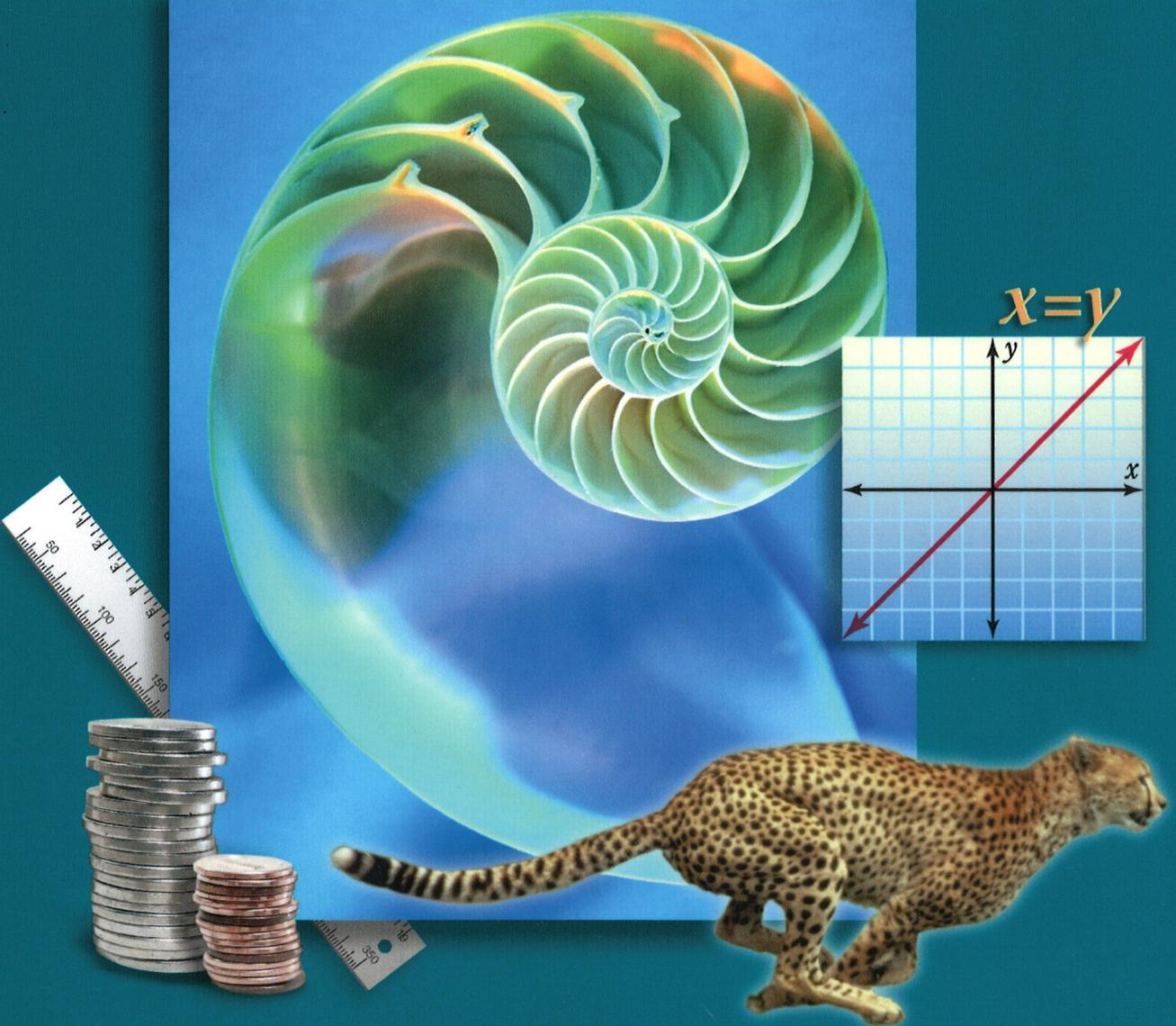


WORKBOOK

PACEMAKER®

Algebra 1



GLOBE FEARON
Pearson Learning Group

P A C E M A K E R®

Algebra 1

Second Edition

WORKBOOK

GLOBE FEARON
Pearson Learning Group

Pacemaker® Algebra 1, Second Edition

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About the Cover: Algebra 1 is important in mathematics and in everyday life. The images on the cover represent some of the things you will be learning about in this book. The pattern in the nautilus shell is an example of a number pattern called the Fibonacci numbers. The graph of the equation $x = y$ shows how you can connect Algebra and Geometry. The running cheetah is an example of the familiar relationship between distance, rate, and time. The coins represent problems about discount, sale price, and the cost of items. The ruler is one of the tools you will use to measure the world around you. What other images can you think of to represent Algebra 1?

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A Note to the Student

The exercises in this workbook go along with your *Pacemaker*[®] *Algebra 1* textbook. This workbook gives you the opportunity to review concepts, practice skills, and think critically.

Set goals for yourself and try to meet them as you complete each activity. The more you practice, the more you will remember. Being able to remember and apply information is an important skill, and leads to success on tests, in school, at work, and in life.

Your critical thinking skills will be challenged. You will need to think beyond what you learned in your textbook. The critical thinking activities provide you with the opportunity to put the information you have learned to use.

Your textbook is a wonderful source of knowledge. By completing the activities in this workbook, you will learn a great deal about algebra skills. The real value of the information will come when you have mastered these skills and put critical thinking to use.

1 Understanding Absolute Value Exercise 1

Lessons 1.1 and 1.2

Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. Numbers to the left of 0 on the number line are positive.

2. The distance of a number from 0 is always positive.

3. Five is the absolute value of both 5 and -5 .

4. -7 is greater than 4.

5. 0 is less than -3 .

CRITICAL THINKING

Find the integers.

1. List the integers with absolute value less than 2. _____

2. List the negative integers with absolute value less than 5. _____

3. List the positive integers with absolute value less than 4. _____

4. List the integers with absolute value 7. _____

1 Adding and Subtracting Integers Exercise 2

Lessons 1.1, 1.3, and 1.4

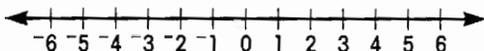
A. Tell which direction from zero you would move to graph the integer. Write *left* or *right*.

1. -2 _____ 2. 3 _____ 3. $+2$ _____

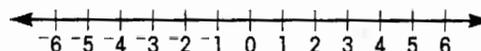
4. 0 _____ 5. $-(8)$ _____ 6. $|-4|$ _____

B. Add using the number line.

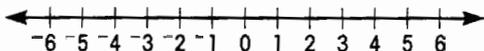
1. $3 + 3$



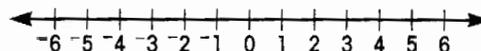
2. $-5 + 2$



3. $4 + (-2)$



4. $-3 + 0$

**C. Add or subtract.**

1. $7 + (-2)$

2. $-3 - 8$

3. $-5 + 1$

4. $-(-4) - 6$

5. $0 - (-9)$

6. $-2 - (-5)$

7. $-8 + |6|$

8. $|-4| + |-3|$

9. $5 - |-4|$

10. $|6| + (-1)$

11. $(-1) - |-3|$

12. $(-2) + |0|$

1

Operations on Integers

Exercise 3

Lessons 1.5, 1.6, and 1.8

A. Write division facts to complete the table.

1. $-2 \cdot 5 = -10$	$-10 \div (-2) = 5$	$-10 \div 5 = -2$
2. $6 \cdot (-3) = -18$		
3. $(-1)(-9) = 9$		
4. $4 \cdot (-2) = -8$		

B. Multiply or divide.

1. $-4 \cdot 6$

2. $(-20) \div (-5)$

3. $-3 \cdot 8$

4. $\frac{-5}{5}$

5. $(7)(-2)$

6. $\frac{-14}{-2}$

7. $0 \div 9$

8. $-2 \cdot 5$

9. $12 \div (-4)$

10. $(-2) \cdot (-2)$

11. $6 \cdot (-3)$

12. $\frac{6}{-1}$

C. Find the power.

1. $(-2)^2$

2. $(-2)^3$

3. $(-2)^4$

4. -7^2

5. $(-1)^8$

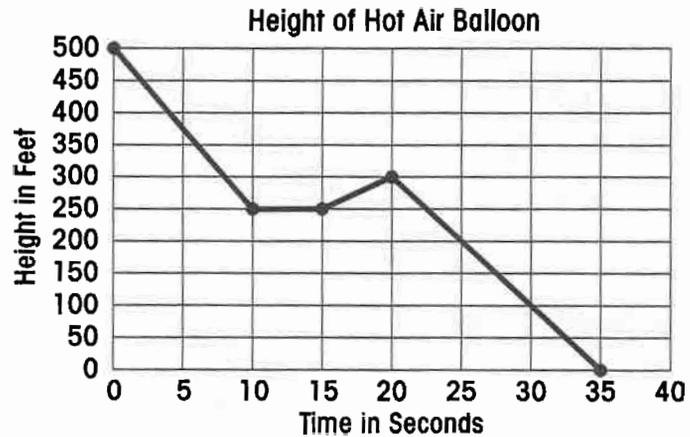
6. $(-3)^3$

1 Using a Broken-Line Graph Exercise 4

Lesson 1.11

Use the graph to answer the questions.

A hot air balloon at 500 feet drops at a constant rate of 25 feet per second for 10 seconds. It stops for 5 seconds, rises 50 feet at a constant rate of 10 feet per second, and then drops to the ground at a constant rate of 20 feet per second.



1. After the first 10 seconds, how far has the balloon dropped?
2. How high is the balloon when it stops for 5 seconds?
3. How many seconds total does it take the balloon to drop to a height of 200 feet?
4. How many seconds does it take for the balloon to land?
5. How many seconds does it take for the balloon to fall to the ground?

1 Working with Integers**Exercise 5***Lessons 1.2 and 1.7*

- A. Complete the table. Give the opposite in words. Then, write the opposite as an integer.**

	Opposite in words	Integer
1. Earned \$12	Spent \$12	-12
2. Spent \$50		
3. 20°C rise in temperature		
4. Down 5 feet		
5. Up 28 feet		

- B. Simplify.**

1. $3 - ^{-}4 + 10$

2. $^{-}6 + 3 - 10$

3. $^{-}3 - 14 - 7$

4. $3 + ^{-}4 - 10$

5. $^{-}5 - ^{-}5 - 5$

6. $^{-}6 - 7 - ^{-}13$

7. $14 + 7 - ^{-}3$

8. $^{-}10 - ^{-}4 - 2$

9. $6 - 2 - 8$

CRITICAL THINKING

Solve the problem. Show your work.

Reina heard on the 6:00 P.M. news that the temperature had dropped 22° since 4:00 P.M. At 4:00 P.M., the temperature was 12°. What is the temperature at 6:00 P.M.?

1 Solving Problems**Exercise 6***Lesson 1.10*

Solve each problem using **Guess, Check, Revise**.

- 1.** In a fishing contest, the two largest bass weighed a total of 22 pounds. The first-place bass weighed 8 pounds more than the second-place bass. Find the weights of the first-place and second-place bass.

- 2.** The band members sold 316 juice drinks for a fund-raiser. They sold 52 more grape drinks than strawberry drinks. How many of each type of juice drink did they sell?

- 3.** The product of two integers is 50. One integer is twice the other. Find the integers.

- 4.** The sum of two integers is -1 . The product of the integers is -72 . Find the integers.

2

**Using Properties of Addition
and Multiplication****Exercise 7***Lessons 2.1 to 2.4, 2.8, and 2.10*

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. In the expression $7x + 15$, 15 is a coefficient.

2. $\frac{3x + 7}{2}$ means $(3x + 7) \div 2$.

3. You can rewrite $2(4 + 8)$ as $(2)(4) + (2)(8)$ using the Distributive Property.

4. An example of the Associative Property is $(3 + 7) + 14 = 3 + (7 + 14)$.

5. To show 9 decreased by 6, you can write $9 - 6$.

B. Find the value of each number expression.

1. $12 - (2 + 6)$ _____

2. $2 + 3 \times 8$ _____

3. $5(4 + 8)$ _____

4. $14 + 3^3 \times 3$ _____

2**Simplifying Expressions****Exercise 8**

Lessons 2.1, 2.5, 2.7, 2.10, and 2.11

A. Simplify each expression. Circle the correct answer.

1. $3(x + 7)$

a. $3x + 7x$

b. $3x + 21$

c. $7x + 21$

d. cannot be simplified

2. $5x + 6 + 2y + 3x + 4y$

a. $14xy + 6$

b. $6 + 7xy + 7xy$

c. $8x + 6y + 6$

d. cannot be simplified

3. $2x + (3 + 5x)$

a. $2x + 8$

b. $7x + 3$

c. $10x$

d. cannot be simplified

4. $2x + 3y + 7 + z$

a. $7 + 6xyz$

b. $12xy + z$

c. $(2x + 3y + z) + 7$

d. cannot be simplified

5. $4 + 33 + 4 \times 2$

a. 45

b. 82

c. 78

d. 43

B. Are the two expressions equivalent? Write *yes* or *no*.

Show your work.

1. $2x + 6x$ and $x(2 + 6)$ _____

2. $3 + (4 \times 3)$ and $(3 + 4) \times 2$ _____

3. x^5 and $x \cdot x \cdot x \cdot x \cdot x$ _____

4. $4 - 11$ and $11 - 4$ _____

2

Finding the Value

Exercise 9

Lessons 2.3 and 2.6

Write the expressions. Then evaluate.

1. **a.** the product of 5 and a number x _____
b. Evaluate when $x = -1$.

2. **a.** 18 decreased by a number z _____
b. Evaluate when $z = 23$.

3. **a.** the quotient of 16 and a number m _____
b. Evaluate when $m = -4$.

4. **a.** the product of 8 and twice a number n _____
b. Evaluate when $n = 3$.

5. **a.** the sum of 3 times a number k and 4 _____
b. Evaluate when $k = -2$.

