

## To the Student

This *Skills Practice Workbook* gives you additional examples and problems for the concept exercises in each lesson. The exercises are designed to aid your study of mathematics by reinforcing important mathematical skills needed to succeed in the everyday world. The materials are organized by chapter and lesson, with one Skills Practice worksheet for every lesson in *IMPACT Mathematics, Course 3*.

Always keep your workbook handy. Along with your textbook, daily homework, and class notes, the completed Skills Practice Workbook can help you in reviewing for quizzes and tests.

## To the Teacher

These worksheets are the same ones found in the Chapter Resource Masters for *IMPACT Mathematics, Course 3*. The answers to these worksheets are available at the end of each Chapter Resource Masters Booklet.



The McGraw-Hill Companies

Copyright © by The McGraw-Hill Companies, Inc. All rights reserved.  
Except as permitted under the United States Copyright Act, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without prior written permission of the publisher.

Send all inquiries to:  
Glencoe/McGraw-Hill  
8787 Orion Place  
Columbus, OH 43240

ISBN: 978-0-07-891168-2

MHID: 0-07-891168-0

*Skills Practice Workbook, IMPACT Mathematics, Course 3*

Printed in the United States of America.

1 2 3 4 5 6 7 8 9 10 009 14 13 12 11 10 09 08

# Table of Contents

<b>Lesson/Title</b>	<b>Page</b>
1-1 Direct Variation . . . . .	1
1-2 Slope . . . . .	2
1-3 Write Equations . . . . .	3
2-1 Lines . . . . .	4
2-2 Angle Relationships . . . . .	5
2-3 Constructions . . . . .	6
3-1 Understand Percents . . . . .	7
3-2 Work with Percents . . . . .	8
4-1 Exponents . . . . .	9
4-2 Exponential Relationships . . . . .	10
4-3 Radicals . . . . .	11
5-1 Rearrange Algebraic Expressions . . . . .	12
5-2 Monomials, Binomials, and Trinomials . . . . .	13
5-3 Special Products . . . . .	14
6-1 Symmetry and Reflection . . . . .	15
6-2 Rotation . . . . .	16
6-3 Translations, Dilations, and Combined Transformations . . . . .	17
7-1 Equations . . . . .	18
7-2 Inequalities . . . . .	19
7-3 Solve Systems of Equations . . . . .	20

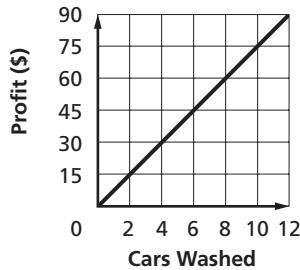
8-1	Use Graphs and Tables to Solve Equations . . . . .	21
8-2	Quadratic Relationships . . . . .	22
8-3	Families of Quadratics . . . . .	23
8-4	Inverse Variation . . . . .	24
8-5	Conjectures . . . . .	25
9-1	Backtracking . . . . .	26
9-2	Factoring . . . . .	27
9-3	Completing the Square . . . . .	28
9-4	The Quadratic Formula . . . . .	29
10-1	Functions . . . . .	30
10-2	Graphs of Functions . . . . .	31
11-1	Counting Strategies . . . . .	32
11-2	Modeling with Data . . . . .	33
12-1	Work with Algebraic Fractions . . . . .	34
12-2	Add and Subtract Algebraic Fractions . . . . .	35

## Lesson 1.1 Skills Practice

### Direct Variation

Determine whether a linear relationship exists between the two quantities shown. Explain your answer.

**1. Fundraiser Profits**



**2.**

Time (seconds)	Distance (yards)
$x$	$y$
1	6
2	8
3	10
4	12

Determine whether the relationship is a direct variation. Explain your reasoning.

**3.** The graph in Exercise 1

**4.** The table in Exercise 2

**Paper Costs** The cost of paper is directly proportional to the number of reams bought. Suppose 2 reams cost \$6.

**5.** Write an equation that could be used to find the cost of  $x$  reams of paper.

**6.** Find the cost of 15 reams of paper.

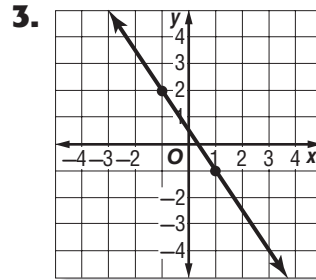
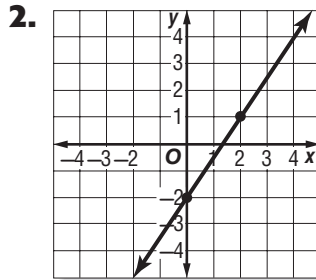
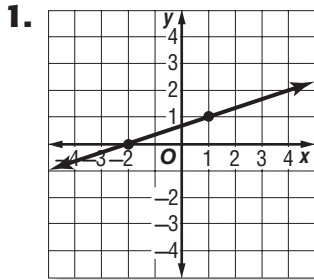
**Physical Science** Recall that the length a spring stretches is directly proportional to the amount of weight attached to it. A certain spring stretches 5 centimeters when a 10-gram weight is attached.

