3m \quad 10)(m + 3)$

DO YOU WANT TIBET

Do you want to bet?

Page 93

This puzzle is similar to the one on page 91. Students must find one factor in each column of binomials.

1. $(2n + 7)(2n - 7)$
2. $(n + 6)(n + 2)$
3. $(n - 4)(n - 5)$
4. $(n + 8)(n + 8)$
5. $(n + 5)(n - 3)$
6. $(3n - 5)(n - 1)$
7. $(a + 7)(a - 3)$
8. $(5a - 1)(a + 2)$
9. $(2a + 5)(a + 3)$
10. $(1 - 3a^2)(1 + 3a^2)$
11. $(a - 5)(a - 6)$
12. $(5a + 1)(2a - 1)$
13. $(8u + 3)(u + 2)$
14. $(5u - 2)(5u - 2)$
15. $(3u - 14)(u + 1)$
16. $(u + 3)(u - 7)$
17. $(3u + 10)(2u - 1)$
18. $(2u + 9)(u - 2)$

BY FORMING CARP POOLS

By forming carp pools (car pools)

Page 94

1. O
2. E
3. N
4. O
5. C
6. H
7. N
8. O
9. T
10. P
11. R
12. C

CORN ON THE COP

Corn on the cop (cob)

Page 95

LOSE THEIR APPEAL

GO DOWNHILL

1. T
2. A
3. D
4. E
5. S
6. W
7. I
8. G
9. R
10. H
11. N
12. O
13. P
14. L

Page 96

THE MAN WHO HUNTED BEAR UNTIL THE FOREST RANGER MADE HIM PUT ON CLOTHES

Page 97

No rearrangement of terms is needed in order to factor by grouping.

1. N
2. A
3. 4
4. E
5. B
6. R
7. I
8. L
9. T
10. P
11. N
12. G

WITHEASE

With ease (e's)

Page 98

1. R
2. A
3. N
4. T
5. S
6. E
7. F
8. H
9. U
10. I
11. D
12. L
13. O
14. W

THEIR WINDOWS FALL OUT

Page 99

1. R
2. N
3. O
4. S
5. A
6. H
7. I
8. B
9. F
10. T
11. E
12. L

THERES BEEN LESS INFLATION

There's been less inflation.

Page 100

1. SR
2. UI
3. EF
4. LL
5. AN
6. TH
7. TE
8. YQ
9. AT
10. UL
11. EA
12. EY

THATS REALLY QUITE AN EYEFUL

That's really quite an eyeful (Eiffel).

Page 101

THE REASON WHY ESCAPED BANK ROBBERS ALWAYS RUN TO CANADA IS BECAUSE THAT IS THE ONLY PLACE THEY HAVE TORONTO (to run to).

Page 102

1. I
2. C
3. O
4. Y
5. L
6. S
7. J
8. R
9. B
10. F
11. A
12. E
13. N
14. T

TENNIS BALL FACTORY REJECT

Page 103

THE NOVICE WATER POLO PLAYER WHO WAS UPSET BECAUSE HIS HORSE COULD NOT SWIM

Page 104

HE GOT A BIG HAND

Page 105

Students may find these problems challenging, especially 6-10. Most students will need to see an example like problem 7 before they try the last four problems. You may split the page into two separate assignments.

1. 2 or 4
2. 5 or -3
3. 3/2 or -2
4. 5/2 or $-5/2$
5. 7, 8, or -8, -7
6. 5, 7
7. 4, 5 or -5, -4
8. 3, 5
9. 6, 8 or -8, -6
10. 4, 5, 6

CLIPSEW

Clip sew (calypso)

Page 106

Solutions for these problems represent physical dimensions, so students should reject negative solutions.

THE CROOKED FURNITURE DEALER WHO BUYS HOT WATERBEDS

A. 7 cm by 10 cm
B. 8 cm by 12 cm
C. 5 cm by 9 cm
D. 5 m
E. 8 m
F. 7 m by 8 m
G. 5 m by 12 m
H. 6 m by 8 m

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Page 107

1. 2
2. 1/7
3. $x - 2$
4. $\frac{x + 5}{3}$
5. $\frac{x + 4}{x - 9}$
6. $\frac{n + 2}{n - 3}$
7. $\frac{n - 4}{n + 1}$
8. $\frac{n + 9}{n + 2}$
9. $\frac{4}{n - 1}$
10. $1/n$
11. 2/5
12. $\frac{b + 7}{2(b + 3)}$
13. $\frac{3}{2(b - 5)}$
14. $\frac{b + 2}{2b - 1}$
15. $\frac{6b^2}{b + 5}$

ATAILGATOR

A tail gator (tailgater)

Page 108

The last four exercises involve polynomials in two variables.

1. A SICK CHUTER
2. JUST BARGE IN
1. R
2. H
3. A
4. N
5. E
6. I
7. J
8. T
9. K
10. U
11. C
12. S
13. G
14. B

Page 109

A RHYTHMIC TICK

Arithmetic

Page 110

JUSTIN CASE

LES DANCE

I I SERR

1. T
2. A
3. U
4. R
5. L
6. C
7. D
8. I
9. J
10. E
11. N
12. S

Page 111

1. H
2. D
3. E
4. I
5. G
6. L
7. S
8. N
9. T
10. O

SIGN ON THE DOTTED LION

Sign on the dotted lion (line).

Page 112

1. EB
2. EN
3. TH
4. HL
5. EY
6. OT
7. AR
8. DS
9. EG

THEY ARE BOTH LEGENDS

They are both legends (leg ends).

Page 113

1. U
2. E
3. T
4. I
5. D
6. W
7. S
8. L
9. A

IT WAS ASSAULTED

It was assaulted (a salted).

Page 114

These exercises are challenging.

1. R
2. A
3. Y
4. S
5. O
6. B

UCLA

(You see L.A.)

Page 115

1. VARIABLE
2. EQUATION
3. SOLUTION
4. DISTRIBUTIVE
5. FORMULA
6. COEFFICIENT
7. OPPOSITE
8. RECIPROCAL
9. FACTOR
10. POWER
11. POLYNOMIAL
12. BINOMIAL
13. PRIME
14. INTEGERS
15. QUADRATIC

TO PROVIDE BETTER QUARTERS

To provide better quarters

Page 116

You may prefer to use these questions one at a time.

1. A, B, C
2. 2178
   x 4
   8712
3. Monday
4. 3:36 P.M.
5. 7 1/2 ft
6. Rollo
7. Answers will vary.
8. a) 33
   b) 59

Each difference is the sum of the digits of the preceding number.

Page 117

1. G
2. R
3. I
4. A
5. C
6. M
7. K
8. U
9. O
10. H
11. S
12. T

A THOUGHT STRUCK HIM

Page 118

1. $n/2$
2. $\frac{2n}{3}$
3. $\frac{31n + 21}{12}$
4. $\frac{13n + 4}{6}$
5. $\frac{n - 3}{2}$
6. $2n$
7. $\frac{19x - 4}{18x}$
8. $\frac{3x + 1}{6}$
9. $\frac{23x - 29}{15x}$
10. $\frac{2(5x + 4)}{3x}$
11. $\frac{9x - 2}{5x}$
12. $\frac{4x + 9}{15}$

A CLAM SHOUTER

Page 119

1. S
2. Y
3. A
4. E
5. I
6. K
7. W
8. R
9. D
10. T

IT WAS A DIRTY TREK

It was a dirty trek (trick).

Page 120

1. DCA
2. THE
3. EST
4. WHI
5. ERM
6. BIR
7. TCH
8. RLY
9. HEG

THE WHIRLY BIRD CATCHES THE GERM

The whirlybird (early bird) catches the germ (worm).

Page 121

1. O
2. A
3. E
4. W
5. I
6. H
7. B
8. N
9. R
10. S

HE HAS SNOW BRAINS

He has no brains.

Page 122

The last four exercises are more challenging. Many students will need to see an example like G or H before they can do these.

THE DRIVING TEACHER WHO DECIDED TO GRADE ON THE CURVE

Page 123

1. SK
2. HU
3. TH
4. ST
5. BE
6. NT
7. HE
8. OT
9. SH

ATRAINHITHIM

A train hit him.