2**Properties****Exercise 10***Lessons 2.8 to 2.11*

A. Which equation shows the property? Circle the correct answer.

1. Addition Property of Opposites

a. $2 + 3 = 3 + 2$

b. $2 + (3 + 4) = (2 + 3) + 4$

c. $2 + -2 = 0$

2. Associative Property of Multiplication

a. $3(2 \times 4) = 3(2) \times 3(4)$

b. $3(2 \times 4) = (3 \times 2)4$

c. $3 \times 5 = 5 \times 3$

3. Distributive Property

a. $7(x + y) = 7x + 7y$

b. $7(x + y) = (7x)(7y)$

c. $7(x + y) = (x + y)7$

4. Identity Property of Multiplication

a. $x \cdot 0 = 0$

b. $x \cdot x = x^2$

c. $x \cdot 1 = x$

B. Simplify.

1. $7(x + 9)$

2. $7z + z(2 + 5)$

3. $24x + (3x + 17)$

4. $3 + 7(x + 5)$

2

Like Terms and Formulas

Exercise 11

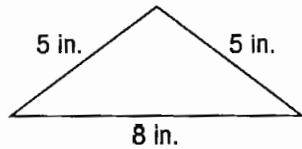
Lessons 2.4 and 2.14

A. Match like terms. Write the correct letters on the lines.

- | | | |
|-------|--------------------|-------------------|
| _____ | 1. $3x^2$ | a. a^2b |
| _____ | 2. $2ab$ | b. $10x$ |
| _____ | 3. $-5x$ | c. $2a$ |
| _____ | 4. a | d. $-3x^2$ |
| _____ | 5. $-4a^2b$ | e. $2ba$ |

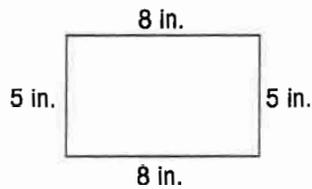
B. Match each picture of the figure with its formula. Write the letter on the line.

1. _____



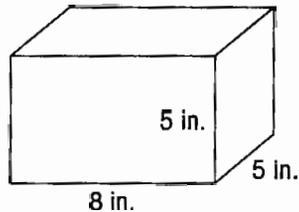
- a.** $A = lw$
 $A = 5 \cdot 8$

2. _____



- b.** $V = lwh$
 $V = 8 \cdot 5 \cdot 5$

3. _____



- c.** $P = a + b + c$
 $P = 5 + 5 + 8$

2

Writing Equations

Exercise 12

Lessons 2.13 and 2.14

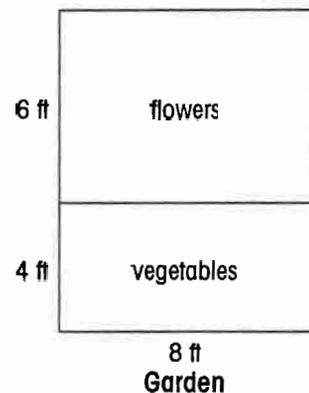
Write an equation for each problem.

1. Tickets to a play cost \$6.50 each. Write an equation for the total cost of 12 tickets plus a \$7.50 fee for large groups.
2. A shirt order consists of 10 small, 5 medium, and 8 large shirts. The prices of the shirts are small \$5.00; medium \$7.50; large \$12.00. There is a mail order charge of \$.50 per shirt for shipping and handling. Write an equation for the total cost of ordering the shirts by mail.
3. The total cost of ribbon is the product of the total number of yards and the cost per yard. The cost per yard is \$.40. Write an equation for the total cost of the following:
 - 2 yards blue ribbon
 - 8 yards white ribbon
 - 11 yards pink ribbon
 - 7 yards peach ribbon

CRITICAL THINKING

Solve the problem. Show your work.

Find the total area of the flower and vegetable garden. Use the formula for the area of a rectangle.



3**Solving Equations****Exercise 13***Lessons 3.1 to 3.4, 3.6, 3.8, and 3.9*

A. Is the first number a solution for the equation? Write *yes* or *no*. Show your work.

1. $-5; 3z + 4 = 15$

2. $16; 8 - \frac{x}{2} = 0$

3. $12; 4(p + 5) = 60$

4. $-40; 8 - k = -48$

B. Circle the correct answer for each question.

1. Which equation has the same solution as $4x = 16$?

a. $x = 8$

b. $x = 4$

c. $x = -32$

d. $x = 64$

2. Which operation is needed to solve $6a = 36$?

a. addition

b. subtraction

c. multiplication

d. division

3. Which operation is needed to solve $m - 8.83 = 12.75$?

a. addition

b. subtraction

c. multiplication

d. division

4. What is the first step you use to solve $15 = 6y - 9$?

a. add 9

b. divide by 6

c. subtract 15

d. multiply by 15

3

Solving Equations

Exercise 14

Lessons 3.1 and 3.4

A. Evaluate the equation. Answer the question.

Renelle solved the equation $60 = 12n$ and found a solution of 720.

Did Renelle get the right solution? _____

Explain how you decided if Renelle's solution was correct. _____

B. For each equation, give the following information.

Name the operation in the equation.

Name the inverse of that operation.

Solve by showing a step that uses the inverse operation.

1. $d + 7 = 5$

operation: _____

inverse: _____

solve: _____

2. $t - 57 = 39$

operation: _____

inverse: _____

solve: _____

3. $6 = \frac{a}{2}$

operation: _____

inverse: _____

solve: _____

4. $-3x = 12$

operation: _____

inverse: _____

solve: _____

3

Writing Equations

Exercise 15

Lessons 3.5 to 3.8

Choose the equation that describes the problem.

1. Joaquin weighs his dog by weighing himself while holding the dog. Their total weight is 237 pounds. Joaquin weighs 156 pounds. Use d for the dog's weight. Which equation shows the dog's weight?

a. $d + 237 = 156$

b. $d - 156 = 237$

c. $d + 156 = 237$

2. A baseball diamond has four equal sides. The total distance around the diamond is 360 feet. Use s for side. Which equation shows the length of a side?

a. $\frac{s}{4} = 360$

b. $4s = 360$

c. $s + 4 = 360$

CRITICAL THINKING

Write an equation for each problem. Then solve.

1. The headquarters of the United States Department of Defense is the Pentagon. The Pentagon has 5 sides that are all the same length. If the perimeter of the Pentagon is 1,600 m, what is the length of each side?
2. The total weight of Maya and her large cat is 157 pounds. The cat weighs 19 pounds. How much does Maya weigh?

3

Solving Equations

Exercise 16

Lessons 3.1, 3.2, 3.4, 3.7, and 3.9 to 3.11

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. Equivalent equations are equations that have the same variable.

2. The solution to an equation is any value of the variable that makes the equation true.

3. Inverse operations are operations that “undo” each other. For example, addition and subtraction are inverse operations.

4. Discount is the amount you spend when you buy an item on sale.

B. Solve each equation. Then, check the solution.

1. $5(12 + k) = 215$

2. $\frac{y}{7} = -7$

3. $36 = -9(w + 1)$

4. $42 + 12d = 5d$

3**Solving Equations****Exercise 17***Lessons 3.5 to 3.11*

Solve each equation. Show all your steps. Check.

1. $12x - 18 = 126$

2. $-8(5 + k) = -104$

3. $36 + 3m = 12m$

4. $180 = \frac{v}{2} + 4$

5. $\frac{x}{-5} + 6 = -4$

6. $12(r - 6) = 48$

CRITICAL THINKING

Solve each problem. Show your work.

1. The football team scored 24 points in the first half. The team's final score was 45 points. How many points did the football team score in the second half?
2. Lonna has \$278.00 in her savings account. Debbie has 3 times as much as Lonna. How much money does Debbie have in her savings account?
3. Harry earned \$171.00 last week. He worked 30 hours. What is his hourly pay rate?

3**Solving Equations and Problems****Exercise 18***Lessons 3.5, 3.6, 3.13, and 3.14*

Write an equation for each problem. Then solve the problem.

1. 75% of the tickets to the concert in the auditorium were sold. The auditorium has 1,200 seats. How many tickets were sold?
2. Wei Lu needs new tires. Tires are regularly priced at \$48.00 each, but they are on sale for 20% off the regular price. What is the sale price of tires?
3. Janine bought a new blouse for 25% off. The blouse was originally \$28.00. What was the sale price?

CRITICAL THINKING

Solve each problem. Show your work.

1. Maria started with \$58.00 in her checking account. She made a deposit of \$347.00 and wrote a check for \$265.00 to pay her rent. She wrote another check for groceries. Maria has \$92.00 left in her account. What was the amount of the check for groceries?
2. Jamal earns \$6.00 an hour for working 40 hours a week. If he works more than 40 hours in a week, he makes \$9.00 an hour for every hour over 40. Last week, Jamal worked 48 hours. How much did he earn?

4 Coordinate Plane

Exercise 19

Lessons 4.1 and 4.2

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. The order of the numbers in an ordered pair is is not important.

2. The horizontal axis is called the x-axis.

3. The point where the coordinate axes cross is called the center.

B. Give the ordered pair of each point.

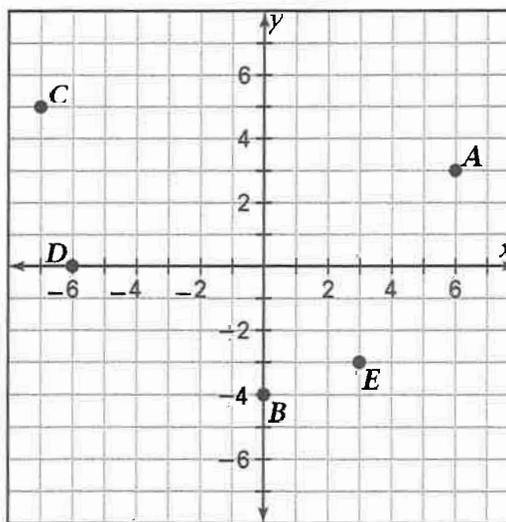
1. Point A _____

2. Point B _____

3. Point C _____

4. Point D _____

5. Point E _____



C. On the grid above, graph and label each point.

1. F at (2, 3) 2. G at (3, 2) 3. H at (-4, -3) 4. I at (6, -4)

4

Functions

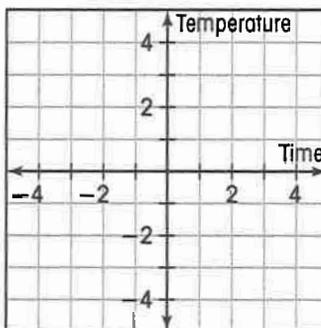
Exercise 20

Lessons 4.3 and 4.4

A. Graph and label the ordered pairs.

1.

Point	Time	Temperature
A	0	-1
B	1	-3
C	2	-5
D	3	-4
E	4	0



B. Complete each table.

1. $y = x + 1$

x	$x + 1$	y
-2		
-1		
0		
1		
2		

2. $y = -2x$

x	$-2x$	y
-2		
-1		
0		
1		
2		

3. $y = 3x + 2$

x	$3x + 2$	y
-2		
-1		
0		
1		
2		

4. $y = 2(x - 3)$

x	$2(x - 3)$	y
-2		
-1		
0		
1		
2		

4

Ordered Pairs

Exercise 21

Lessons 4.5 and 4.6

A. Find $f(5)$ for the following functions.

1. $f(x) = -x$

2. $f(x) = 3x^2$

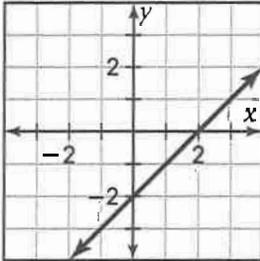
3. $f(x) = 4(x + 1)$

$f(5) =$ _____

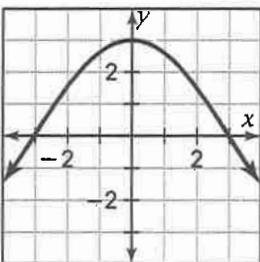
$f(5) =$ _____

$f(5) =$ _____

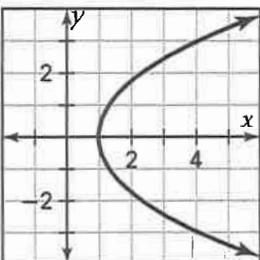
B. Use the vertical line test to determine whether the graph is a function. Write *yes* or *no* on the line.



1. _____



2. _____



3. _____

4

Problem Solving

Exercise 22

Lesson 4.8

A. Complete the table of ordered pairs.

x	$10x + 4$	y
1	$10(1) + 4$	
2		
4		
7		
10		

B. Use the above table to answer the questions.

You want to order posters by mail. Each poster costs \$10.00, and you have to pay \$4.00 for shipping. Let x be the number of posters you buy and y the total cost of the order.

1. What is the equation that you would use to show the total cost?
2. How much do 4 posters cost, including shipping?
3. How much do 15 posters cost, including shipping?
4. If you order 20 posters at once, does it cost the same, including shipping, as two separate orders of 10 posters each? Explain your answer.

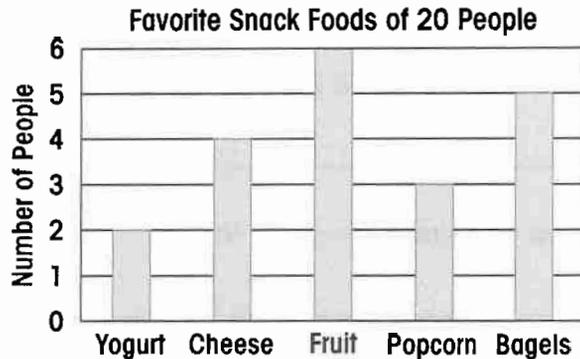
4

Using a Bar Graph

Exercise 23

Lesson 4.9

Use the bar graph below to answer the questions.