**7.** Write a direct-variation equation relating the weight  $x$  and the amount of stretch  $y$ .

**8.** Estimate the stretch of the spring when it has a 42-gram weight attached.

**Lesson 1.2 Skills Practice****Slope**

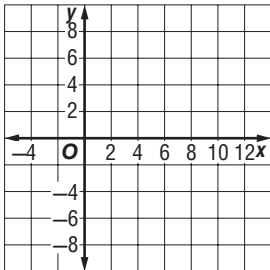
Find the slope of each line.



The points given in each table lie on a line. Graph the line. Then find the slope of the line by finding the ratio of rise to run.

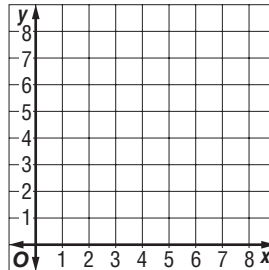
4. 

<b>x</b>	0	3	6	9
<b>y</b>	1	2	3	4



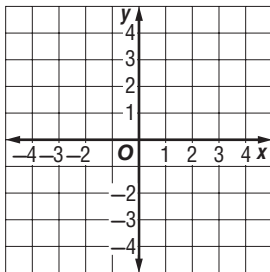
5. 

<b>x</b>	1	3	5	7
<b>y</b>	6	5	4	3



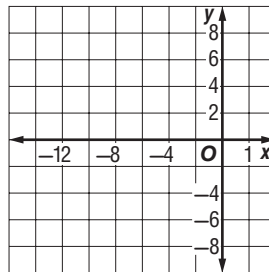
6. 

<b>x</b>	-4	-2	0	2
<b>y</b>	3	3	3	3



7. 

<b>x</b>	-7	-5	-3	-1
<b>y</b>	-6	-3	0	3



## Lesson 1.3 Skills Practice

### Write Equations

State the slope and  $y$ -intercept of the graph of each equation.

1.  $y = x + 4$

2.  $y = 2x - 2$

3.  $y = 3x - 1$

4.  $y = -x + 3$

5.  $y = \frac{1}{2}x - 5$

6.  $y = -\frac{1}{3}x + 4$

7.  $y - 2x = -1$

8.  $y + 4x = 2$

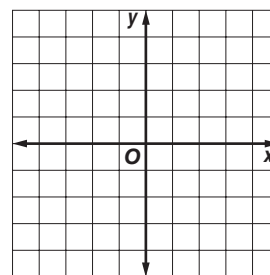
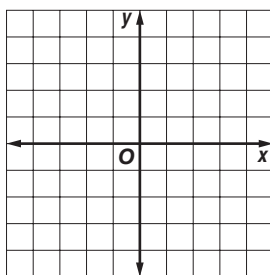
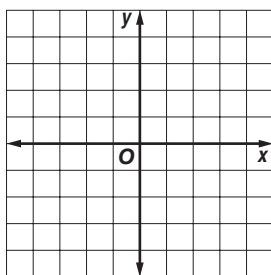
9.  $y = \frac{3}{2}x - 3$

Graph a line with the given slope and  $y$ -intercept.

10. Slope = 1  
 $y$ -intercept =  $-4$

11. Slope = 2  
 $y$ -intercept =  $-3$

12. Slope =  $\frac{1}{3}$   
 $y$ -intercept = 1

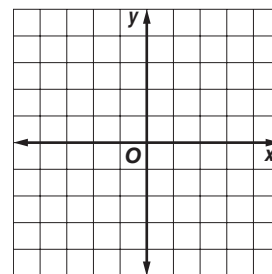
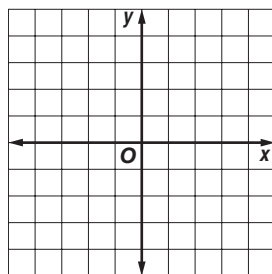
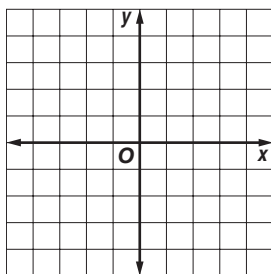


Graph each equation using the slope and  $y$ -intercept.