Page 124

1. C
2. R
3. I
4. E
5. S
6. H
7. W
8. T

SWITCH HITTERS

Page 125

It is important that students discriminate between ratios in which units of measure can and cannot be cancelled (rates). Parts I and II of this puzzle correspond to these two kinds of ratios. Notice that in Part I, answers are in fraction form; in Part II, answers are in decimal form.

S. 1/6
A. 9/2
O. 3/8
H. 7/4
E. 3/20
D. 4/1
Y. 2/25
A. 8/5
W. 24/1
E. 5/6
T. 2/3
A. 5/3
S. 2/13
E. 24/25
V. 20
Y. 22.5
S. 400
L. 32
N. 7.5
H. 0.3
C. 6.2

THEY ALWAYS HAVE SECONDS

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Page 126

1. 40, 16
2. 45, 105
3. 45, 20
4. 375, 625
5. 14, 21, 35
6. 96, 36, 48
7. 24, 18, 6
8. 8, 8, 12, 24, 28
9. 32, 48

NO HE JUST GRAZED THEM

No, he just grazed them.

Page 127

TILLIE N DATIME

(Till the end of time)

GORDON BLUDDY

(Gored and bloody)

U. 21
E. 32/3
Y. 8/9
O. 33/16
G. 5/8
I. 20/3
B. 38/7
N. −12
A. 12/7
M. 15
R. −43/4
T 84/5
D. 11/4
L. −3/2

Page 128

1. 210
2. 112.5
3. 125
4. 43.2
5. 6.8
6. 13
7. 2150
8. 9600

ITSDOGONICE

It's dog on ice (doggone nice).

Page 129

1. A FORGET ME GNAT
2. FROSTBITE

G. 30/7
I. 20
O. 9/4
S. 11/2
A. 1/2
E. −2
M. 23
B. −5/4
R. −17/15
N. 5
F. −4
T. 1

Page 130

1. 18
2. 40
3. 30
4. 12
5. 68, 70
6. 8, 9
7. 9, 18
8. 100

BE A LITTLE BOULDER

Be a little boulder (bolder).

Page 131

THE CROSS EYED COLLEGE PROFESSOR WHO HAD NO CONTROL OVER HIS PUPILS

A. 3
B. 10
C. 3/4
D. −4
E. 7/2
F. −1/2
G. −8
H. 7
I. −11/3
J. 1
K. 8/3
L. −2

Page 132

1. −2
2. 4/3
3. −1/2
4. 6, −2
5. 6, 1
6. 1/2, 3
7. −7, 3
8. −1 (7 is an extraneous solution.)
9. −3, 1

SISBOOMBAH

Sis boom bah

Page 133

You may wish to have students use calculators for all puzzles involving percent.

S. 16.08
I. 0.37
H. 1.5
N. 77
T. 52.2
U. 0.255
W. 30
A. 4.25
I. 0.07
E. 6
S. 175
A. 0.099
I. $37.95
C. 1050
V. $590
N. $238
L. $1630

IT WAS SUCH A VILE INN (violin)

Page 134

You may wish to have students use calculators for all puzzles involving percent.

DETERMINED WORM CROSSING A RAZOR BLADE

N. 11.34
O. 25.2
G. 30
I. 60
T. 32
A. 7
C. 54.12
E. 11
L. 6.4
W. 5
Z. 85
S. 24
B. 70
M. 45
D. 18
R. 200

Page 135

1. NAP SACK
2. WOMB MATES
3. A DOLLAR WASTED

T. 224
P. 31.2
O. 1.25
C. 15
B. 26 2/3
E. 3.5
K. 45
R. 32
D. 200
N. 225
L. 19.6
M. 140
A. 33 1/3
W. 90
S. 7000

Page 136

1. 5.70
2. 7280
3. 62 1/2
4. 43 1/3
5. 12,500
6. 40,000
7. 1.5
8. 32 1/2

HISSANDHEARSE

Hiss and hearse (his and hers)

Page 137

1. 20%
2. 13 1/3%
3. 55%
4. 6 2/3%
5. $3750
6. 215
7. 7.5%
8. $126

HE HAD A SUITE TOOTH

He had a suite (sweet) tooth.

Page 138

For additional practice, have students solve these formulas for other letters. (Use page 72 for practice with formulas having no variables in the denominator.)

1. E
2. T
3. R
4. I
5. U
6. A
7. I
8. C
9. U
10. F
11. W
12. T
13. S
14. K
15. T
16. R

A FUTURE WRIST TICK

A future wrist tick (futuristic)

Page 139

The last three exercises require splitting a sum of money into two parts. You may remind students that these can be represented as x and SUM − x.

1. 100
2. 600
3. 750
4. 200
5. $300, $600
6. $350, $550
7. $2000, $3500
8. $500, $400
9. $1200, $1800
10. $3000, $4000

ITISASLOPEUP

It is a slope up (slow pup).

Page 140

1. 1500
2. 8000
3. $2000, $5000
4. $12,000; $15,000
5. $720, $520
6. $2100, $3700
7. $6000

HE HAD TO WORK ON WICK ENDS

He had to work on wick ends (weekends).

Page 141

Exercises 1, 2, 3, and 7 represent one variation of dry mixture problems; exercises 4, 5, and 6 represent another. You might wish to use exercises 1 and 4 as examples in class.

IS — 8, 12
ES — 100, 50
RT — 1, 2
IT — 2
RI — 7
PA — 250
DG — 16, 9

IT IS PART RIDGES

It is part ridges (partridges).

Page 142

Exercises 1, 2, 3, and 4 represent one variation of liquid mixture problems; exercises 5, 6, and 7 represent another. You might wish to use exercises 1 and 5 as examples in class.

1. 24 L
2. 8 L
3. 225 g
4. 31.2 g
5. 25 L
6. 4 kg
7. 3.5 mL

HEWENTDATAWAY

He went data way (that-a-way).

Page 143

1. 1 5/7 h
2. 1 7/8 d
3. 3 3/7 h
4. 2 6/17 h
5. 6 h
6. 4 4/5 h
7. 60 d

ABRICKLAYER

A bricklayer

Page 144

HE WAS CREDITED WITH TWENTY-ONE STOLEN BASSES (stolen bases).

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Page 145

1. (2,1)(4,−5)(−1,10)
2. (0,4)(−3,−2)(3,10)
3. (3,7))(−1,−3)(1,2)
4. (0,−1)(−2,−9)(1,3)
5. (3,9)(−3,9)(−1,1)
6. (1,5)(−1,5)(−2,11)
7. (1,−1)(8,0)(−6,−2)
8. (2,5)(−2,−5)(−5,−2)

HIS MOTHER WAS A WAFER SO LONG

His mother was a wafer so long (away for so long).