1. How many people reported that bagels were their favorite snack?
2. Which snack was favored by the most people?
3. Look at yogurt on the bar graph. Which snack was favored by twice as many people as yogurt?
4. Which snack was the second favorite?
5. How many people reported that cheese was their favorite snack?
6. How many more people reported popcorn than yogurt as their favorite snack?

5

Using Slopes

Exercise 24

Lessons 5.1 to 5.3, 5.6, and 5.9

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. The point where a line crosses the x -axis is called the y -intercept.

2. The standard form of the equation of a line is $y = mx + b$.

3. Rise is the change between two points on a line in an up-and-down direction.

4. A linear equation is an equation whose graph is a circle.

B. Tell whether the ordered pair is a solution of $y = 4 - 2x$.

Write *yes* or *no*. Show your work.

1. $(0, -2)$ _____ 2. $(2, 1)$ _____ 3. $(1, 2)$ _____

4. $(-1, 5)$ _____ 5. $(3, -2)$ _____ 6. $(0, 4)$ _____

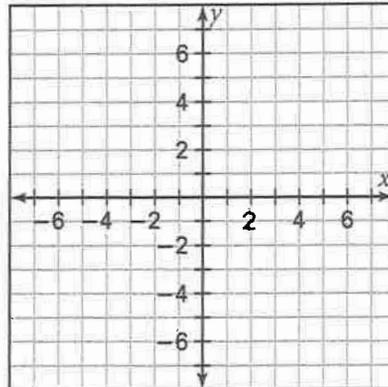
5 Graphing Equations Exercise 25

Lesson 5.2

Make a table of values to show ordered pairs for each equation. Then, graph the ordered pairs.

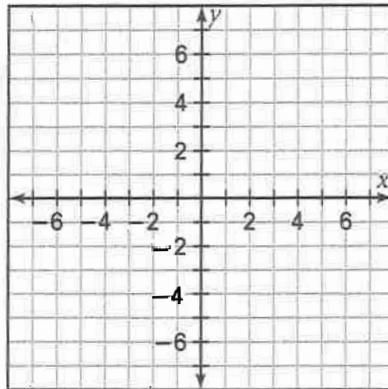
1. $y = 3 - x$

x	$3 - x$	y
-2		
-1		
0		
1		
2		



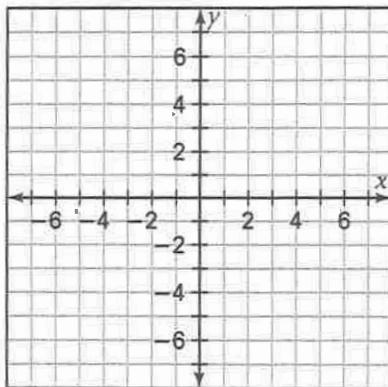
2. $y = x + 4$

x	$x + 4$	y
-2		
-1		
0		
1		
2		



3. $y = -4 + 2x$

x	$-4 + 2x$	y
-2		
-1		
0		
1		
2		



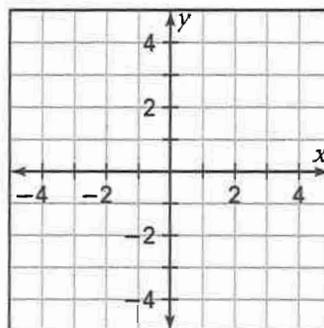
5 Graphing Equations

Exercise 26

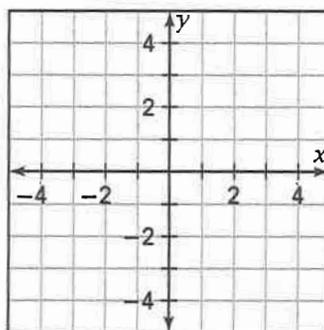
Lessons 5.2 to 5.4

A. Find at least three points, and graph each equation.

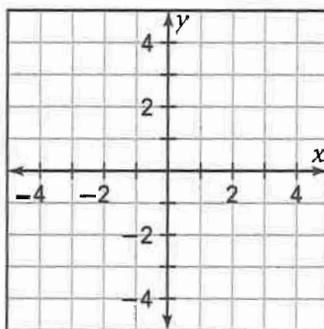
1. $y = 3x - 3$



2. $y = 2 - 2x$



3. $y = 3$



B. Find the slope of the line that contains the given points.

1. (3, 1) and (4, 7)

slope _____

2. (-2, 6) and (1, 3)

slope _____

3. (3, 4) and (0, 2)

slope _____

4. (5, -1) and (4, -1)

slope _____

5

Using Slope

Exercise 27

Lesson 5.5

A. Tell whether the lines containing these pairs of points are parallel.

1. line 1: $(6, 4)$ and $(4, 2)$

line 2: $(9, 7)$ and $(6, 4)$

2. line 1: $(0, 1)$ and $(3, 10)$

line 2: $(7, 3)$ and $(2, 1)$

3. line 1: $(8, 8)$ and $(4, -4)$

line 2: $(3, -6)$ and $(7, 2)$

4. line 1: $(1, -7)$ and $(-4, 3)$

line 2: $(-2, 8)$ and $(1, 2)$

B. Tell whether the lines containing these pairs of points are perpendicular.

1. line 1: $(12, 3)$ and $(8, 4)$

line 2: $(1, 9)$ and $(2, 5)$

2. line 1: $(6, 7)$ and $(4, 8)$

line 2: $(6, 8)$ and $(5, 6)$

3. line 1: $(10, 8)$ and $(5, -2)$

line 2: $(5, 3)$ and $(4, 1)$

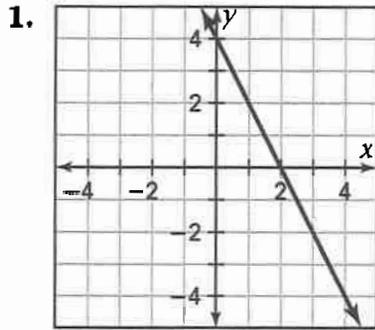
4. line 1: $(-4, -5)$ and $(0, 3)$

line 2: $(5, -3)$ and $(-5, 2)$

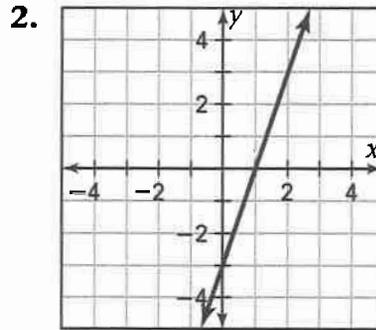
5 Finding Intercepts Exercise 28

Lesson 5.6

A. Use the graph to find the x -intercept and y -intercept of each line.



x -intercept _____
 y -intercept _____



x -intercept _____
 y -intercept _____

B. Find the x -intercept by substituting 0 for y . Then find the y -intercept by substituting 0 for x .

1. $y = 6x - 6$

x -intercept _____
 y -intercept _____

2. $y = 4 - 2x$

x -intercept _____
 y -intercept _____

3. $y = x + 5$

x -intercept _____
 y -intercept _____

4. $y = 7$

x -intercept _____
 y -intercept _____

5

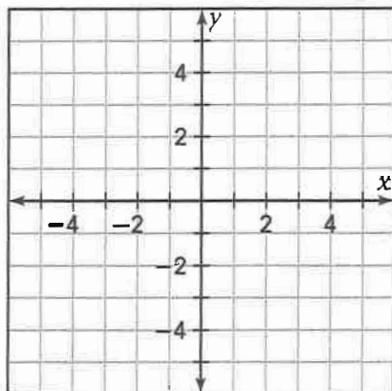
Using Slope

Exercise 29

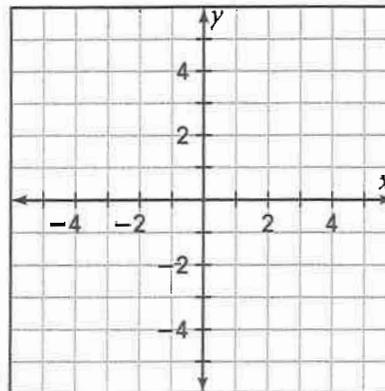
Lessons 5.7 to 5.9

A. Graph the line that contains the given point and has the given slope.

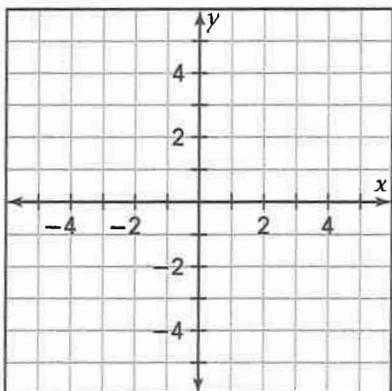
1. point: $(-6, 2)$; slope: $\frac{2}{3}$



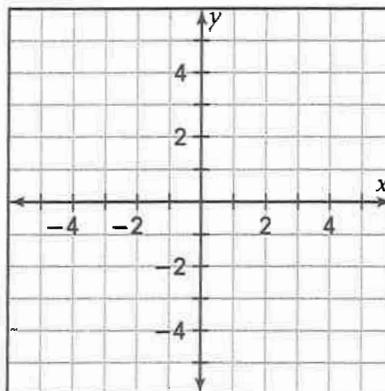
2. point: $(5, 0)$; slope: -1



3. point: $(-4, 4)$; slope: $\frac{1}{4}$



4. point: $(1, -2)$; slope: -3



B. Write these equations in slope-intercept form. Then, find the slope and y-intercept of each line.

1. $6x + 4y = -12$

equation _____

slope _____

y-intercept _____

2. $-6x + 3y = 18$

equation _____

slope _____

y-intercept _____

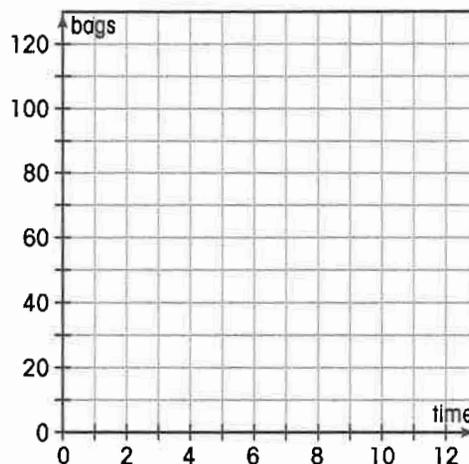
5 Using Rate of Change

Exercise 30

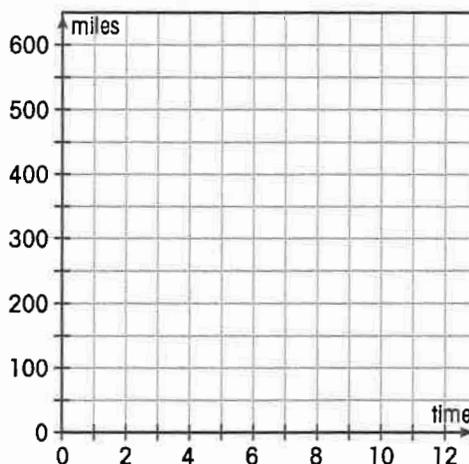
Lessons 5.11 and 5.12

A. Graph and find the slope to solve each problem.

1. Marlene is selling popcorn at a football game. At 6:00 P.M., she has sold 20 bags of popcorn. By 8:00 P.M., she has sold 60 bags. At this rate, how many bags of popcorn will she have sold by 10:00 P.M.?



2. A train leaves the station at 5:00 A.M. By 8:00 A.M. it has traveled 300 miles. At this rate, how many miles will the train have traveled by 10:00 A.M.?



B. Robert is driving 240 kilometers to the beach. The distance Robert drives varies directly with the hours he drives. He has driven 120 kilometers in 3 hours.

1. Find the r in the equation $D = rt$ (Distance = rate \times time)
2. Keeping that pace, how long will it take Robert to drive to the beach?

6

Using Slope and y -Intercept

Exercise 31

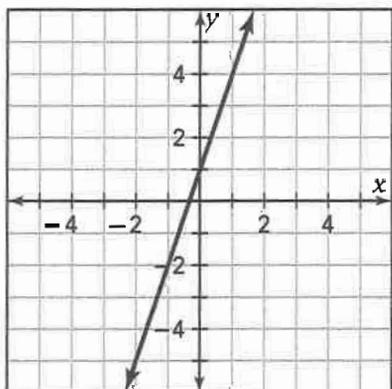
Lesson 6.1

A. Write the equation of the line with the given slope and y -intercept.

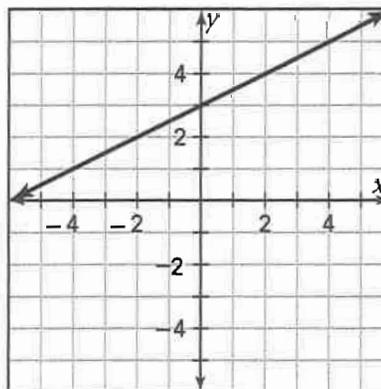
1. slope = 4 and y -intercept = -2 _____
2. slope = 0 and y -intercept = 10 _____
3. slope = -3 and y -intercept = 6 _____
4. slope = 5 and y -intercept = 0 _____
5. slope = $\frac{2}{3}$ and y -intercept = 9 _____