13.  $y = 3x - 3$

14.  $y = -x + 1$

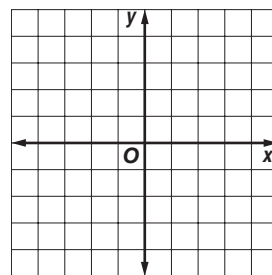
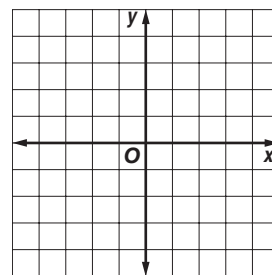
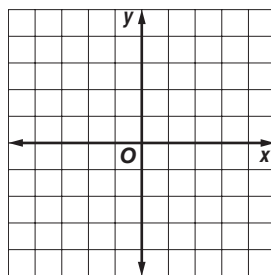
15.  $y = \frac{1}{2}x - 2$



16.  $y = 4x - 2$

17.  $y = -\frac{3}{2}x + 1$

18.  $y = \frac{2}{3}x - 3$



## Lesson 2.1 Skills Practice

### Lines

State the slope and  $y$ -intercept of the graph of each equation.

1.  $y = x + 4$

2.  $y = 2x - 2$

3.  $y = 3x - 1$

4.  $y = -x + 3$

5.  $y = \frac{1}{2}x - 5$

6.  $y = -\frac{1}{3}x + 4$

7.  $y - 2x = -1$

8.  $y + 4x = 2$

9.  $y = \frac{3}{2}x - 3$

State whether the equation is linear. If it is, identify the values of  $m$  and  $b$ . If an equation is not linear, explain how you know.

10.  $y = \frac{6}{x}$

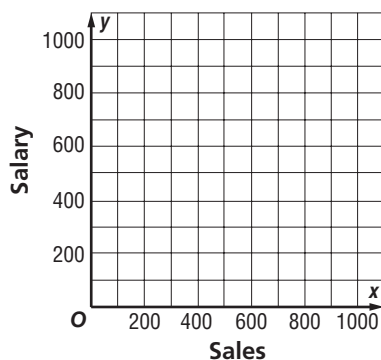
11.  $5y = 10x + 20$

12.  $3(x + 2) + 4(y - 1) = -2$

**13. Sales** The table gives Miranda's salary per week based on her sales during that week.

<b>Sales (\$)</b>	100	200	400	700
<b>Salary (\$)</b>	540	580	660	780

**a.** Plot the points in the table on the grid.



**b.** Draw a straight line through the points.

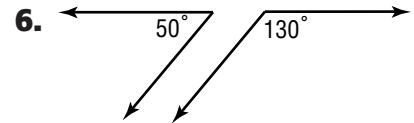
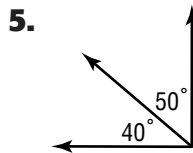
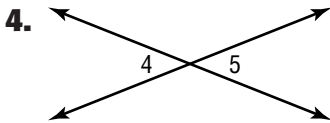
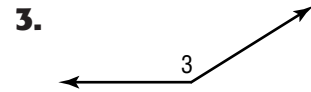
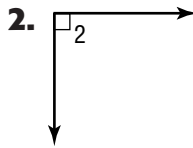
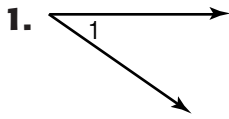
**c.** Write an equation of the line you drew.

**d.** Use your equation to predict Miranda's salary if her total sales for a week are \$900.

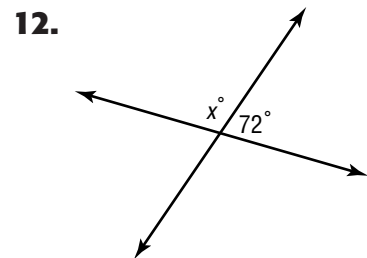
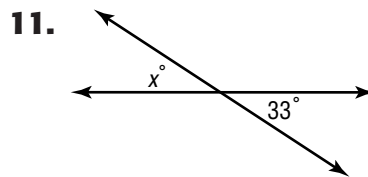
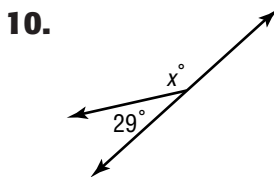
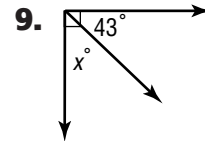
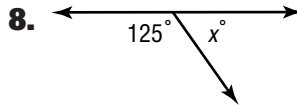
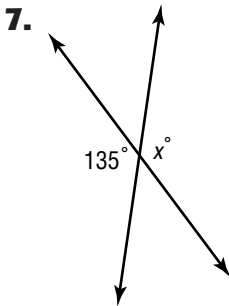
## Lesson 2.2 Skills Practice

### Angle Relationships

Classify each angle or angle pair using all names that apply.