Page 146

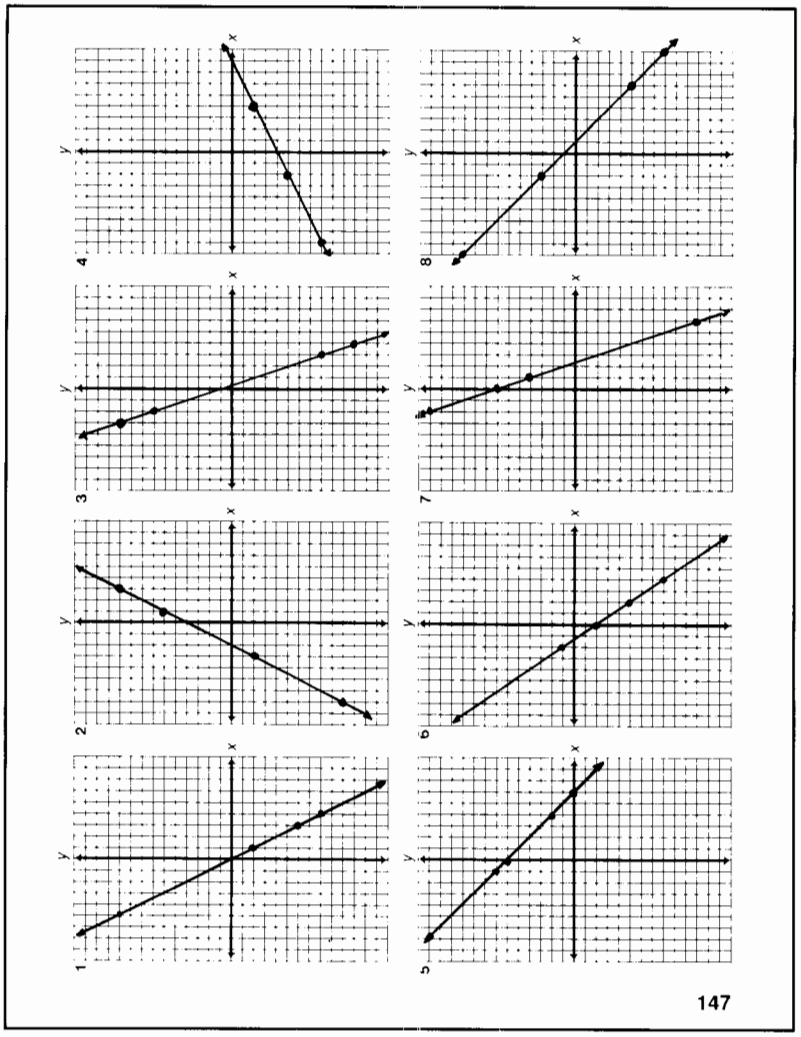
Coordinate grids suitable for graphing these functions are on page 147.

1.	−2	−8	10	−6
2.	10	−10	6	−2
3.	−8	10	−11	7
4.	1	−5	−2	−8
5.	2	7	0	6
6.	−8	−5	−2	1
7.	−11	4	7	13
8.	3	10	−8	−5

HER BROTHER SAID HE WANTED HIS PALM RED (read).

Page 147

This page is useful not only for graphing the functions on pages 146 and 149, but also for a variety of other graphing activities.



147

Page 148

1. SHE WAS A STEP DOTTER
2. A LUMBER YARD

1. P
2. O
3. W
4. E
5. Y
6. U
7. H
8. B
9. D
10. L
11. A
12. R
13. M
14. S
15. T

Page 149

You may wish to have students graph these equations. There is a suitable set of coordinate grids on page 147.

1.	3	9	−5 ROOSTER
2.	2	−4	−7 ROBINSON
3.	6	2	0 BECAUSE IT
4.	1	3	5 CREW SO
5.	10	1	−5
6.	2	0	−3
7.	−1	−8	2
8.	8	−1	−10

YOU HAVE ACID IN DE CHEST YUNN

You have acid in de chest, Yunn (indigestion).

Page 150

Coordinate grids suitable for graphing these equations are on page 151.

THE FARMER WHO NAMED HIS PET

Page 151

This page is useful not only for graphing the equations on page 150, but also for a variety of other graphing activities.

Page 152

E. 2/3
O. 4
G. 1/2
S. 3
O. 1
N. −5/2
V. −2
L. 3/7

GLOVES ON

Page 153

The objective for this page is to find the slope *not* using the graph. The first six exercises, however, review finding the slope using the graph.

1. 4/3
2. −2
3. −3/5
4. 3
5. −1/4
6. 0
7. 2/3
8. −1/3
9. 2/5
10. −3/4
11. 1/2
12. −6
13. −3/2
14. 5/3
15. 4
16. 1
17. −4/7
18. −7/2

A ROBBER DUCKY

A robber (rubber) ducky

Page 154

1. $y = 2x - 3$
2. $y = 2/3x + 1$
3. $y = -2x - 4$
4. $y = -3/2x - 1$
5. $y = 3x + 5$
6. $y = -x + 3$
7. $y = 4/3x$
8. $y = -1/4x + 2$
9. $y = -3$
10. $y = 2/5x - 5$

HE THOUGHT IT WAS DEVINE

He thought it was devine (the vine).

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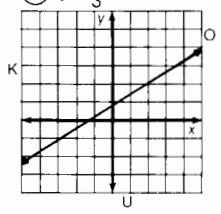
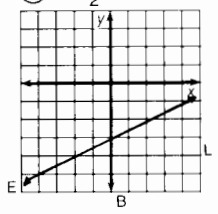
Whom Should You See at the Bank If You Need To Borrow Money?

Use the slope and y-intercept to graph each equation below. The graph, if extended, will cross a letter. Print this letter in each box that contains the number of that exercise.

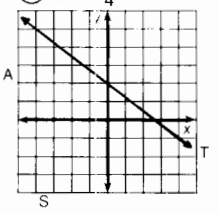
① $y = \frac{2}{3}x + 1$



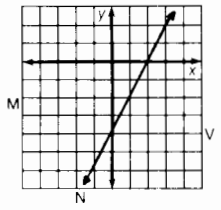
② $y = \frac{1}{2}x - 3$



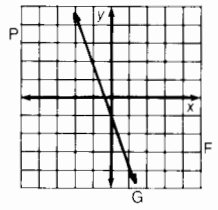
③ $y = -\frac{3}{4}x + 2$



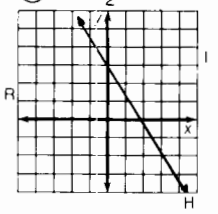
④ $y = 2x - 4$



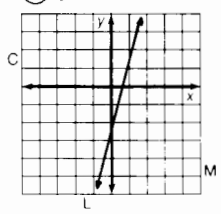
⑤ $y = -3x - 1$



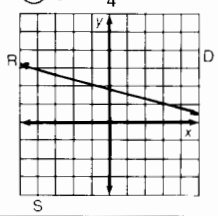
⑥ $y = -\frac{3}{2}x + 3$



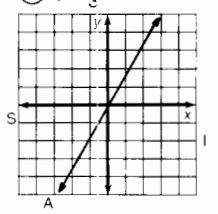
⑦ $y = 4x - 2$



⑧ $y = -\frac{1}{4}x + 2$



⑨ $y = \frac{5}{3}x$



3	6	2	7	1	9	4	9	8	8	9	4	5	2	8
T	H	E	L	O	A	N	A	R	R	A	N	G	E	R

OBJECTIVE 5 | To graph a line given its equation in slope-intercept form 155

THE LOAN ARRANGER

The loan arranger (Lone Ranger)

Page 156

O. $y = -2/5x + 2$
N. $y = -4/3x + 3$
L. $y = 2/3x - 7$
I. $y = 1/4x + 5$
A. $y = 3/5x - 1$
U. $y = -7/4x - 4$
R. $y = 2x - 7/2$
I. $y = -3x + 1/3$
S. $y = 6x - 4$
G. $y = -4/3x + 8/3$
N. $y = 5/9x + 7/9$
F. $y = 2/7x$
T. $y = 6x - 1/2$
F. $y = 1/4x + 1$
H. $y = 2/3x + 1/2$

ITS FOR HALVING FUN

It's for halving (having) fun.

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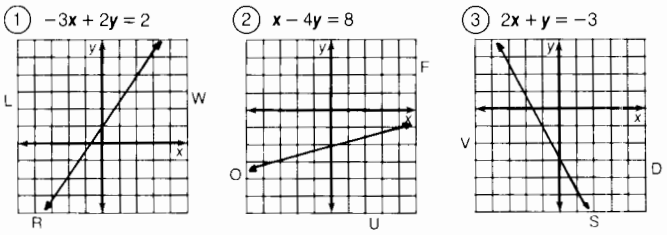
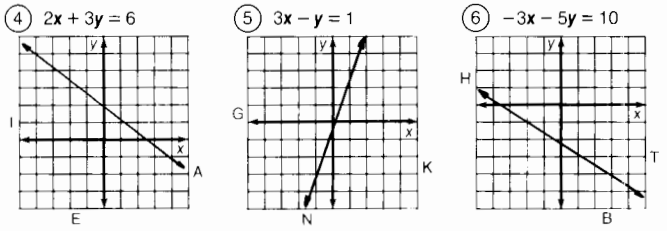
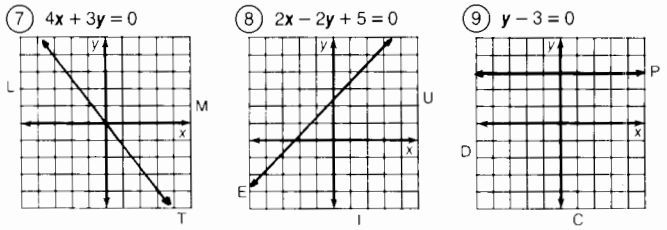
Why Does a Poor Man Drink Coffee?