B. Use the graph to write the equation of each line.

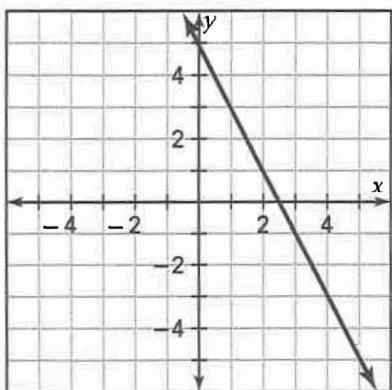
1. _____



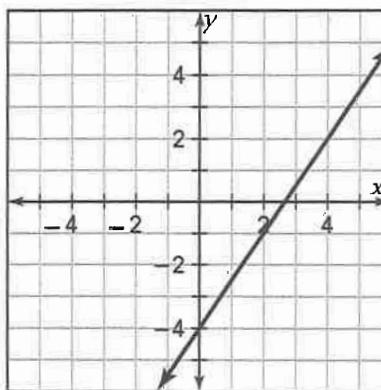
2. _____



3. _____



4. _____



6

Equations of Lines

Exercise 32

Lessons 6.2 and 6.6

A. Does the line pass through the given point? Write *yes* or *no* on the line. Show your work.

1. $(4, 2); y = 2x + 2$ _____

2. $(1, -1); y = -x$ _____

3. $(5, 3); y = x - 2$ _____

4. $(0, 7); y = x + 6$ _____

B. Write the equation of the line with the given point and slope. Then check the equation.

1. point: $(4, 3)$ slope: 2 equation _____

2. point: $(3, 2)$ slope: $\frac{2}{3}$ equation _____

3. point: $(5, 1)$ slope: -3 equation _____

6 Equations of Lines Exercise 33

Lessons 6.1, 6.3, and 6.4

A. Find the equation of the line through the given points. Then check the equation.

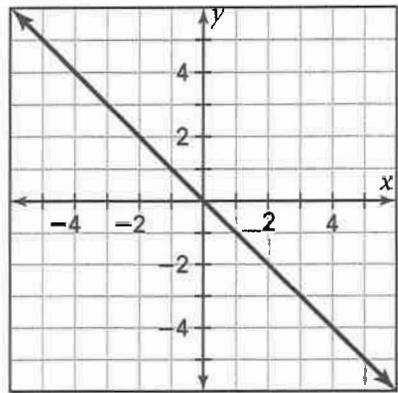
1. (3, 2) and (5, 6) _____

2. (3, 8) and (1, 4) _____

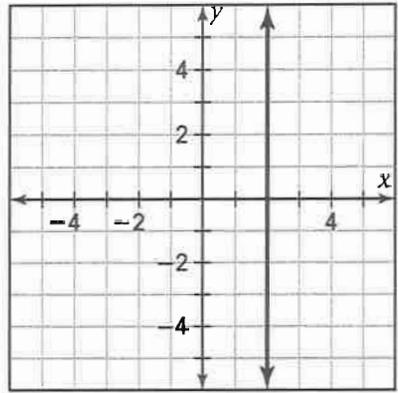
3. (-5, 1) and (0, 0) _____

B. Write the equation for each line.

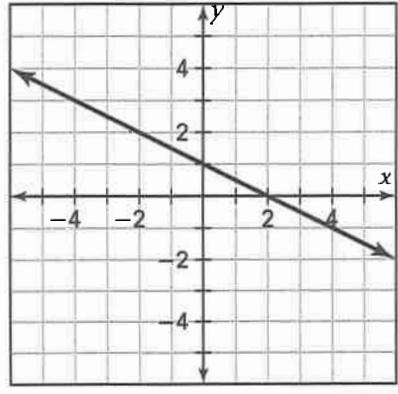
1. _____



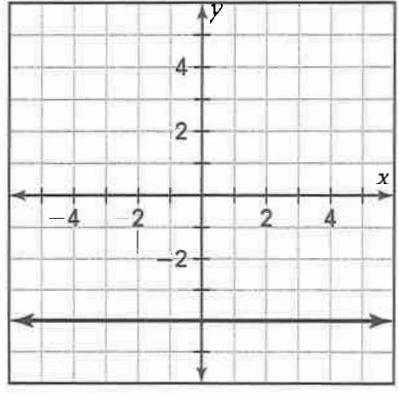
2. _____



3. _____



4. _____



6

Parallel and Perpendicular Lines

Exercise 34

Lessons 6.1, 6.4., and 6.5

A. Find the slope from each equation. Then write the slope of a perpendicular line and of a parallel line.

1. $y = 2x + 2$ slope of perpendicular line _____

slope _____ slope of parallel line _____

2. $y = -4x$ slope of perpendicular line _____

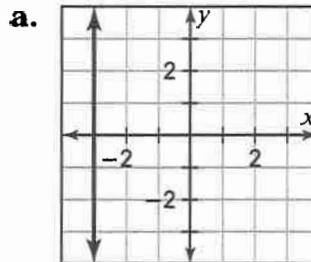
slope _____ slope of parallel line _____

3. $y = x - 3$ slope of perpendicular line _____

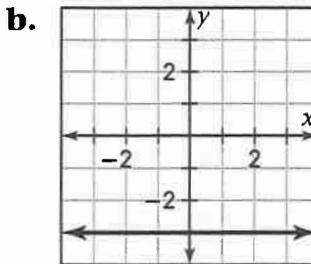
slope _____ slope of parallel line _____

B. Match each equation with its graph. Write the correct letter on the line.

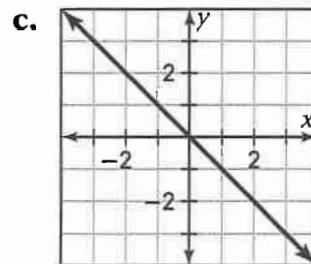
_____ 1. $y = -x$



_____ 2. $y = -3$



_____ 3. $x = -3$



6 Finding Number Patterns Exercise 35

Lesson 6.7

A. Describe the pattern in each table. Write your answers on the lines.

1.

x	y
10	6
11	7
12	8

2.

Pints	Cups
1	2
2	4
3	6

3.

Postage	Total Cost
5	11
6	12
7	13

4.

Students	Teachers
30	1
60	2
90	3

B. Use the table to find a pattern. Then, write the equation for the pattern.

1.

x	y
8	40
9	45
10	50

equation _____

2.

Height	Coat Length
60	50
61	51
62	52

equation _____

6

Writing Formulas

Exercise 36

Lessons 6.7 and 6.8

A. Use the table to answer each question.

Minutes	Distance (km)
25	5
50	10
75	15

1. Write an equation that shows how the distance changes with time. Use m for minutes and d for distance.
2. Use the equation to find the distance when $m = 35$.
3. Use the equation to find the distance when $m = 0$.

B. The table below shows how profit at a toy company changes with sales.

Sales	Profit
\$12	\$4
\$18	\$6
\$24	\$8

1. Write an equation to show how profit changes with sales. Use s for sales and p for profit.
2. Use the equation to find the profit when $s = 42$.
3. Use the equation to find the profit when $s = 60$.

7 Graphing Inequalities Exercise 37

Lesson 7.1

A. What is wrong with the graph of each inequality? Write your answer on the lines.

1. $x > 6$

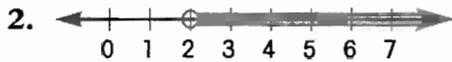


2. $x \leq -3$



B. Write the inequality described by the graph on the number line.











7 Solving Inequalities Exercise 38

Lessons 7.2 to 7.4

A. Name a number in the solution by looking at the graph. Then check the number.

1. $a + 1 > -2$



Number in solution _____

Check:

2. $2y - 4 < 8$

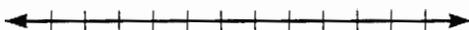


Number in solution _____

Check:

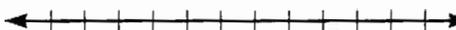
B. Solve each inequality. Then, graph the solution. Check with a point from the graph of the solution.

1. $-5m > 10$



Check:

2. $3w - 3 \leq 6$



Check:

7

Inequalities with Two Variables

Exercise 39

Lessons 7.1, 7.3, and 7.5

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. In $x > 5$, 5 is part of the solution.

2. In the graph of an inequality, a solid dot on 3 means the number 3 is a solution of the inequality.

3. Multiplying or dividing both sides of an inequality by the same negative number does not change the inequality.

4. The "less than" symbol is $<$.

B. Tell whether the point is a solution of the inequality. Write *yes* or *no*. Show your work.

1. $(4, 5); y < x + 2$ _____ 2. $(-2, 1); y \leq x - 1$ _____

3. $(0, 3); 3y \geq x$ _____ 4. $(0, -1); y > 4x - 1$ _____

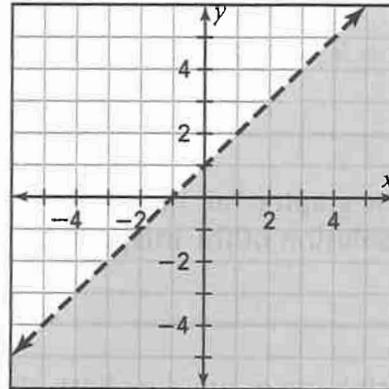
5. $(6, 2); y > x + 5$ _____ 6. $(-3, 2); y > 4x$ _____

7 Graphing Solutions in the Coordinate Plane Exercise 40

Lessons 7.5 and 7.6

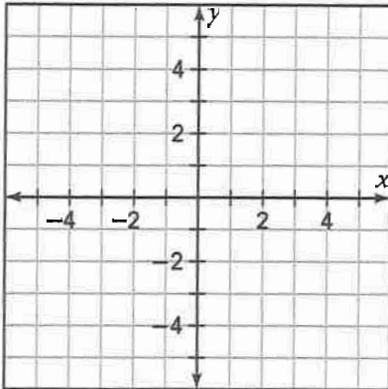
A. Use the graph to tell whether each point is a solution of the inequality. Write *yes* or *no* on the line.

1. $(4, 5)$ _____
2. $(0, 0)$ _____
3. $(-1, -3)$ _____
4. $(-3, 2)$ _____

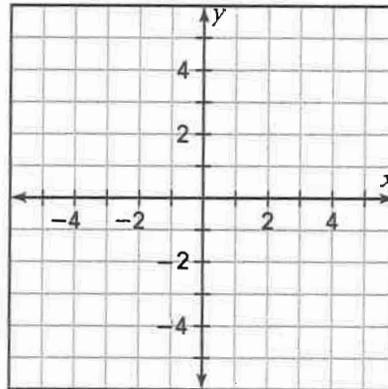


B. Graph the solution of each inequality on a coordinate plane.

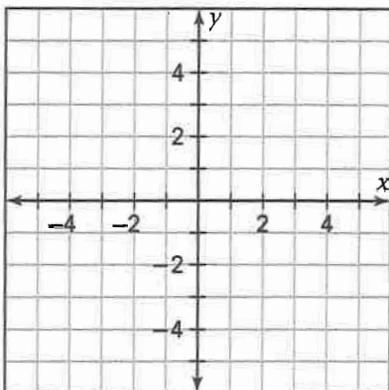
1. $y < x$



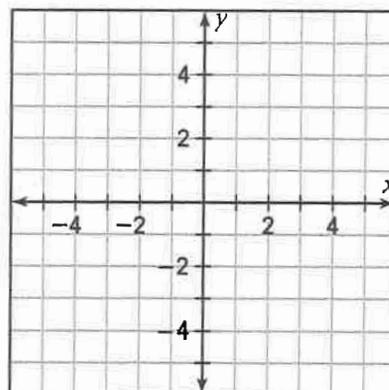
2. $y \geq x - 5$



3. $y < -\frac{3}{2}x + 5$



4. $y \leq \frac{1}{2}x - 4$



7

Using Inequalities

Exercise 41

Lesson 7.8

Decide whether each inequality is correct. Write *yes* if it is right. If it is wrong, write the correct inequality.

1. The cookies must bake for no more than 10 minutes.
Use t for time.

$$t > 10 \text{ _____}$$

2. Tony wants to save at least \$16.00. Use m for money.

$$m \geq 16 \text{ _____}$$

3. The coldest temperature of the year was less than -5°C .
Use t for temperature.

$$t \leq -5 \text{ _____}$$

CRITICAL THINKING

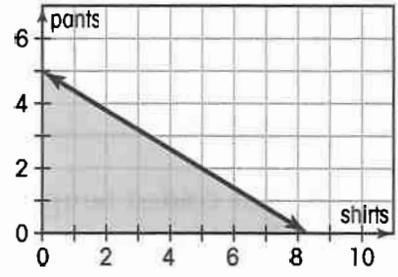
Write an inequality for each problem. Then, solve the inequality.

- Two high school students want to buy a tennis racket that costs more than \$100.00. If they share the cost evenly, how much will each student pay?
- Team A has to score at least 55 points to avoid elimination from the game. They now have 43 points. How many more points must Team A score to stay in the game?
- Jamie is buying tickets to a movie. How many \$6.00 tickets can he buy if he wants to spend less than \$36.00?

7 Using Inequalities **Exercise 42**
Lesson 7.9

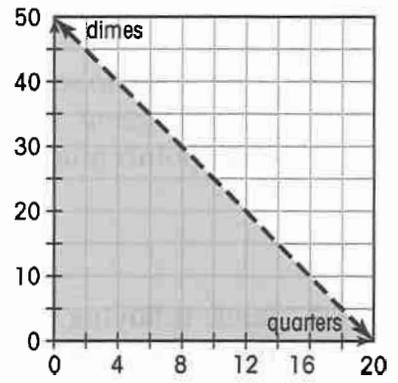
A. Cathy has \$25.00 to spend on clothes for school. She found a clearance sale where each shirt costs \$3.00 and each pair of pants costs \$5.00. The ordered pair (shirts, pants) tells the number of each item she buys. Use the graph of the inequality to answer the questions ($3s + 5p \leq 25$).

1. Can Cathy buy 6 shirts and 2 pairs of pants?
2. Can she buy 1 shirt and 4 pairs of pants?
3. Can she buy 5 shirts and 2 pairs of pants?



B. Julio has less than \$5.00 in coins. All of the coins are quarters and dimes. The ordered pair (quarters, dimes) tells the number of each coin he has. Use the graph of the inequality to answer the questions ($.25q + .10d < 5$). Explain your answer.

1. Could Julio have 10 quarters and 20 dimes? Why?
2. Could he have 14 quarters and 18 dimes? Why?
3. Could he have 16 quarters and 10 dimes? Why?