Find the value of  $x$  in each figure.



For Exercises 13–22, use the figure at the right.

13. Find  $m\angle 5$  if  $m\angle 1 = 127^\circ$ .

14. Find  $m\angle 2$  if  $m\angle 7 = 65^\circ$ .

15. Find  $m\angle 3$  if  $m\angle 6 = 29^\circ$ .

16. Find  $m\angle 8$  if  $m\angle 4 = 132^\circ$ .

17. Find  $m\angle 5$  if  $m\angle 8 = 106^\circ$ .

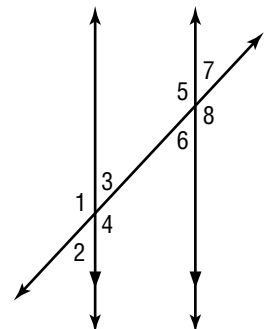
18. Find  $m\angle 3$  if  $m\angle 4 = 128^\circ$ .

19. Find  $m\angle 4$  if  $m\angle 5 = 151^\circ$ .

20. Find  $m\angle 1$  if  $m\angle 2 = 51^\circ$ .

21. Find  $m\angle 6$  if  $m\angle 7 = 81^\circ$ .

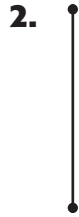
22. Find  $m\angle 3$  if  $m\angle 1 = 143^\circ$ .



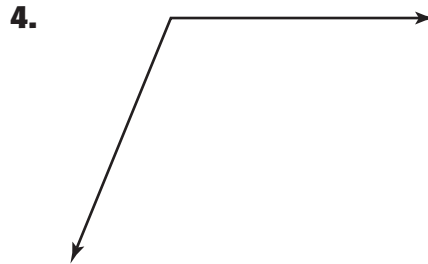
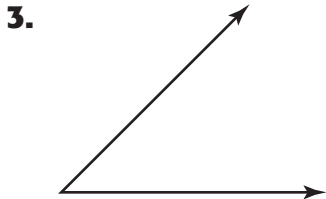


**Lesson 2.3 Skills Practice****Constructions**

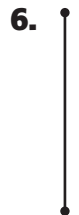
Construct a segment congruent to each segment.



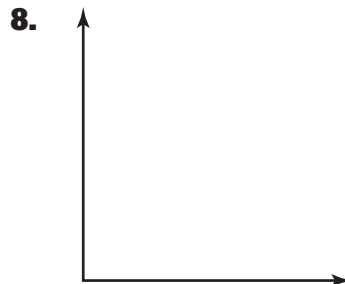
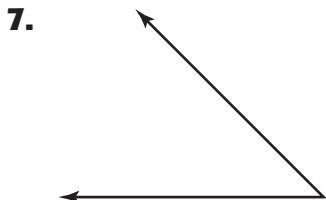
Construct an angle congruent to each angle.



Construct the perpendicular bisector of each segment.



Construct the bisector of each angle.



**Lesson 3.1 Skills Practice****Understand Percents**

Write a percent proportion to solve each problem. Then solve.  
Round to the nearest tenth if necessary.

1. 1 is what percent of 5?
2. What number is 25% of 40?
3. 30 is 60% of what number?
4. What percent of 8 is 6?
5. Find 15% of 20.
6. 33 is 33% of what number?
7. 15 is what percent of 150?
8. What number is 30% of 140?
9. 90 is 60% of what number?
10. What percent of 60 is 42?
11. Find 90% of 40.
12. 21 is 35% of what number?
13. 36 is what percent of 45?
14. What number is 75% of 44?
15. 12 is 40% of what number?
16. What percent of 40 is 15?
17. Find 5% of 80.
18. 45 is 60% of what number?
19. 46 is what percent of 69?
20. Find 55% of 120.
21. 11 is 44% of what number?
22. 19 is what percent of 20?
23. What number is 85% of 40?
24. 9 is 18% of what number?

**Lesson 3.2 Skills Practice****Work with Percents**

Find each percent of change. Round to the nearest tenth of a percent if necessary. State whether the percent of change is an *increase* or a *decrease*.