Use the slope and y-intercept to graph each equation below. The graph, if extended, will cross a letter. Print this letter in each box that contains the number of that exercise.







6	8	6	4	3	5	2	9	1	2	9	8	1	7	8	4
H	E	H	A	S	N	O	P	R	O	P	E	R	T	E	A

OBJECTIVE 5.1 To graph a line given its equation (excludes vertical lines) 157

HE HAS NO PROPER TEA

He has no proper tea (property).

Page 158

SHE HAD A BUM STEER

Page 159

As an additional activity, you might have students write each equation in standard form and/or graph it.

1. R
2. O
3. M
4. E
5. U
6. H
7. I
8. F
9. J
10. T
11. L
12. S

JUST FOR THE SMELL OF IT

Page 160

1. DE
2. CT
3. TH
4. AP
5. EY
6. AR
7. ER
8. MA
9. FE
10. PE

THEY MADE A PERFECT PEAR

They made a perfect pear (pair).

Page 161

Coordinate grids for graphing these systems of equations are on page 162.

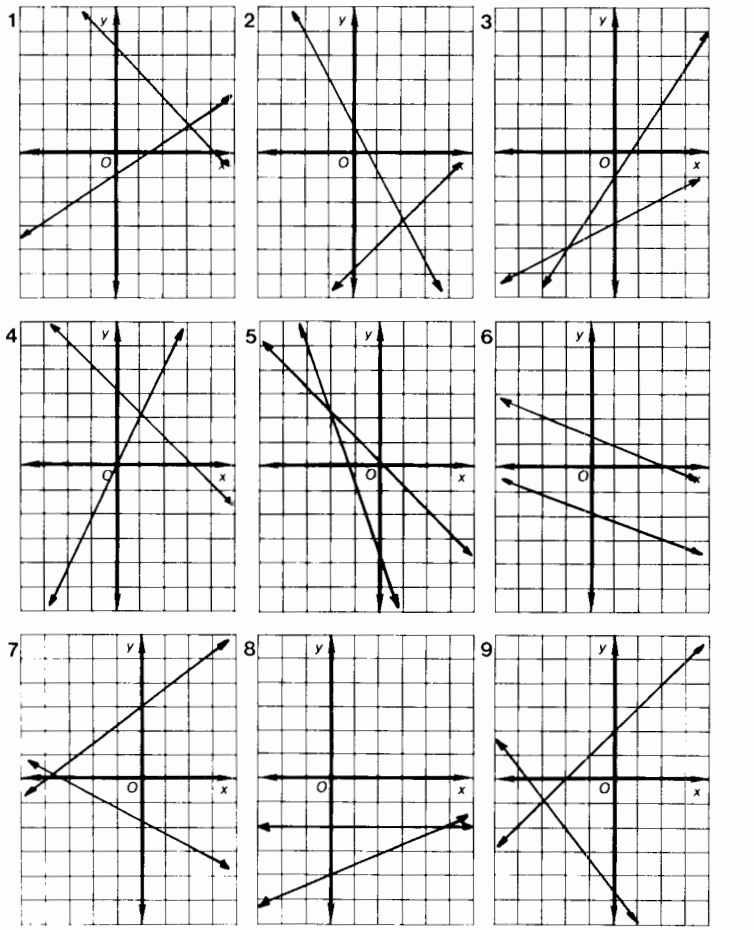
1. (3, 1)
2. (2, −3)
3. (−2, −4)
4. (1, 2)
5. (−2, 2)
6. no solution
7. (−4, 0)
8. (5, −2)
9. (−3, −1)

EGGSSPEARAMINT

Eggs spear a mint (experiment)

Page 162

This page is intended for graphing the systems of equations on page 161.



162

Page 163

1. (4, 8)
2. (5, 2)
3. (1, −3)
4. (9, 2)
5. (6, −1)
6. (5, 3)
7. (−1, 4)
8. (1/2, 7)
9. (−1/3, 4/3)
10. (−4, −3)
11. (5/2, −1/2)
12. (8, 0)

HE IS HOPING FOR WHIRLED PEAS

He is hoping for world peace.

Page 164

You might have students solve one or two of the systems by graphing in the given coordinate system. This puzzle format makes it convenient to compare the two methods of solution.

1. (3, 2)
2. (2, −1)
3. (−5, 3)
4. (0, 6)
5. (−3, −1)
6. (5, 4)
7. (−2, 0)
8. (5, −2)
9. (3, 6)
10. (1, −5)
11. (−4, 1)
12. (4, −4)

A SUDDEN DEBT PAYOFF

A sudden debt payoff (sudden-death playoff)

Page 165

1. (2, 3)
2. (−1, 4)
3. (5, −2)
4. (3, 4)
5. (1, −3)
6. (−2, −1)
7. (−4, 1)
8. (1/3, 2)
9. (−5, 3/2)
10. (0, −4)
11. (−1, −5)
12. (1/2, 0)

OPENTOAD

Open toad (open-toed)

Page 166

1. 36, 54
2. 26, 30
3. 655
4. 13, 31
5. 26, 49
6. 24, 4
7. 370, 130
8. 16, 12

SO THAT WE CAN HAVE LAWN ORDER

So that we can have lawn order (law and order)

Page 167

THE FARMER WHO FED HIS COWS BIRDSEED AND STARTED SELLING CHEEP MILK

A. (2, 3)
B. (1, −2)
C. (1, −4)
D. (−2, 4)
E. (2, 1)
F. (1, 4)
G. (−1, −2)
H. (0, 3)
I. (2, −2)
J. (−5, 0)
K. (5, 2)
L. (−1, −1)

Page 168

A. (3, 1)
I. (−1, 2)
R. (2, −3)
T. (4, 0)
A. (−1, 5)
O. (4, −2)
F. (−6, −4)
M. (1, 4)
N. (0, −5)
L. (3, 8)

A FLAT MINOR

A flat minor (miner)

Page 169

1. 12, 9
2. 24, 8
3. 13, 6
4. $5, $7
5. 18, 6
6. $1.50
7. $20, $35
8. 14

A HOT AIR BABOON

A hot-air balloon

Page 170

1.	16 km/h	4 km/h
2.	550 km/h	50 km/h
3.	8 km/h	1 km/h
4.	900 km/h	100 km/h
5.	12 km/h	4 km/h
6.	200 m/min	40 m/min
7.	325 km/h	25 km/h
8.	8.75 m/min	3.75 m/min

DECALFINATED

(decaffeinated)

Page 171

1. 19, 11
2. 13, 5
3. 26, 20
4. 9, 14
5. 38, 19
6. 16, 10
7. 15, 35

ABIGFIRE

A big fire (A "three-alarmer" is a big fire.)

Page 172

1. 36
2. 39
3. 53
4. 84
5. 28
6. 47
7. 38

PLUG INN

Page 173

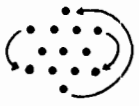
1. $60
2. $1000, $2000
3. 2 1/2 cups
4. $3000, $1500
5. $2000, $1200
6. 40, 30

AFLYINGSAWSIR

A flying saw, sir (saucer)

Page 174

You may prefer to use these questions one at a time.

1. 3 pounds
2. $\begin{array}{r} 54 \\ \times\ 3 \\ \hline 162 \end{array}$
3. 1, 2, 4, 5, 7, 10, 13. Once 3 consecutive numbers can be attained, all higher scores can be also.
4. $2.10
5. 
6. 40 inches
7. 16 cm^2
8. 0 The factor (x−x) equals 0.

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Page 175

This puzzle will help illustrate the meaning of relation, function, domain, and range. You may wish to have students write the domain and range for each relation.

1. f
2. f
3. not f
4. f
5. f
6. not f
7. f
8. f
9. not f
10. not f
11. f
12. f

HIMA

Hi, Ma.