8 Systems of Equations and Inequalities

Exercise 43

Lessons 8.1, 8.2, and 8.7

A. Tell whether the ordered pair is the solution of the system of equations. Write *yes* or *no*.

1. $(5, 1); y = x + 7$
 $y + 2x - 6$

2. $(-1, -4); y = x - 3$
 $y = -5 - x$

3. $(0, 6); y = x + 6$
 $y = 4x + 1$

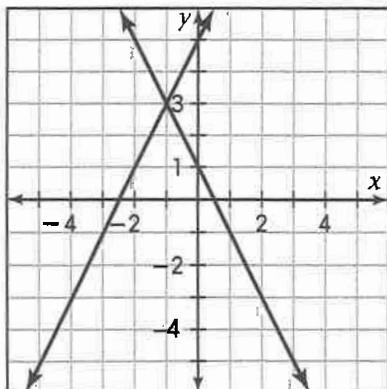
4. $(3, -5); y = 4 - 3x$
 $y = x - 8$

B. Tell whether the ordered pair is a solution of the system of inequalities. Write *yes* or *no*.

1. $(-1, 3); y > 2x$
 $y < x - 6$

2. $(4, -1); y < 3x + 4$
 $y \geq 7 - 2x$

C. Find the solution of the system by looking at its graph. Write the ordered pair in the blank.



Solution _____

8

Solving Systems of Equations

Exercise 44

Lessons 8.3 and 8.4

A. Use the substitution method to solve each system of equations. Then check.

1. $y = 4x$

$y = x + 6$

Check:

2. $y = x + 3$

$x = 4y$

Check:

B. Use addition or subtraction to solve each system of equations. Then, check.

1. $6x + y = 10$

$2x - y = 6$

Check:

2. $3x + 5y = -20$

$3x + 2y = -17$

Check:

CRITICAL THINKING

Tell whether you would use substitution or addition to solve each system. Explain why.

1. $y = 2x + 10$

$x = 3y$

2. $3x + y = -3$

$2x - 2y = -10$

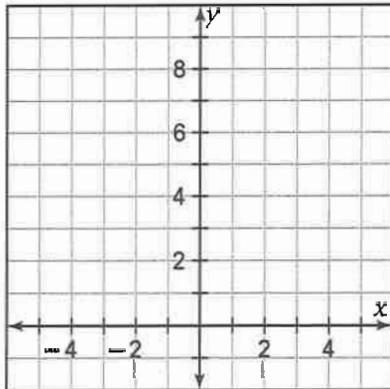
8 Solving Systems by Graphing Exercise 45

Lessons 8.2 and 8.8

A. Solve by graphing. Write the solution or write *no solution* on the line.

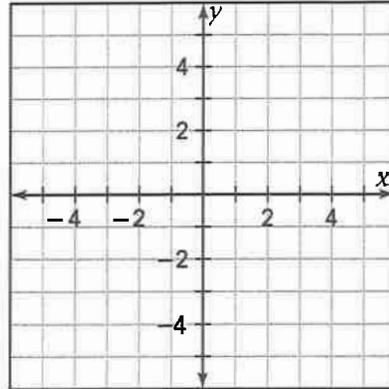
1. $y = 2x$

$y = x + 5$ _____



2. $y = 3x$

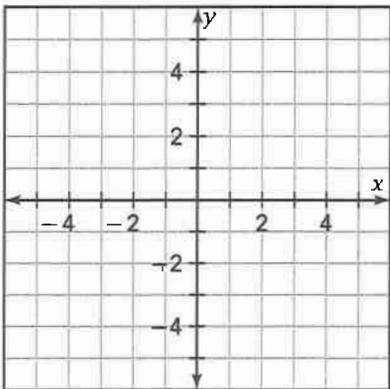
$y = x + 2$ _____



B. Solve by graphing.

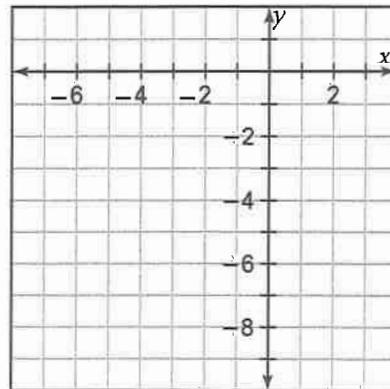
1. $y > 3x$

$y < x + 2$



2. $y \geq 2x + 2$

$y > x - 5$



8

Using Systems

Exercise 46

Lesson 8.10

Use a system of equations to solve each problem.

1. Five times a number plus another number is 12. Their difference is 6. What are the two numbers?

x _____

y _____

2. Last week at the farmer's market, Jerry paid \$5.00 for 2 pounds of cucumbers and 1 pound of squash. This week, he paid \$9.00 for 3 pounds of cucumbers and 2 pounds of squash. How much does each vegetable cost per pound?

Cucumbers _____

Squash _____

3. The sum of two numbers is 15. Their difference is 5. What are the two numbers?

x _____

y _____

4. Maria has 20 coins in her pocket, and all of the coins are either quarters or dimes. The coins total \$3.20. How many of each coin does she have?

Quarters _____

Dimes _____

8 Solving Systems

Exercise 47

Lessons 8.5, 8.6, and 8.8

A. Solve each system.

1. $5x + y = -4$
 $x + 2y = -17$

2. $8x - 2y = 14$
 $-7x + y = 5$

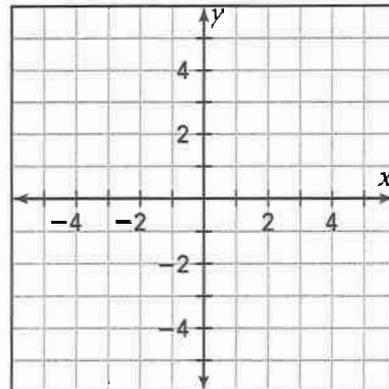
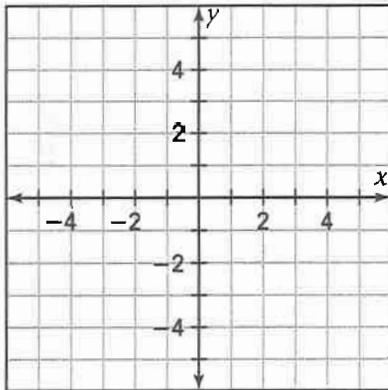
3. $2x + 3y = 15$
 $5x + 2y = 21$

4. $4x + 3y = 2$
 $3x + 4y = -2$

B. Solve by graphing.

1. $y \geq 5$
 $y \leq 3x + 2$

2. $y > x - 3$
 $y > 2x - 1$



8 Using Systems

Exercise 48

Lesson 8.11

A. Write the inequalities.

1. Pamela is planning her Saturday schedule. She wants to sleep at least 8 hours, and she must work at least 5 hours. She can only sleep and work for a total of 16 hours if she plans to run all of her errands.

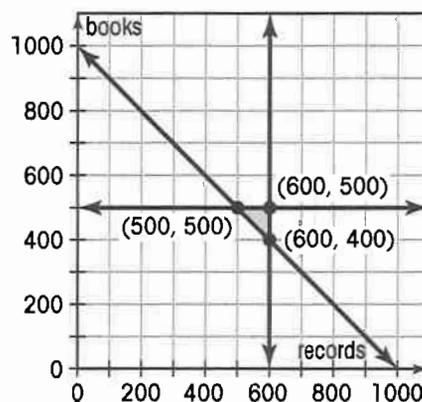
2. An interior designer orders no more than 100 rolls of red and blue wallpaper. She needs at least 60 rolls of red wallpaper and at least 25 rolls of blue wallpaper.

B. Write the inequalities. Then solve.

A store manager wants to have at least 1,000 records and books in his store. It costs \$10.00 to order a record and \$6.00 to order a book. He needs at most 600 records and 500 books.

1. Write the inequalities for books, records, and total books and records.

2. Use the graph of the inequalities and the equation $\text{Cost} = 10r + 6b$ to find the minimum cost.





Representing Data

Exercise 49

Lessons 9.1 to 9.3

A. Find the mean, mode, and median of each data set.

1. The classes at Southside High School are not all the same size. The principal wants to give a report to the school board. The numbers of students in each class are as follows: 32, 23, 28, 15, 17, 21, 9, 7, 28.

Mean _____

Mode _____

Median _____

2. The low temperatures during the month of January broke all records. The temperatures (in degrees Fahrenheit) for the first 6 days of the month were as follows: -3, 8, -5, 1, 8, -3.

Mean _____

Mode _____

Median _____

B. Find the minimum, maximum, and range of the set of data.

1. The college basketball team did not have a very consistent season. The team scores for the home games were as follows: 73, 104, 100, 68, 55, 93.

Minimum _____

Maximum _____

Range _____

9 Mean, Mode, Median, Range Exercise 50

Lessons 9.1 to 9.3

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. To find the median, order a set of data from least to greatest. Then choose the middle number.

2. The median is the number that appears most often in a data set.

3. The maximum is the largest number in a set of data.

4. The range is the difference between the minimum and maximum values in a set of data.

5. For a positive correlation, the data in two sets decrease together.

6. The minimum is the smallest number in a set of data.

B. Tell whether the information about the data is correct. Write *true* or *false*. If *false*, find the correct value.

Data: 11, 8, 6, 23, 7, 2, 11, 5, 17

1. mean = 12 _____

2. median = 7 _____

3. mode = 11 _____

4. maximum = 17 _____

5. minimum = 2 _____

6. range = 21 _____

9

Displaying Data

Exercise 51

Lessons 9.4 and 9.5

A. Complete the frequency table for the data set of registered voters in a very small town. Then, answer the questions.

R = Republican, D = Democrat, I = Independent

Data set: R, D, R, D, D, I, R, D, I, R, R, R, D, I, R, D, D, I, R, I, R, R, D, I

1.

Voters	Tally	Frequency
Republican		
Democrat		
Independent		
	Total	

2. How many voters were registered? _____

3. How many more Republicans are registered than Democrats? _____

4. Which party has the smallest number of registered voters? _____

B. Make a stem-and-leaf plot to display the data set. Then, find the information.

1. 41, 41, 44, 55, 58, 59, 60, 61, 62, 63, 72, 77

2. Find the minimum of the data. _____

3. Find the maximum of the data. _____

4. Find the range of the data. _____

Stem	Leaves

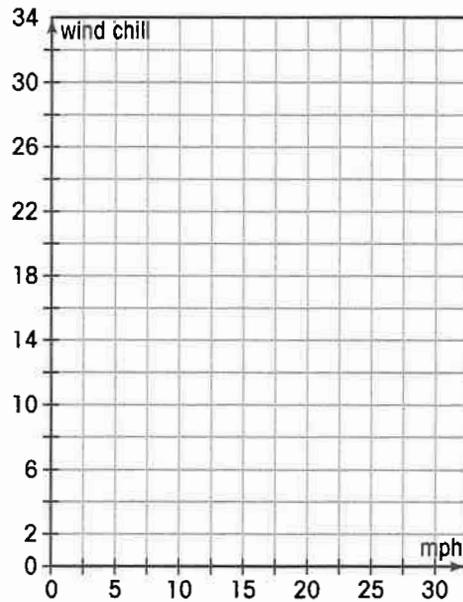
9 Describing Data Exercise 52

Lesson 9.6

Make a scatter plot for each set of data. Then, tell if the correlation is positive or negative. Write your answer on the line.

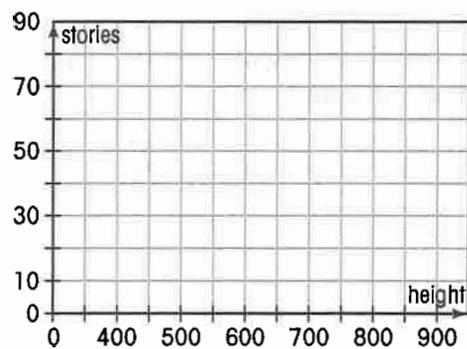
- The table below lists the wind speed and wind chill temperature when the actual temperature is 35° Fahrenheit.

Wind Speed (mph)	Wind Chill (Fahrenheit)
5	33°
10	22°
15	16°
20	12°
25	8°



- The table below lists the height from the sidewalk to the roof and the number of stories from street level of several notable tall buildings.

Height (feet)	Stories
400	32
400	40
529	40
580	50
788	61
859	74
880	63



9 **Representing Data** **Exercise 53**

Lesson 9.8

Find the mean, mode, and median. What are the best descriptions for the data sets? Explain why.

- 1.** Jerry's test scores on his last five tests were: 87, 86, 85, 83, 50, 83.

mean _____ median _____ mode _____

Best descriptions of the data set _____

Why? _____

- 2.** The prices of the magazine subscriptions are \$21, \$6, \$10, \$17, \$3, and \$3.

mean _____ median _____ mode _____

Best descriptions of the data set _____

Why? _____

- 3.** The number of cars on local car dealers' lots are 80, 52, 10, 8, and 80.

mean _____ median _____ mode _____

Best descriptions of the data set _____

Why? _____

9 **Quartiles** **Exercise 54**

Lesson 9.9

Find the quartiles of each set of data.

1. Daily stock prices in dollars: \$44, \$20, \$43, \$48, \$39, \$21, \$55

First quartile _____

Second quartile _____

Third quartile _____

2. Test scores: 99, 80, 84, 63, 105, 82, 94

First quartile _____

Second quartile _____

Third quartile _____

3. Shoe sizes: 2, 13, 9, 7, 12, 8, 6, 3, 8, 7, 4

First quartile _____

Second quartile _____

Third quartile _____

4. Price of eyeglass frames in dollars: 99, 101, 123, 85, 67, 140, 119

First quartile _____

Second quartile _____

Third quartile _____

5. Number of pets per family: 5, 2, 3, 1, 0, 7, 4, 3, 2, 2, 6

First quartile _____

Second quartile _____

Third quartile _____

10 Powers**Exercise 55**

Lesson 10.1

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. In the equation $y = 4^x$, 4 is the base.

2. When the base is positive, the power is always negative.

3. The product of equal factors is called a power.

4. In the equation $y = 6^x$, x is the exponent.

B. Find each power.

1. $(-3)^3$ _____

2. 6^2 _____

3. 5^3 _____

4. $(-1)^5$ _____

C. Find the value of each power when x is -2 .

1. x^2 _____

2. x^3 _____

3. x^4 _____

4. x^5 _____

10 Finding Powers**Exercise 56**

Lessons 10.2, 10.6 to 10.8

A. Write as factors. Then, rewrite with exponents.

1. $m^4 \cdot m$ Factors _____

Exponents _____

2. $a^4 b^3 \cdot a^2$ Factors _____

Exponents _____

3. $rs^3 \cdot 6r^2s$ Factors _____

Exponents _____

B. Tell whether each equation is *true* or *false*. If *false*, correct the right side to make a true equation.

1. $r^3 \cdot r^3 = r^9$ _____

2. $x^5 \cdot 3xy = x^2y^3$ _____

3. $4n^3p \cdot np^2 = 4n^3p^2$ _____

C. Multiply or divide.

1. $\frac{d^2}{d^2}$

2. $x^0 \cdot a^2$

3. $a^2b^0c \cdot a^0b^7c^0$

4. $m^{-3}m^3$

5. $n^2 \cdot n^{-1}$

6. $a^{-7}b^2 \cdot ab^{-3}$

7. $\frac{x^3}{x^5}$

8. $\frac{a^{-2}b^3}{a^{-3}b}$

9. $\frac{x^{-5}y^2}{x^2y^{-7}}$

D. Find each number named in scientific notation.

1. 1.44×10^8

2. 6.23×10^{-4}

3. 2.06×10^{-2}

10 Division and Rules of Exponents Exercise 57

Lessons 10.3 to 10.5

A. Multiply or divide.

1. $x^5 \cdot x^7$ _____

2. $\frac{n^6}{n^3}$ _____

3. $b^4c^2 \cdot b^5$ _____

4. $\frac{a^{10}b^3}{a^5b^2}$ _____

5. $3x^3y^2 \cdot 2xy^2$ _____

6. $\frac{20n^4c^6}{4n^4c^4}$ _____

B. Find the missing term.

1. $c^9 \cdot \underline{\hspace{2cm}} = c^{16}$

2. $\underline{\hspace{2cm}} \cdot x^2 = x^8$

3. $\underline{\hspace{2cm}} \cdot 2a^3 = 10a^7$

4. $6y \cdot \underline{\hspace{2cm}} = 18y^2$

5. $a^2b^3 \cdot \underline{\hspace{2cm}} = a^4b^4$

6. $\underline{\hspace{2cm}} \cdot n^2x^5 = n^3x^5$

C. Find the missing term.

1. $\frac{a^9}{\blacksquare} = a^3$

2. $\frac{\blacksquare}{y^2} = y^6$

3. $\frac{\blacksquare}{2n^2} = 4n^5$

4. $\frac{24x^{10}}{\blacksquare} = 4x^9$

5. $\frac{b^5c^4}{\blacksquare} = b^3c$

6. $\frac{\blacksquare}{y^3} = x^3y^4$

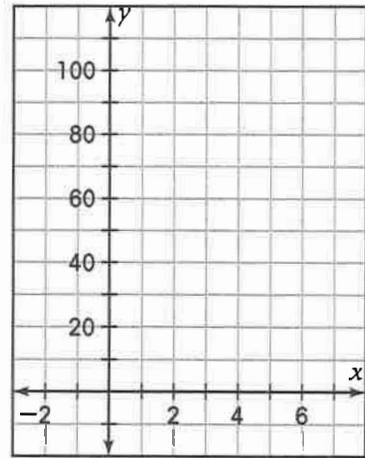
10 Exponential Functions Exercise 58

Lessons 10.9 and 10.10

Find six ordered pairs for each function. Use the values $x = 0, 1, 2, 3, 4$ and 5 . Graph each function using the ordered pairs from the table.

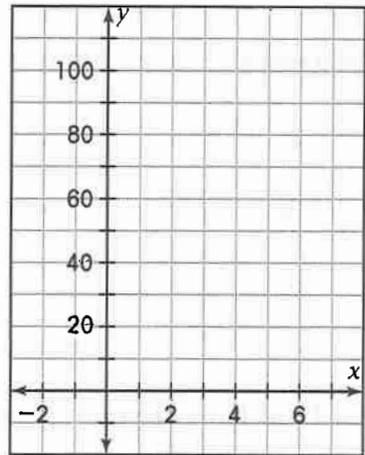
1. $y = 3^x$

x	3^x	y
0		
1		
2		
3		
4		
5		



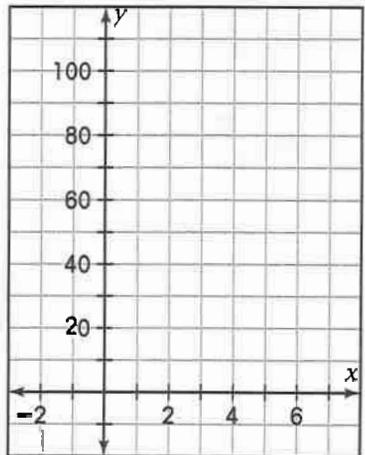
2. $y = 4^x$

x	4^x	y
0		
1		
2		
3		
4		
5		



3. $y = 3 \cdot 2^x$

x	$3 \cdot 2^x$	y
0		
1		
2		
3		
4		
5		



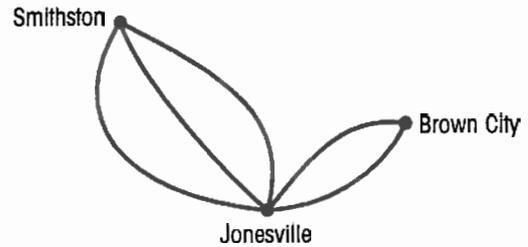
10 Using Tree Diagrams

Exercise 59

Lesson 10.12

Draw a tree diagram to show all the possible choices.

- There are 3 roads that go from Smithston to Jonesville. There are 2 roads that go from Jonesville to Brown City. How many ways are there to go from Smithston to Brown City if you have to go through Jonesville?



- The college shop is trying to sell its new line of clothing. It is selling 4 types of pants and 5 styles of tops. How many different outfits can you wear if you buy all of these items?

10

Using Exponents

Exercise 60

Lessons 10.8 and 10.13

- A.** The compound interest formula is $\text{Total} = a(1 + r)^x$, where a is the initial deposit, r is the rate of interest, and x is the number of time periods the money is invested.

Look at the compound interest equation
 $428.72 = 200 \cdot (1.1)^8$ to answer the questions.

1. Find the rate of interest. _____
2. Find the initial deposit. _____
3. Find the number of time periods (years) the money will be in the bank. _____

- B.** Write the number named by scientific notation.

1. The thinnest piece of glass is 9.8×10^{-4} in. _____
2. A drop of water contains 1.7×10^{22} molecules. _____
3. The growth rate of the abnormal cells in the sample is 1.45×10^5 cells per week.

4. The weight of the particle being studied was less than expected. It weighed only 7.823×10^{-3} kg.

11

Graphing Quadratic Functions

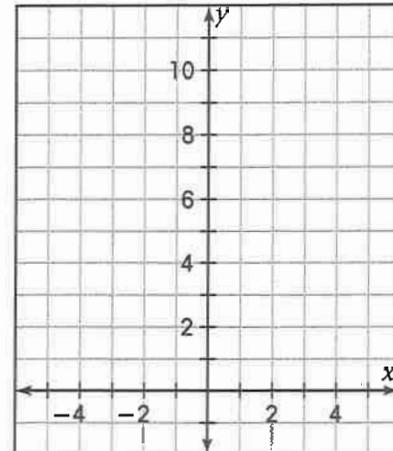
Exercise 61

Lesson 11.2

Make a table of values from the quadratic function.
Then, graph.

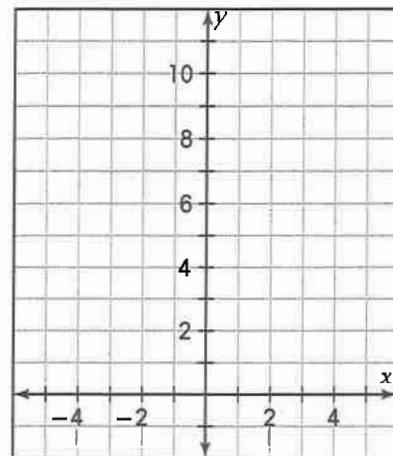
1. $y = \frac{1}{2}x^2$

x	$\frac{1}{2}x^2$	y
-4		
-2		
0		
2		
4		



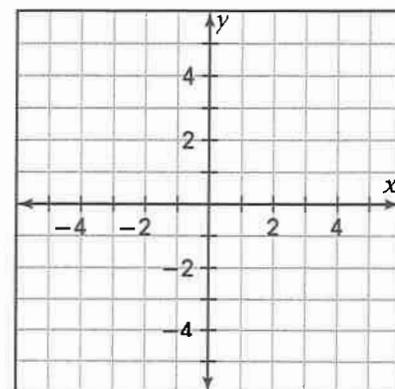
2. $y = x^2 + 1$

x	$x^2 + 1$	y
-3		
-2		
-1		
0		
1		
2		
3		



3. $y = -x^2 + 4x$

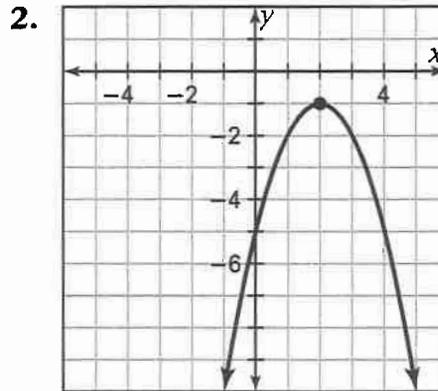
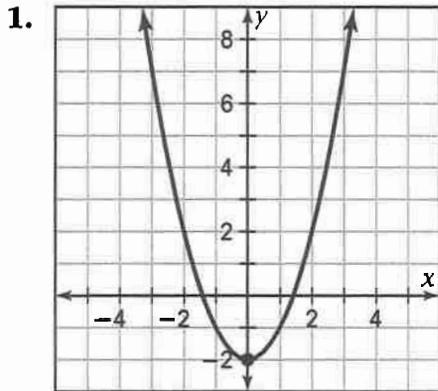
x	$-x^2 + 4x$	y
-1		
0		
1		
2		
3		
4		
5		



11 Minimums and Maximums Exercise 62

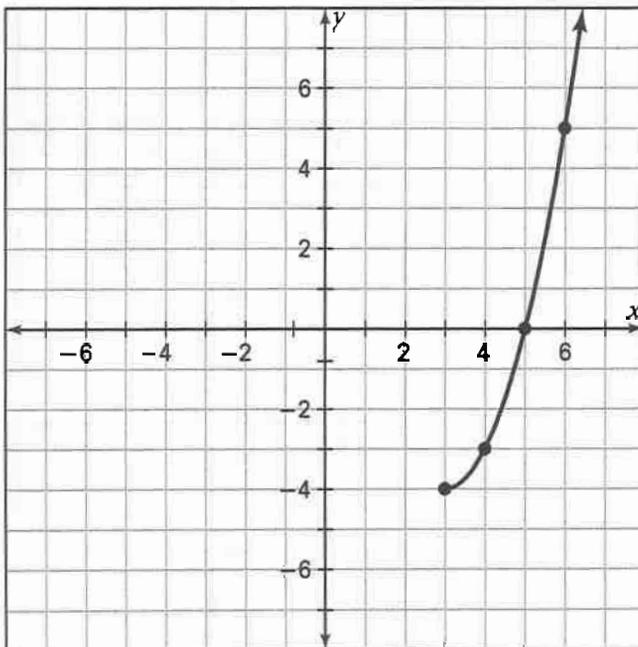
Lesson 11.3

Tell whether the graph has a minimum or maximum.
Then name the point.



CRITICAL THINKING

The graph below shows part of the graph of a quadratic function. Complete the graph.



11

Squares and Square Roots

Exercise 63

Lessons 11.1, 11.3, 11.5, and 11.6

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. The equation $y = 3x^2 + 6x + 1$ is a quadratic function.

2. The maximum of a quadratic function is the largest value of y in a quadratic function.

3. In a quadratic function, the value of b tells whether the graph opens upward or downward.

4. Square refers to a number raised to the second power.

B. Find the square roots of each number.

1. 121 _____

2. 25 _____

3. 144 _____

4. 49 _____

5. 1 _____

6. 100 _____

C. Solve the equations. Check.

1. $x^2 = 64$

2. $x^2 = 9$

3. $20x^2 = 20$

4. $x^2 + 7 = 88$

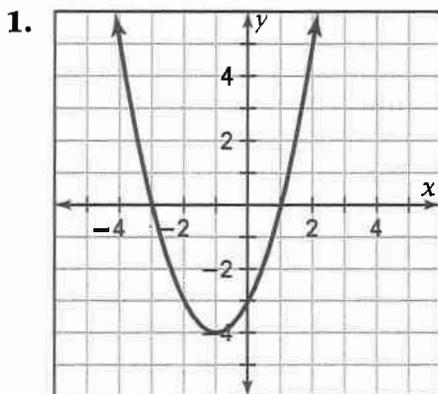
11

Quadratic Formula

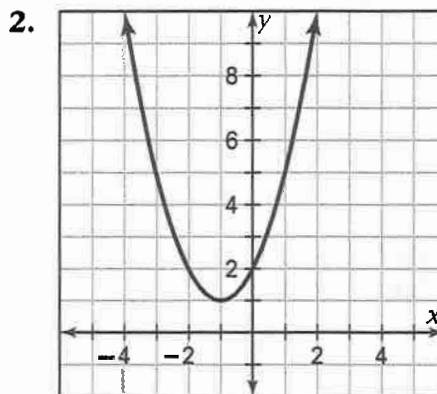
Exercise 64

Lessons 11.4 and 11.7

A. Name the zeros of each function by using its graph.



Zeros _____



Zeros _____

B. Use the quadratic formula to find the zeros of each equation.

1. $y = x^2 + 2x - 15$

2. $y = x^2 + 4x + 4$

11**Writing Quadratic Equations****Exercise 65***Lesson 11.9*

A. Solve each problem by using a quadratic equation. Use the formula for the area of a square ($A = s^2$).

1. The area of a square is 64 square inches. Find the length of a side.
2. A contractor is working on a square patio that will be made of square concrete blocks. He has 25 blocks. How many blocks will there be along each side?