Page 176

1. A. 7 B. −3
2. A. 140 B. 0
3. A. −11 B. 1
4. A. 1/2 B. −1/3
5. {−4, 2, 8}
6. {24, 14, 4}
7. {49, 1, 31}
8. {−4, 3, 12}
9. {−16, 0}
10. {−5, 4}

A FLYER QUACKER

A fire cracker

Page 177

These hypothetical functions will help illustrate concepts of function, slope, domain, range, and initial conditions. The questions at the bottom are suggestions. You may wish to elaborate or extend the discussion.

Page 178

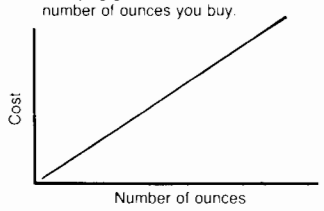
You might have students individually, or as a class, sketch each of these functions BEFORE you pass out copies of this page.

Page 179

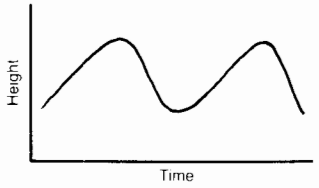
SKETCHING FUNCTIONS III

Make a sketch for each function described below. Use your knowledge of the relationships described.

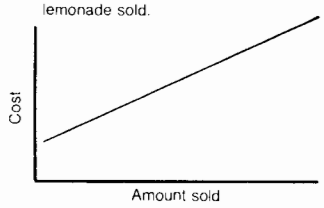
(A) At a fixed price per ounce, the cost of buying gold is a function of the number of ounces you buy.



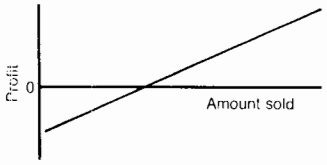
(B) The height of your head above the ground as you ride a Ferris wheel is a function of the time since you got on.



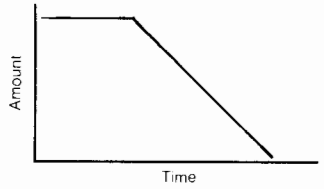
(C) The total cost of operating a lemonade stand is a function of the amount of lemonade sold.



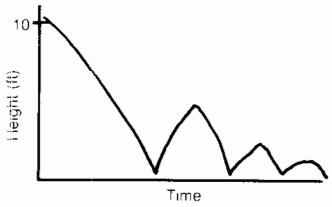
(D) The profit from operating a lemonade stand is a function of the amount of lemonade sold.



(E) The amount of water in a pan on a burner that is turned on "high" is a function of the time since the burner was turned on.



(F) The height of a ball that is dropped from a height of 10 feet is a function of the time since it was dropped.



OBJECTIVE 1.d To sketch the graph of a function using knowledge of real-world relationships

179

Page 180

1. **y**
   7
   1
   −3
   −5
2. **y**
   4
   −1
   −4
   −5
   −4
   −1
   4
3. **y**
   5
   0
   −3
   −4
   −3
   0
   5
4. **y**
   8
   1
   −4
   −7
   −8
   −7
   −4
   1
   8
5. **y**
   −6
   1
   6
   9
   10
   9
   6
   1
   −6
6. **y**
   11
   1
   −5
   −7
   −5
   1
   11

Page 181

There is a coordinate grid for graphing these equations on page 182.

1. y = 4x
2. y = 1/3x
3. y = 2.5x
4. y = 1.6x
5. y = 2/3x
6. y = −5x
7. y = x
8. y = 0.75x
9. y = 10x
10. y = 0.15x
11. y = 22/7x

IT WAS AN X SIGHTING MOMENT

It was an X sighting (exciting) moment.

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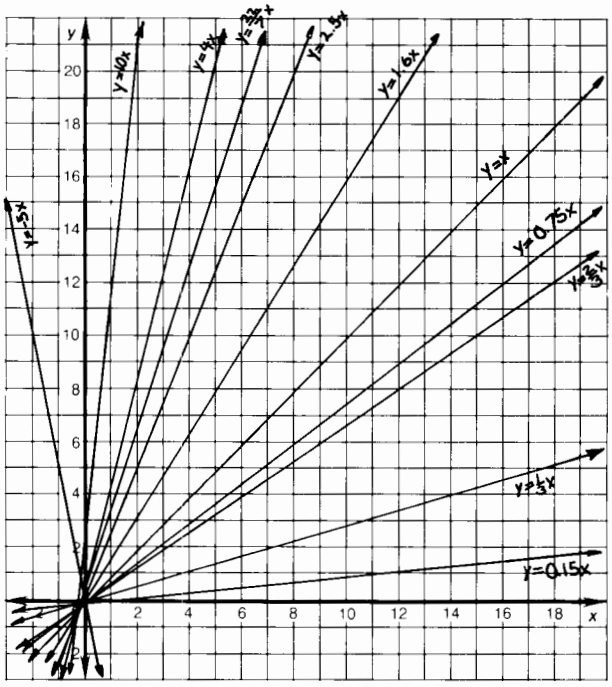
Page 182

This page is for graphing the functions on page 181. The questions at the bottom are useful for an assignment or class discussion.

9. k = rate of speed
10. k = rate of interest
11. k ≐ π

Direct Variation "Grafun"



1. Why does the graph of an equation expressing direct variation always pass through the origin?
2. As k increases from 0.15 to 10, what happens to the graph of $y = kx$? Describe the graph when k is negative.
3. What is the meaning or significance of k in the equation for Exercise 9? For Exercise 10? For Exercise 11?

182 OBJECTIVE 1–q: To graph equations expressing direct variation

Page 183

1. 135
2. 72
3. 3.75
4. $300\overline{3}$
5. 33.3
6. 87.5
7. 10

ANORDEREDPAIR
An ordered pair

Page 184

The exercises in the right column may provide examples to help students gain an intuitive feeling for inverse variation. In the last exercise, the constant of variation equals the approximate speed of sound in air.

SHE LOST HER WHEY

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Page 185

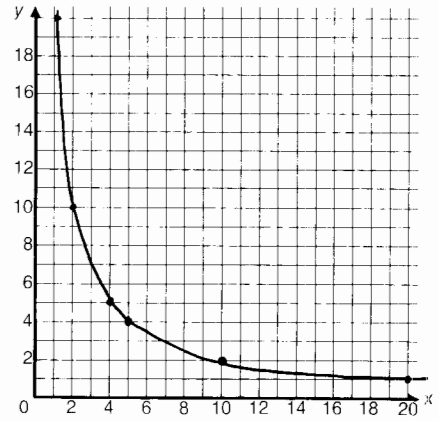
You may wish to use this page as a class activity, making an overhead transparency to guide discussion.

INVERSE VARIATION "GRAFUN"

Complete each table and graph the equation.

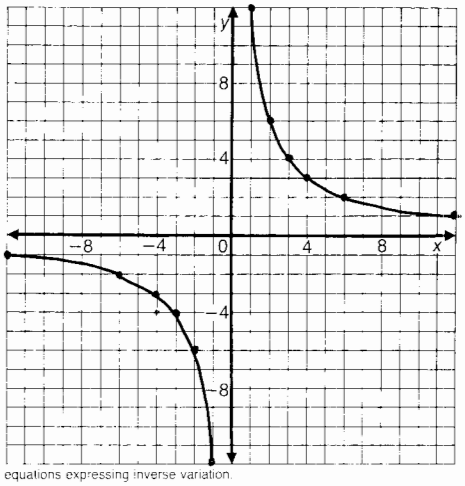
① $y = \frac{20}{x}$

x	y
1	20
2	10
4	5
5	4
10	2
20	1



② $y = \frac{12}{x}$

x	y
1	12
2	6
3	4
4	3
6	2
12	1
−1	−12
−2	−6
−3	−4
−4	−3
−6	−2
−12	−1



OBJECTIVE 1 : To graph equations expressing inverse variation. 185

Page 186

1. 15
2. 8
3. 22.50
4. 30
5. 21
6. 1.2
7. 6.75

THEY MADE HEADLINES

They made headlines (head lines).