B. Solve each problem by using a quadratic equation. Use the formula for the area of a rectangle ($A = lw$).

1. The area of a rectangle is 162 square centimeters. The length of the rectangle is 2 times the width. Find the length and width of the rectangle.
2. An architect is designing a rectangular meeting room so that the length is 3 times the width. She needs the area of the room to be 4,800 square feet. How long should she make each side?

11**Vertical Motion Formula****Exercise 66***Lesson 11.10*

Solve each problem using the vertical motion formula:

$$h = -16t^2 + vt + s.$$

1. You drop a penny into a wishing well. After falling for 3 seconds, the penny hits the bottom of the well. How deep is the well?

2. A rock falls off a mountain that is 1,000 feet high. How much time has passed when the rock reaches 744 feet above the ground?

3. A plant falls from a window that is 144 feet high. How much time will it take for the plant to hit the ground?

4. Medical supplies are dropped out of a plane. After 10 seconds, the parachute opens and the supplies are 5,500 feet above the ground. How high was the plane when the supplies were dropped?

12 Naming Polynomials**Exercise 67**

Lessons 12.1 to 12.3

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. A trinomial is an expression with one term.

2. A binomial is an expression with three terms.

3. A monomial is an expression with two terms.

4. All polynomials have at least one monomial.

B. Add the polynomials.

1. $2x + 5$ and $3x - 2$

2. $3x^2 - x - 5$ and $x^2 - 5x + 7$

3. $3x^2 - 2x - 9$ and $2x + 8$

4. $x^2 + 6x - 2$ and $x^2 + 6$

C. Subtract the polynomials.

1. $4x + 10$ from $8x + 16$

2. $2y^2 - 2$ from $y^2 - 3y + 7$

3. $5y^2 + y + 8$ from $7y^2 - 4y - 4$

4. $2x^2 + 7x - 4$ from $7x^2$

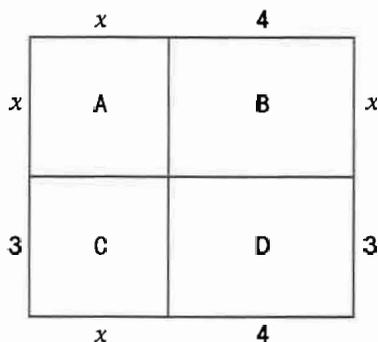
12

Polynomials

Exercise 68

Lessons 12.1, 12.2, 12.4, and 12.5

- A. The rectangle below is divided into four smaller rectangles. Use the formula, $Area = lw$ to find the area of each rectangle.



- Find the area of A. _____
- Find the area of B. _____
- Find the area of C. _____
- Find the area of D. _____
- Use your answers to write a polynomial for the total area of the rectangle.

B. Multiply.

- $3x(x + 2)$
- $2a(a - 8)$
- $(x + 4)(x + 3)$
- $(b + 6)(b - 7)$
- $(x + 4)(x - 7)$
- $(b - 4)(b + 4)$
- $(c - 3)(c + 6)$
- $(d - 5)(d - 4)$

12**Factors****Exercise 69***Lessons 12.6 and 12.7*

A. Decide whether the first expression is a factor of the second expression. Write *yes* or *no*.

1. x^2 ; $6x$

2. x^2 ; x^4y^6

3. $3y$; $7y^3$

4. $2a^4$; $8a^4 + 6a^8$

5. $3x^2y$; $3x^3y - 15x^2y^4$

6. $2ab^2$; $2ab + 4a^2b$

B. Factor by finding the greatest common factor.

1. $5c^2d^3 - 15c^3d$

2. $2a^2b - 12a^2b^4$

3. $14t^2 + 7t^5$

4. $20x^2y^3 - 10x^3y^2$

12**Factoring****Exercise 70***Lessons 12.8 to 12.10*

Factor as the product of two binomials. Then check by multiplying.

1. $n^2 - 121$

2. $p^2 - 49$

3. $64 - x^2$

4. $100 - q^2$

5. $121 - 22x + x^2$

6. $x^2 + 8x - 9$

7. $a^2 + 14a + 13$

8. $c^2 - 20c + 19$

9. $p^2 - 13p + 22$

10. $n^2 - 2n - 8$

12 Zero Products**Exercise 71***Lessons 12.11, 12.12, and 12.14***A. Use the Zero Product Property to solve. Then check.**

1. $2a(a - 4) = 0$

2. $n(n + 3) = 0$

3. $(3x - 6)(4x - 8) = 0$

4. $(y + 5)(y - 7) = 0$

B. Solve. Use the quadratic formula or factoring.

1. $x^2 - 9x - 10 = 0$

2. $y^2 + 6y + 8 = 0$

3. $a^2 - 36 = 0$

4. $b^2 - 8b - 20 = 0$

12

Using Formulas

Exercise 72

Lesson 12.15

Use the given formula to answer the question.

1. Find the area of a triangle with base = 10 m and height = 12 m. Use the formula $A = \frac{bh}{2}$. b means base, and h means height.
2. Find the number of diagonals in a polygon with 8 sides. Use the formula $d = \frac{s^2 - 3s}{2}$. d means number of diagonals and s means number of sides.
3. Find the height in inches of a ball 5 seconds after it is thrown upward. Use the formula $h = 40t - 5t^2$. h means height, and t means time.
4. Find the value of c if $a = 3$ inches and $b = 4$ inches. Use the formula $c^2 = a^2 + b^2$.

13

Simplifying Radicals

Exercise 73

Lessons 13.1 and 13.2

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. $\sqrt{48}$ is between 7 and 8. _____

2. $\sqrt{21}$ is between 4 and 5. _____

3. $\sqrt{67}$ is between 6 and 7. _____

4. $\sqrt{82}$ is between 10 and 11. _____

5. $\sqrt{37}$ is between 6 and 7. _____

6. $\sqrt{18}$ is between 4 and 5. _____

B. Describe the mistake in the work. Then simplify correctly.

1. $\sqrt{45} = \sqrt{9 \cdot 5} = \sqrt{9} \cdot \sqrt{5} = 9\sqrt{5}$ $\sqrt{45}$ _____

Mistake:

2. $\sqrt{75} = \sqrt{3 \cdot 25} = \sqrt{3} \cdot \sqrt{25} = 3\sqrt{5}$ $\sqrt{75}$ _____

Mistake:

3. $\sqrt{48} = \sqrt{4 \cdot 12} = \sqrt{4} \cdot \sqrt{12} = 2\sqrt{12}$ $\sqrt{48}$ _____

Mistake:

13**Operations with Radicals****Exercise 74***Lessons 13.3 and 13.4***A. Simplify each sum or difference.**

1. $2\sqrt{3} + 4\sqrt{3}$ _____

2. $3\sqrt{5} - \sqrt{5}$ _____

3. $4\sqrt{6} + 3\sqrt{7}$ _____

4. $\sqrt{24} + \sqrt{6}$ _____

5. $2\sqrt{50} - 5\sqrt{2}$ _____

6. $\sqrt{24} - \sqrt{20}$ _____

B. Simplify each product.

1. $7\sqrt{2} \cdot 3\sqrt{3}$ _____

2. $5\sqrt{5} \cdot 8\sqrt{7}$ _____

3. $\sqrt{5} \cdot 3\sqrt{10}$ _____

4. $-\sqrt{3} \cdot \sqrt{6}$ _____

C. Simplify each quotient.

1. $\frac{10\sqrt{2}}{6}$ _____

2. $\frac{4\sqrt{50}}{2\sqrt{5}}$ _____

3. $\frac{6\sqrt{3}}{\sqrt{36}}$ _____

4. $\frac{7\sqrt{14}}{\sqrt{2}}$ _____

13 Solving Equations

Exercise 75

Lessons 13.5 and 13.7

A. Solve. Then check.

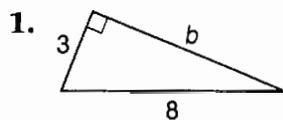
1. $\sqrt{a} = 13$

2. $2\sqrt{2g} = 4$

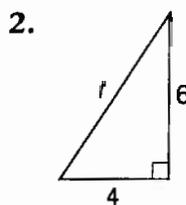
3. $\sqrt{x} - 5 = 11$

4. $\sqrt{p - 10} = 12$

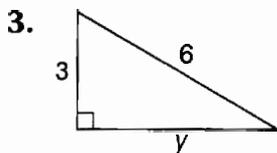
B. Use the Pythagorean theorem to solve for the missing side.



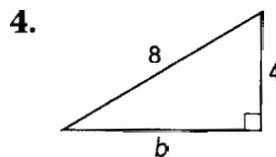
$b =$ _____



$r =$ _____



$y =$ _____



$b =$ _____

13

Right Triangles

Exercise 76

Lessons 13.6 to 13.9

A. Circle the correct answer for each question.

1. To use the Pythagorean Theorem, what information must be given?

a. length of hypotenuse	b. length of any two sides
c. length of short leg	d. length of long leg

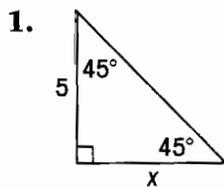
2. Which equation would you use to find the hypotenuse of a $45^\circ-45^\circ-90^\circ$ right triangle?

a. hypotenuse = leg $\cdot \sqrt{2}$	b. hypotenuse = (leg) ²
c. hypotenuse = leg $\cdot \sqrt{3}$	d. hypotenuse = 2 \cdot leg

3. Which equation would you use to find the long leg of a $30^\circ-60^\circ-90^\circ$ right triangle?

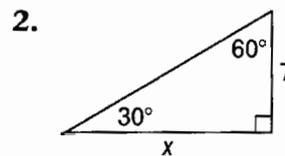
a. long leg = short leg $\cdot \sqrt{2}$	b. long leg = (short leg) ²
c. long leg = short leg $\cdot \sqrt{3}$	d. long leg = 2 \cdot short leg

B. Write the equation you would use to find x . Then, solve the equation.



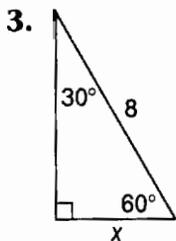
equation _____

solution _____



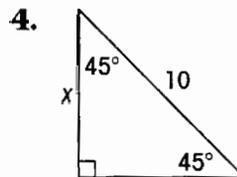
equation _____

solution _____



equation _____

solution _____



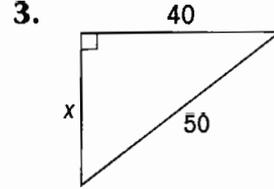
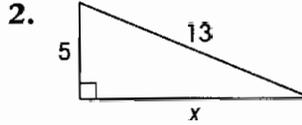
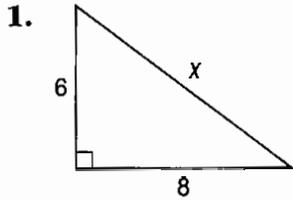
equation _____

solution _____

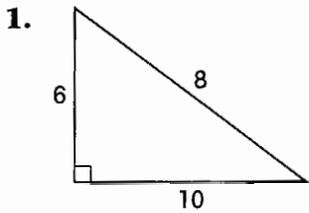
13 Right Triangles Exercise 77

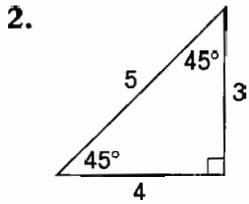
Lessons 13.6 to 13.9

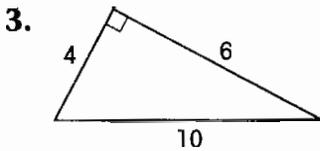
A. Find the missing sides of each triangle.



B. Describe what is wrong with each picture.







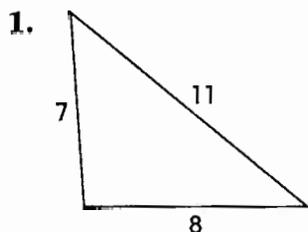
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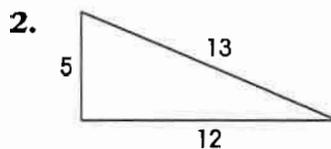
Using the Pythagorean Theorem

Exercise 78

Lessons 13.7 and 13.11

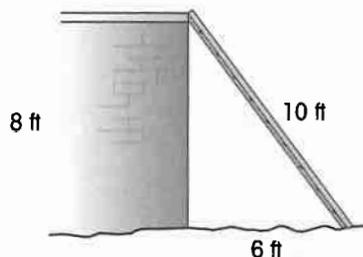
A. Tell whether each triangle is a right triangle. Use the sides and the Pythagorean Theorem. Write your answer on the line.



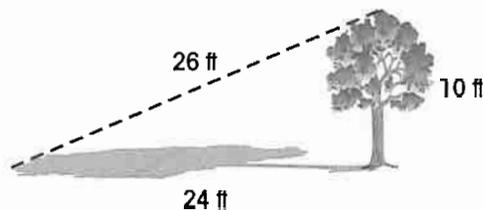


B. Use the Pythagorean Theorem to tell whether each triangle is a right triangle. Then write *yes* or *no*. Show your work.