Page 187

1. D. 4 A. 100
2. T. 14 E. 735
3. A. 0.06 O. 13.50
4. I. 288 K. 32
5. M. 45 F. 11.25
6. N. 3.6 A. 0.4
7. Y. 2000 R. 980

I AM A FRAYED KNOT

I am a frayed knot (afraid not).

Page 188

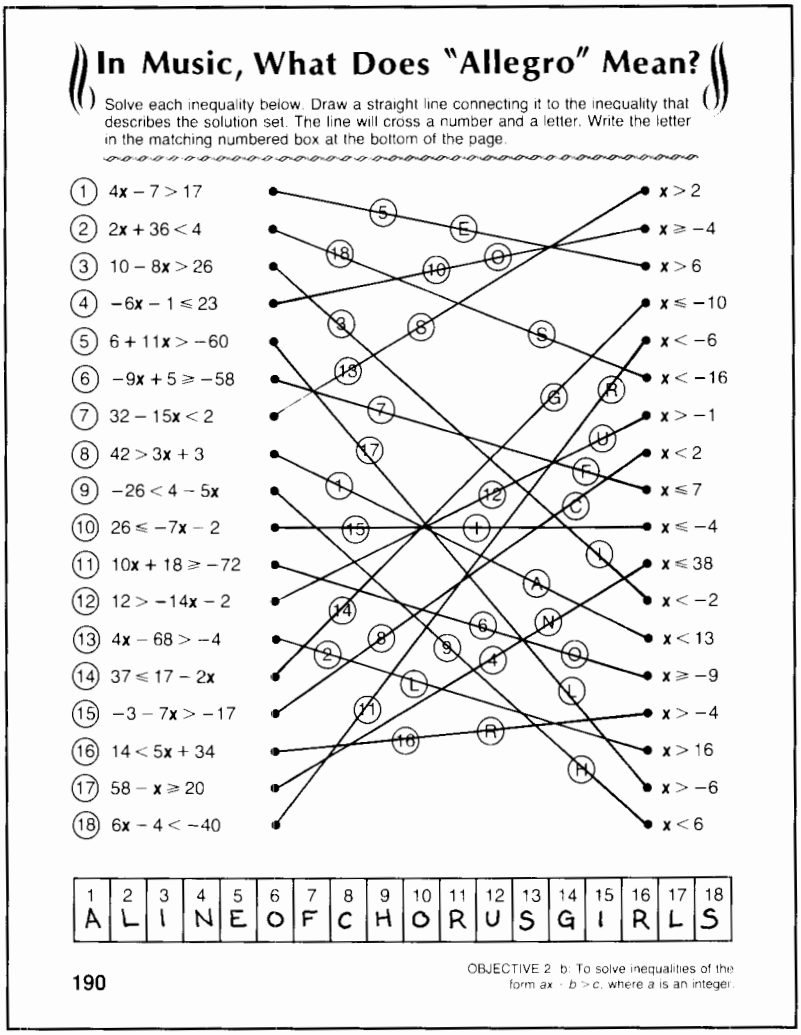
You may wish to use these formulas in discussing with students the effect on the dependent variable of doubling, tripling, etc., one of the independent variables.

1. $V = kBh$
2. $t = kW/n$
3. $P = kV^2/R$
4. $h = kW/r^2$
5. $E = kmv^2$
6. $I = kAH/T$
7. m - kℓwt
8. $V = kT/P$
9. $I = kms^2$
10. $i = kA/d^2$
11. $s = kbd^2/\ell$
12. $g = km_1m_2/d^2$

Page 189

THEY BURIED HIM SIX DOWN AND EIGHT ACROSS

Page 190



Page 191

1. x > 6
2. x ≥ −15
3. x > 3
4. x ≤ −2
5. x < 44
6. x > 60
7. x ≥ 32
8. x ≤ −50
9. x < −48
10. x < 21
11. x ≥ 20
12. x ≥ −10
13. x ≥ 15
14. x < −70
15. x ≥ 5
16. x < 0

ABORINGJOB

A boring job

Page 192

1. x > 4
2. x ≥ 7
3. x < −8
4. x ≤ −11
5. x > 9
6. x < −1
7. n ≥ 3
8. n ≥ −6
9. n > 2
10. n ≥ 1
11. n < −3
12. n < −2

HE WAS PROPOSING A TOAST

Page 193

You may wish to give each student a copy of page 194 to use as a worksheet for this puzzle.

1. H
2. R
3. E
4. D
5. A
6. G
7. N
8. T
9. W
10. P
11. O
12. C
13. S
14. I

A PERSON WITH GOOD ICE SIGHT

A person with good ice sight (eyesight)

Page 194

This page is a worksheet for pages 193 and 195. Students can graph one inequality on the first number line, another on the second number line, and their union of intersection on the third.

Page 195

You may wish to give each student a copy of page 194 to use as a worksheet for this puzzle.

1. I
2. O
3. C
4. E
5. N
6. G
7. M
8. H
9. T
10. S
11. P
12. A

HE GOT A PANE IN HIS STOMACH

He got a pane (pain) in his stomach.

Page 196

1. EI
2. EN
3. HE
4. WE
5. US
6. IT
7. BE
8. AR
9. TS
10. NE
11. OR
12. CA
13. DO
14. NE
15. LL
16. RR

BECAUSE ITS NEITHER RARE NOR WELL DONE

Because it's neither rare nor well done

Page 197

1. A
2. Y
3. P
4. E
5. M
6. T

MEETPATTY

Meet (meat) patty.

Page 198

This is a two-page puzzle. You may wish to assign only one page.

1. E
2. S
3. T
4. O
5. H

Page 199

6. W
7. I
8. F
9. R
10. A
11. B

THEIR FATHER WAS A BOAR

Their father was a boar (bore).

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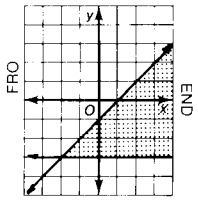
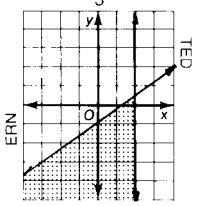
What Did the Toothless Old Termite Say When He Entered a Tavern ?

Graph each pair of inequalities below and indicate the solution set of the system with crosshatching or shading. The crosshatching or shading, if extended, would cover a set of three letters. Print these letters in the three boxes at the bottom of the page that contain the exercise number.

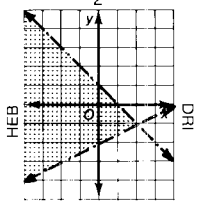
① $y \leq x - 1$
$y \geq -3$



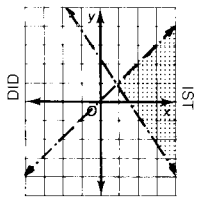
② $x \leq 2$
$y \leq \frac{2}{3}x - 1$



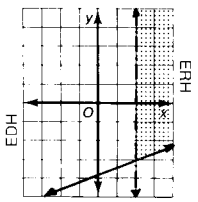
③ $y < -x + 1$
$y > \frac{1}{2}x - 2$



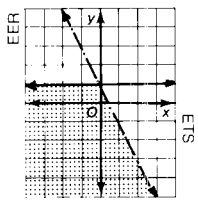
④ $y < x$
$3x + 2y > 4$



⑤ $x - 3y \leq 12$
$x > 2$



⑥ $y \leq 1$
$2x + y < 1$



4	4	4	3	3	3	6	6	6	1	1	1	5	5	5	2	2	2
I	S	T	H	E	B	A	R	T	E	N	D	E	R	H	E	R	E

OBJECTIVE 2--: To solve systems of linear inequalities in two variables by graphing

Famous Last Word

A FAMOUS LAST WORD IS HIDDEN IN THE RECTANGLE ABOVE. TO FIND IT:
Express each fraction below as a repeating or terminating decimal. Express each decimal as a fraction in lowest terms. Find your answers in the rectangle. Shade in each area containing a correct answer.