1. Is the triangle formed by the ladder, the wall, and the ground a right triangle?



2. Is the triangle formed by the tree and its shadow a right triangle?



13

Finding Distances

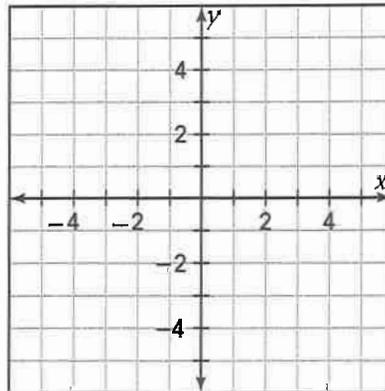
Exercise 79

Lesson 13.12

A. Graph each pair of points. Then find the distance between the points.

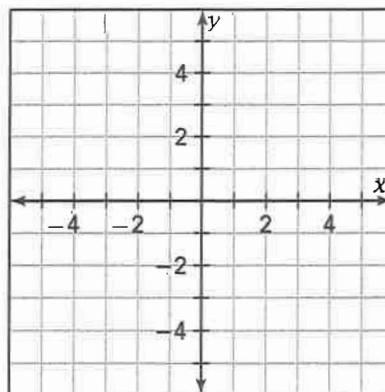
1. $(-3, 4)$ and $(3, 2)$

$d =$ _____



2. $(1, 0)$ and $(5, 3)$

$d =$ _____



B. Use the picture at the right to find the following distances.

1. Find the distance between points A and B.

$d =$ _____

2. Find the distance between points B and C.

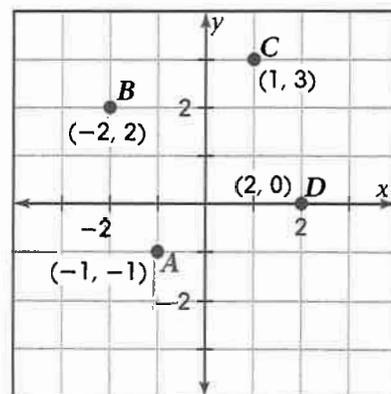
$d =$ _____

3. Find the distance between points C and D.

$d =$ _____

4. Find the distance between points D and A.

$d =$ _____



14 Rational Numbers and Expressions Exercise 80

Lessons 14.1 and 14.2

A. Evaluate each expression.

1. $\frac{4+y}{2}$ when y is 10.

2. $\frac{6}{x+3}$ when x is 9.

3. $\frac{4x}{x^2+1}$ when x is 10.

4. $\frac{5p}{p^2-3}$ when $p = 1$.

5. $\frac{x+7}{6y}$ when x is 2 and y is 3.

6. $\frac{6}{a+b}$ when a is 3 and b is 7.

B. State the values of the variable for which the expression is undefined.

1. $\frac{b+4}{b-8}$ _____

2. $\frac{2a}{(a+2)(a-2)}$ _____

3. $\frac{4}{y^2-5y}$ _____

4. $\frac{7}{2x^2+2x}$ _____

14 Simplifying Rational Expressions **Exercise 81***Lessons 14.3 and 14.4*

A. Simplify all the expressions. Then, draw a line to connect each expression on the left with its equivalent expression on the right.

1. $\frac{20}{24}$

a. $\frac{a}{4a^2}$

2. $\frac{3a}{12a^2}$

b. $\frac{a^2 - 5a}{4a}$

3. $\frac{15}{5(b-4)}$

c. $\frac{5a^4b}{6a^4b}$

4. $\frac{4a - 20}{16}$

d. $\frac{18}{6}$

5. $\frac{3b + 12}{b + 4}$

e. $\frac{6a + 18}{6}$

6. $\frac{a^2 + 7a + 12}{a + 4}$

f. $\frac{3b + 12}{b^2 - 16}$

B. Find the least common multiple.

1. 8 and 24 _____

2. $6n^2$ and $10m^3$ _____

3. $3xy$ and $12x^2$ _____

4. $x - 2$ and $x + 3$ _____

5. $a + 3$ and $a + 6$ _____

6. $r - 5$ and $r + 5$ _____

14

Rational Expressions

Exercise 82

Lessons 14.5 to 14.8

A. Add or subtract as indicated.

1. $\frac{4}{3n} + \frac{2}{3n}$

2. $\frac{3}{5} + \frac{3}{10}$

3. $\frac{3}{8} - \frac{2}{9}$

4. $\frac{3}{c+2} - \frac{1}{c+2}$

5. $\frac{5}{st} + \frac{4}{s}$

6. $\frac{5b}{12} + \frac{b}{8}$

7. $\frac{7}{w} - \frac{2}{w+4}$

8. $\frac{5r}{r+2} + \frac{3}{r-2}$

B. Multiply or divide as indicated. Simplify your answer, if possible.

1. $\frac{3}{4} \div \frac{9}{8}$

2. $\frac{3}{4} \div \frac{6b}{5a}$

3. $\frac{4}{b} \cdot \frac{3}{8ab}$

4. $\frac{m}{4} \cdot \frac{m}{-3}$

5. $\frac{r^2}{7s^2} \div \frac{3r}{28s}$

6. $\frac{uv}{u^2} \cdot \frac{uv^2}{v}$

7. $\frac{2y+4}{7} \cdot \frac{3y}{y+2}$

8. $\frac{y^2+4y+4}{y-2} \div \frac{y+2}{y-2}$

9. $\frac{3y}{6y+18} \cdot \frac{y+3}{5}$

10. $\frac{x^2-9}{x-3} \div \frac{x+3}{x+9}$

14

Proportions

Exercise 83

Lessons 14.1, 14.9, and 14.10

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. A proportion is a statement that two ratios are not equal.

2. The fraction $\frac{2y + 6}{4y + 12}$ in lowest terms is $\frac{1}{2}$.

3. 6 is a rational number.

4. $\frac{1}{x + 4}$ is a rational expression.

5. A rational equation contains irrational expressions.

B. Solve each proportion.

1. $\frac{6}{x} = \frac{1}{2}$

2. $\frac{5}{r + 4} = \frac{3}{r + 2}$

3. $\frac{c - 1}{4} = \frac{3c + 2}{2}$

4. $\frac{m}{m + 4} = \frac{2}{m}$

C. Solve each rational equation.

1. $\frac{s + 2}{8} + \frac{s}{4} = 7$

2. $\frac{3}{w} + \frac{2}{3} = \frac{9}{w}$

3. $\frac{4}{x} - \frac{5}{2x} = \frac{1}{6}$

4. $\frac{3}{5y} - \frac{7}{10} = \frac{4}{2y}$

14**Using Proportions****Exercise 84***Lesson 14.12*

Use a proportion to solve each problem.

1. If 3 pounds of coffee cost \$12.00, how many pounds can you buy for \$20.00?
2. Ron can run 15 miles in 2 hours. If he could run for 6 hours, how many miles would he run?
3. A race car driver can travel 15 miles in 3 minutes. How long would it take the driver to travel 180 miles?
4. You can buy 5 pairs of socks for \$8.00. How much would you spend if you bought 20 pairs of socks?
5. A printer can produce 48 books in 3 hours. How many books can be printed in 8 hours?
6. James can wash 2 cars in 45 minutes. How long will it take him to wash 6 cars?
7. Yoli has a business meeting 4 out of 5 days each week. How many meetings will she have in 80 days?

14 Inverse Variation

Exercise 85

Lesson 14.13

CRITICAL THINKING

A. In a camera, the opening that lets light in is measured by the f-stop (f). The focal length is the distance from the lens to the point inside the camera to where an image is focused. The f-stop varies inversely with the diameter of the lens. For a focal length of 100 mm, use $f = \frac{100}{D}$ to find the diameter of the lens for each f-stop.

The table gives some f-stops found on cameras. Complete the table to find the lens diameter (in mm) for a focal length of 100 mm. Round your answers to the nearest tenth.

Focal length: 100 mm					
f-stop	1.4	2	2.8	4	8
Diameter					

B. In an electric circuit, a battery can provide electric energy measured in volts. The battery sends an electrical charge, called current, through the circuit. The current is then used by a lamp, radio, or other device. The lamp device provides resistance. The current (I) varies inversely with the resistance (R) of the circuit. With a power of 120 volts, use the equation $I = \frac{120}{R}$ to answer the questions. Resistance is measured in ohms. Current is measured in amperes (amps).

1. What is the current when the resistance is 20 ohms?
2. What is the current when the resistance is 30 ohms?

15

Probabilities

Exercise 86

Lessons 15.2 to 15.7

A. Write *true* or *false* after each sentence. If the sentence is *false*, change the underlined word or words to make it true.

1. A compound event is two or more events together.

2. A complementary event is an event whose outcome affects the outcome of a second event.

3. A dependent event is an event whose outcome is not affected by the outcome of another event.

4. Order is not important in a combination.

5. The value 1.3 could be the probability of an outcome.

B. Write whether you would use a permutation or a combination to solve each problem. Then solve.

1. Sarah has 7 bracelets. How many different ways can she choose 2 bracelets to wear to school? _____

2. In how many different sequences can 4 people stand in a line? _____

3. A music competition has 6 finalists. They can win first or second place. How many ways can the finalists win? _____

15**Permutations and Combinations****Exercise 87***Lessons 15.1 to 15.3*

A. Write whether you would solve each problem using a permutation or a combination. Then solve.

1. How many ways can you arrange the letters R, O, C, K, E, T?
2. Joe's company has 5 job openings and 9 applicants. How many ways can he choose 5 people to fill the vacant positions?
3. Seven people are competing in a contest. They can win first, second, or third prize. In how many ways can the finalists win?
4. List all the permutations of the letters in the word MATH.
5. List all the combinations of three letters chosen from the word MATH.

B. Find the total number of choices.

1. Esti has 3 skirts and 5 T-shirts. How many choices does she have to pick a T-shirt and skirt?
2. A phone system has been set up to tell people about school cancellations. The principal calls 5 people who each call 5 more people. Those people then each call 5 people. How many people receive a phone call?

15**Probabilities****Exercise 88***Lessons 15.4 and 15.5***A. Find each probability.**

You select one marble from a jar that has 4 black marbles, 6 gray marbles, and 3 white marbles.

1. What is the probability that you will select a black marble?
2. What is the probability that you will select a gray marble?
3. What is the probability that you will select a green marble?
4. What is the probability that you will select a white marble?
5. What is the probability that you will select a marble that is *not* gray?

**CRITICAL THINKING**

Write each probability.

You choose a letter at random from the word SPRAIN.

1. What is the probability that you will pick the letter N?
2. What is the probability that you will pick a vowel?
3. What is the probability that you will pick a letter that is *not* I?

15 Probability

Exercise 89

Lesson 15.4

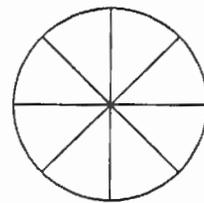
CRITICAL THINKING

A. The probabilities below describe what could happen when you pick a marble from a certain jar. Use the probabilities to draw the marbles that could be in the jar.



1. $P(\text{red marble}) = \frac{3}{9}$ How many red marbles are there? _____
2. $P(\text{blue marble}) = \frac{4}{9}$ How many blue marbles are there? _____
3. $P(\text{yellow marble}) = 0$ How many yellow marbles are there? _____
4. $P(\text{white marble}) = \frac{2}{9}$ How many white marbles are there? _____
5. How many marbles are in the jar? _____

B. The probabilities below describe what could happen when a certain spinner is spun. Use the probabilities to draw what the spinner could look like.



1. $P(\text{land on } 5) = \frac{2}{8}$ How many 5s are there? _____
2. $P(\text{land on } 3) = \frac{3}{8}$ How many 3s are there? _____
3. $P(\text{land on } 2) = \frac{2}{8}$ How many 2s are there? _____
4. $P(\text{land on an even number}) = \frac{3}{8}$ How many even numbers are there? _____
5. $P(\text{land on a number greater than } 5) = \frac{1}{8}$ How many numbers are greater than 5? _____
6. $P(\text{land on a number less than } 7) = 1$ How many numbers are less than 7? _____

15

Events

Exercise 90

Lessons 15.6 and 15.7

Solve each problem.

1. Allison has a bag containing 6 red chips and 4 black chips. Without looking, she pulls out one chip. Then without putting the first chip back, she pulls out a second chip. What is the probability that both chips are red?
2. You have a spinner with 4 odd numbers and 3 even numbers. What is the probability that the spinner will *not* land on an odd number?
3. You roll a cube with sides numbered 0 to 5. Then, you toss a coin. What is the probability that you roll a 5 and toss heads?
4. Carla is taking a multiple choice test. The probability that she guesses correctly on a question is $\frac{1}{5}$. What is the probability that she will guess incorrectly?
5. You flip a coin 4 times. What is the probability that heads will come up all 4 times?

15**Probabilities****Exercise 91***Lesson 15.9*

Solve each problem. Write the probability as a percent.

1. A survey asks 20 people if they have a pet. Seven people answer "yes." Find the probability that a person has a pet.
2. The team has won 9 of its last 12 games. Find the probability that the team wins.
3. A factory makes computer chips. In a sample of 8,000 chips, 50 of the chips were defective. Find the probability that a chip is defective.
4. A newspaper reports that 21 of the 25 people surveyed voted in the last election. Find the probability that a person voted in the last election.
5. A survey asked 60 people if they preferred apples or oranges. 42 people said they preferred apples. Find the probability that a person prefers apples.

Lesson 15.10

Predict each outcome.

1. The probability of a defective car radio is 7%. How many defective radios would you expect to find in 500 cars?
2. Jim plays basketball. He scores a basket in 75% of his free throws. How many free throws would you expect Jim to make in 40 attempts?
3. There is a 20% chance of rain in the next 12 days. How many days do you expect it to rain?
4. 29% of the people surveyed said they bought a book last week. How many people would you expect to have purchased a book if 1,000 people were surveyed?
5. In one industry, 22% of the products sold become obsolete very quickly. How many products in 450 would you expect to become obsolete very quickly?
6. Maria is a soccer player. She scores 90% of her goal shots. If she takes 8 shots, how many goals can she expect to score?
7. There is a 10% chance of sleet in the next 10 days. How many days do you expect sleet?