Express as a repeating or terminating decimal:		Express as a fraction in lowest terms:	
① $\frac{7}{9}$ $0.\overline{7}$	⑤ $\frac{3}{11}$ $0.\overline{27}$	⑨ $0.\overline{8}$ $\frac{8}{9}$	⑬ 0.125 $\frac{1}{8}$
② $\frac{3}{8}$ 0.375	⑥ $-\frac{5}{22}$ $-0.2\overline{27}$	⑩ $-0.\overline{18}$ $-\frac{2}{11}$	⑭ $0.8\overline{3}$ $\frac{5}{6}$
③ $\frac{5}{12}$ $0.41\overline{6}$	⑦ $\frac{1}{16}$ 0.0625	⑪ $1.\overline{3}$ $\frac{4}{3}$	⑮ $-0.08\overline{3}$ $-\frac{1}{12}$
④ $\frac{11}{4}$ 2.75	⑧ $-\frac{4}{7}$ $-0.\overline{571428}$	⑫ $-0.\overline{21}$ $-\frac{7}{33}$	⑯ $0.\overline{009}$ $\frac{1}{111}$

OBJECTIVE 3.1a To express a fraction as a repeating or terminating decimal; to express a repeating decimal as a fraction in lowest terms

201

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Page 202

S. 7
T. 1
H. 10
I. 30
H. 2
S. 6
O. 8
R. 5
S. -8
E. -15
I. -100
T. 3/4
E. 20
T. -90
N. -120
S. 1/3
O. 9
E. 15
R. 11
W. 60
E. $-9/2$
A. 0.5
I. -0.7
E. 0.1
E. 1
T. 3
H. 10
P. 14
A. -1.2
T. 0.02
S. -0.11
M. 2/3

IT IS THE SPOT WHERE THE SONS RAISE MEAT

It is the spot where the sons raise meat (sun's rays meet).

Page 203

S. rational number
I. numerator by denominator
A. terminating decimal
D. repeating decimal
S. terminating or repeating
H. fraction
F. irrational number
H. repeat
I. terminates
N. 0.1212212221...
P. real numbers
S. decimal

FISH AND SHIPS (chips)

Page 204

It may be useful to have students write the radicand in factored form before writing answers. For example:

$\sqrt{8} = \sqrt{4 \cdot 2} = 2\sqrt{2}$

L. $2\sqrt{2}$
I. $3\sqrt{5}$
A. $5\sqrt{2}$
T. $2\sqrt{3}$
O. $7\sqrt{2}$
S. $4\sqrt{3}$
E. $5\sqrt{5}$
A. $2\sqrt{5}$
S. $6\sqrt{2}$
Y. $3\sqrt{7}$
E. 12
W. $4\sqrt{2}$
D. $5\sqrt{3}$
A. $10\sqrt{2}$
S. $15\sqrt{2}$
U. $6\sqrt{7}$
A. $20\sqrt{10}$
P. 1000
E. $24\sqrt{2}$
K. $24\sqrt{3}$
L. $16\sqrt{5}$
H. $-9\sqrt{6}$
A. $-14\sqrt{10}$
B. -88
S. $20\sqrt{5}$
T. $-8\sqrt{6}$
Z. $15\sqrt{7}$
C. $30\sqrt{3}$

SHE ALWAYS TALKED ABOUT CAP SIZES

She always talked about cap sizes (capsizes).

Page 205

1. $\sqrt{100}$
2. $\sqrt{97}$
3. $\sqrt{288}$
4. $\sqrt{69}$
5. $\sqrt{400}$
6. $\sqrt{75}$
7. $\sqrt{25}$
8. $\sqrt{140}$
9. $\sqrt{4}$
10. $\sqrt{144}$
11. $\sqrt{34}$
12. $\sqrt{81}$
13. $\sqrt{2}$
14. $\sqrt{1}$

SHELVES WITH A HIGH POT IN USE (hypotenuse)

Page 206

1. A. $\sqrt{157}$
B. $\sqrt{105}$
C. 1 m
2. $\sqrt{149}$ cm
3. $\sqrt{675}$ cm
4. 20 in.
5. $\sqrt{336}$ ft
6. $\sqrt{7200}$ ft
7. $\sqrt{975}$ m

INBEEFFLAT

In beef flat (B flat)

Page 207

This puzzle and page 208 are identical, with one exception. In this puzzle, all variables are assumed to represent nonnegative numbers. On page 208, all radicands, but not all variables, are assumed to be nonnegative. For this puzzle, absolute value bars are not required in answers; they are required for some answers on page 208. Use either puzzle, depending on whether you wish to teach absolute value in this type of exercise.

THEY DONT HAVE THE VEGAS IDEA

They don't have the Vegas (vaguest) idea.

Page 208

Please see the note on page 207. Absolute value bars are required for some answers. (Note that absolute value isn't used for x because x can't be negative in this case; if x were negative, the entire radicand would be negative.)

THEY DONT HAVE THE VEGAS IDEA

They don't have the Vegas (vaguest) idea.

Page 209

E. 9
H. 23
O. 5
A. 14
R. 26
H. 2
E. 21
A. 12
D. 16
T. 1
E. 7
P. 18
E. 3
N. 10
B. 13
I. 25
A. 17
R. 6
L. 20
M. 8
N. 15
P. 19
T. 11
O. 24
F. 4
C. 22

THE FOREMEN TAB AND APPLE CHOIR

The foremen Tab and apple (Mormon Tabernacle) choir

Page 210

1. T
2. E
3. U
4. I
5. A
6. E
7. T
8. F
9. Y
10. R
11. E
12. T
13. O
14. R
15. N
16. L
17. D
18. S
19. K
20. U

RENT A DUET YOURSELF KIT

Rent a duet yourself (do-it-yourself) kit.

Page 211

THE VERY SAD GUY WHO TRIED TO KISS HIS GIRL FRIEND IN THE FOG AND MIST

A. $\frac{5\sqrt{3}}{3}$
B. $\frac{2\sqrt{7}}{7}$
C. $4\sqrt{5}$
D. $7\sqrt{2}$
E. $\frac{\sqrt{6}}{2}$
F. $\frac{2\sqrt{10}}{5}$
G. $\sqrt{11}$
H. $\frac{\sqrt{3}}{2}$
I. $5\sqrt{2}$
J. $\frac{4\sqrt{5}}{5}$
K. $\frac{3\sqrt{5}}{10}$
L. $\frac{\sqrt{21}}{3}$
M. $\frac{\sqrt{2}}{2}$
N. $3\sqrt{3}$
O. $\frac{\sqrt{2}}{4}$
P. $\frac{2\sqrt{5}}{5}$

Page 212

1. $3\sqrt{5}$
2. $5x^2\sqrt{2}$
3. $11\sqrt{3}$
4. $4\sqrt{6}$
5. $-60\sqrt{2}$
6. $2xy\sqrt{5y}$
7. $7\sqrt{x} + 3\sqrt{y}$
8. $\frac{2\sqrt{30}}{5}$
9. $\frac{\sqrt{2}}{4}$
10. $6nt\sqrt[3]{n}$
11. $-30\sqrt{6}$
12. $\frac{4\sqrt{15}}{3}$
13. $30n^4t^2\sqrt{7t}$
14. $59\sqrt{3}$
15. $35\sqrt{11} + 2\sqrt{22}$
16. $\frac{\sqrt{6}}{10}$

I DONT KNOW AND I DONT CARE

I don't know, and I don't care.

Page 213

S. $\frac{\sqrt{21}}{7}$
E. $\frac{\sqrt{15}}{6}$
I. $\frac{3\sqrt{5}}{10}$
O. $\frac{2\sqrt{6}}{9}$
S. $\frac{3\sqrt{10}}{5}$
E. $\frac{\sqrt{2}}{2}$
A. $\sqrt{6}$
F. $\frac{5\sqrt{3}}{6}$
R. $\frac{\sqrt{6}}{10}$
E. 1/2
T. $\frac{4\sqrt{5}}{5}$
S. $\frac{\sqrt{15}}{2}$
M. $\frac{\sqrt{30}}{6}$
K. $\frac{3\sqrt{30}}{2}$
D. 7

MASTER OF DE SKIES

Master of de skies (disguise)

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Page 214

These exercises are challenging.

1. S
2. U
3. A
4. C
5. E
6. N
7. I
8. B
9. T
10. K
11. L
12. W

IT WASNT A WELL BUCKET

It wasn't a well bucket.

Page 215

1. A HARDENED CRIMINAL
2. CHECKOUT LIONS

1. 23
2. 46
3. -26
4. 4
5. $26 + 11\sqrt{2}$
6. $8 - 4\sqrt{13}$
7. $33 - 9\sqrt{15}$
8. $88 + 18\sqrt{7}$
9. $6\sqrt{3} + 6$
10. $14\sqrt{15} - 10\sqrt{2}$
11. $30\sqrt{5} + 10\sqrt{6}$
12. $36\sqrt{2} - 18\sqrt{10}$
13. $38 + 19\sqrt{5}$
14. $26 - 2\sqrt{7}$
15. $16\sqrt{5}$

Page 216

1. 64
2. 25
3. 24
4. 45
5. 300
6. 16
7. 12
8. 16/5
9. 30
10. 8
11. 17/3
12. no solution; 4 is extraneous
13. 150
14. 27/2
15. 98
16. 11
17. 5
18. 9/4

IT IS A TWIN KEY

It is a twin key (Twinkie).

Page 217

1. 500
2. 24
3. 1/32
4. 4/75
5. 144
6. 7/5
7. 6
8. $\{1, -4\}$
9. 5; -2 is extraneous
10. 27/2
11. $\{3, 4\}$
12. 2; -7 is extraneous
13. 10; 3 is extraneous
14. 8; -3 is extraneous
15. 16; 1 is extraneous

IT IS BETTER THAN THE OLD CLOUDY KIND

It (new clear physics) is better than the old cloudy kind.

Page 218

THERE ONCE WAS A TEACHER WHO TOLD TEN JOKES TO MAKE THE STUDENTS LAUGH BUT NO PUN IN TEN DID

(no pun intended).

Page 219

1. $\{-1, 9\}$
2. $\{-8, -6\}$
3. $\{2 \pm 2\sqrt{3}\}$
4. $\{2, 8\}$
5. $\{-4, 10\}$
6. $\{-9, 7\}$
7. $\{9 \pm 2\sqrt{6}\}$
8. $\{-6 \pm 5\sqrt{3}\}$
9. $\{-1/2, 3/2\}$
10. $\left\{\frac{3 \pm \sqrt{7}}{4}\right\}$
11. $\left\{\frac{-5 \pm \sqrt{15}}{2}\right\}$
12. $\left\{\frac{\pm \sqrt{10}}{2}\right\}$
13. $\left\{\frac{1 \pm \sqrt{6}}{2}\right\}$
14. $\left\{\frac{3 \pm 2\sqrt{5}}{5}\right\}$
15. $\left\{\frac{-7 \pm \sqrt{3}}{3}\right\}$

APOTPI

A pot pi (pie)

Page 220

1. R
2. N
3. Y
4. C
5. A
6. W
7. U
8. E
9. M
10. F
11. B
12. O
13. T
14. S

BOY SCOUT TENT AFTER A SNOWSTORM

Page 221

1. $-1, -3$
2. 5, 2
3. $-2, -3$
4. $4, -1$
5. $2, -4$
6. $\frac{5 \pm \sqrt{17}}{2}$
7. $\frac{-3 \pm \sqrt{37}}{2}$
8. 2, 1/2
9. 5/2, -1
10. $\frac{-5 \pm \sqrt{13}}{6}$
11. 2, $-4/3$

TOKEEPCOWSIN

(What is a meadow for?) To keep cows in

Page 222

The exercises in this puzzle include these variations: equations are not given in standard form; the radical term can be simplified; an equation has no solution; reducing is possible in which students must divide *both* parts of the numerator, and the denominator, by a common factor.

I. 5/2, 1
N. 3/2, -2
S. 5/3, -1
A. $\frac{-7 \pm \sqrt{33}}{2}$
I. $\frac{-3 \pm \sqrt{69}}{10}$
G. 2/3, $-1/2$
E. $\frac{9 \pm \sqrt{65}}{4}$
I. $3 \pm \sqrt{5}$
L. $-2 \pm \sqrt{6}$
N. $\frac{-5 \pm \sqrt{10}}{3}$
V. $1, -1/4$
L. no solution
X. $-1 \pm 2\sqrt{2}$
I. $\frac{-9 \pm 3\sqrt{5}}{2}$

LIVING IN X AISLE

Living in x aisle (exile)

Page 223

For exercises 1-3, the graph of the function defined by the equation is given. the number of solutions is evident from the graph. For exercises 4-11, students should compute the value of the discriminant to determine the number of solutions.

1. $y = x^2 + 2x - 3$ D
2. $y = x^2 - 4x + 4$ A
3. $y = x^2 - 2x + 2$ O
4. K
5. U
6. A
7. H
8. P
9. N
10. L
11. B

HOLDUPABANK

Hold up a bank.

Page 224

Students need a table of square roots or a calculator with a square root key for this puzzle.

THE CHIROPRACTOR WHO GOT NOTHING BUT BACK TALK

A. 5 m by 9 m
B. 6 cm by 18 cm
C. 4 cm by 7 cm
D. 7 m
E. 3.6 m by 5.6 m
F. 1.5 cm by 7.5 cm
G. 6.7 m by 10.7 m
H. 2.7 km by 3.4 km

Page 225

Students need a table of square roots or a calculator with a square root key for this puzzle.

1. 7 cm
2. 6.6 cm
3. 5 m
4. 3.1 m by 5.1 m
5. 8.9 cm
6. 1.2 m
7. 4.5 cm

INSTINCT (In stink)

Page 226

1. E
2. N
3. C
4. A
5. U
6. C
7. E
8. N
9. D
10. H
11. L
12. E
13. P
14. I
15. A
16. S
17. I
18. B
19. M
20. E

HE MADE A SCENE IN PUBLIC

Page 227

1. R
2. I
3. E
4. A
5. T
6. S
7. I
8. E
9. R
10. A
11. U
12. I
13. E
14. H
15. F
16. N
17. I
18. W
19. C
20. R
21. L
22. T
23. T
24. B

HE IS A TERRIFIC BUTTER IN LAW

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Page 228

T. 0.4226
H. 0.7002
E. 0.9848
E. 0.1736
O. 0.9397
A. 1.000
W. 0.3420
O. 35°
E. 0.2588
N. 60°
E. 1.4281
T. 40°
D. 0.9962
W. 65°
T. 0.5774
N. 80°
F. 0.7660
D. 15°

HE WENT DOWN TO DEFEAT

He went down to defeat (the feet).

Page 229

Students need a table of trigonometric ratios for this puzzle.

1. 2.1 m
2. 18.5 cm
3. 10.9 m
4. 6.2 m
5. 7.3 cm
6. 61.8 m
7. 4.7 m
8. 16.9 cm
9. 22.2 m
10. 34.9 mi
11. 5.2 m

APARKINSPACE

A park in space (parking space)

Page 230

Students need a table of trigonometric ratios for this puzzle.

YOUR TURN TO BAT

WALL TO WALL CARPIT

N. 37°
U. 21°
C. 51°
O. 42°
Y. 30°
P. 68°
A. 5°
W. 46°
I. 34°
L. 9°
R. 24°
B. 32°
T. 2°

Page 231

1. ORDERED PAIR
2. COORDINATE SYSTEM
3. SOLUTION
4. GRAPH
5. SLOPE
6. Y-INTERCEPT
7. SLOPE-INTERCEPT FORM
8. SYSTEM OF EQUATIONS
9. FUNCTION
10. DIRECT VARIATION
11. INVERSE VARIATION
12. RADICAL
13. QUADRATIC FORMULA
14. PARABOLA

ONLY ON SPECIAL EQUATIONS

Only on special equations (occasions)

Page 232

You may prefer to use these questions one at a time.

1. 4
2. 44
3. No, 32 by 33 — A-1; B-100; C-196; D-49; E-16; F-225; G-324.
4. 37081 or 37091

37081	37091
74126	74182

5. 3
6. Separate the links from 1 piece and use them to connect the other pieces.
7. A: $13; B: $7; C: $4
8. Horse racing (by the horses)