- |                                     |                                     |                                    |                                   |
|-------------------------------------|-------------------------------------|------------------------------------|-----------------------------------|
| <b>1.</b> Original: 4<br>New: 6     | <b>2.</b> Original: 35<br>New: 28   | <b>3.</b> Original: 80<br>New: 52  | <b>4.</b> Original: 45<br>New: 63 |
| <b>5.</b> Original: 120<br>New: 132 | <b>6.</b> Original: 210<br>New: 105 | <b>7.</b> Original: 84<br>New: 111 | <b>8.</b> Original: 91<br>New: 77 |

Find the selling price for each item given the cost to the store and the markup.

- |  |  |
|--|--|
| <b>9.</b> Suit: \$200, 50% markup      | <b>10.</b> Tire: \$50, 40% markup          |
| <b>11.</b> Sport bag: \$40, 30% markup | <b>12.</b> Radio: \$120, 25% markup        |
| <b>13.</b> Grill: \$85, 15% markup     | <b>14.</b> Microwave: \$96, 20% markup     |
| <b>15.</b> Chair: \$140, 45% markup    | <b>16.</b> Camcorder: \$350, 33% markup    |
| <b>17.</b> Camera: \$245, 10% markup   | <b>18.</b> Diamond ring: \$470, 35% markup |

Find the sale price of each item to the nearest cent.

- |  |  |
|--|--|
| <b>19.</b> Shoes: \$70, 10% off          | <b>20.</b> Artwork: \$250, 20% off           |
| <b>21.</b> Speakers: \$180, 30% off      | <b>22.</b> Bicycle: \$320, 25% off           |
| <b>23.</b> Antique chest: \$179, 15% off | <b>24.</b> Pendant: \$93.50, 5% off          |
| <b>25.</b> Sofa: \$749.95, 35% off       | <b>26.</b> Oven: \$535.99, 20% off           |
| <b>27.</b> Guitar: \$488.20, 25% off     | <b>28.</b> Weight machine: \$919.70, 10% off |

**Lesson 4.1 Skills Practice****Exponents**

Write each expression using exponents.

**1.**  $2 \cdot 2 \cdot 2 \cdot 2$

**2.**  $9 \cdot 9$

**3.**  $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$

**4.**  $x \cdot x \cdot x$

**5.**  $m \cdot n \cdot n \cdot n \cdot m \cdot n$

**6.**  $y \cdot x \cdot x \cdot y \cdot x \cdot y \cdot y$

Evaluate each expression.

**7.**  $4^3$

**8.**  $2^5$

**9.**  $8^{-2}$

**10.**  $7^{-4}$

**11.**  $4^2 \cdot 3^4$

**12.**  $2^6 \cdot 6^2$

**13.**  $3^3 \cdot 2^2$

**14.**  $2^5 \cdot 5^2$

**15.**  $(-2)^{-6}$

**16.**  $(2^3)^2$

**17.**  $(3^2)^2$

**18.**  $2^5 \cdot 2^7$

**19.**  $(3^7)^0$

**20.**  $10^{-4} \cdot 10^3$

**21.**  $2^5 \cdot 2^{-3}$

**22.**  $3^{-1} \cdot 3^{-2}$

Simplify.

**23.**  $x^3 \cdot x^4$

**24.**  $(3x^2)^3$

**25.**  $(-2y^4)^3$

**26.**  $5a^3 \cdot 2a^7$

**27.**  $(m^2n^4)^5$

**28.**  $(2x^{-3})^2$

**29.**  $(x^{-2})^3 \cdot x^8$

**30.**  $(a^7b^{-2})^4$

**31.**  $\frac{10a^4}{5a}$

**32.**  $\frac{12b^5}{-4b^6}$

**33.**  $\left(\frac{2x^4}{3y}\right)$

**34.**  $(5a^4b^{-2})^3$

Express each number in standard form.

**35.**  $1.5 \times 10^3$

**36.**  $3.78 \times 10^2$

**37.**  $1.75 \times 10^4$

**38.**  $2.34 \times 10^{-2}$

Express each number in scientific notation.

**39.** 17,400

**40.** 8

**41.** 0.125

**42.** 0.003

## Lesson 4.2 Skills Practice

### Exponential Relationships

Solve.

- 1. Population** Suppose the population of Tiny Town was 3,000 in 2007. Each year the population doubled.

**a.** Complete the chart to show the population each year.

Year	2007	2008	2009	2010
Population	3,000			

- b.** What number is each entry multiplied by to get to the next entry?  
**c.** If you represent 2007 as year 0, 2008 as year 1, and so forth, which expression gives the population in year  $n$ ,  $3,000 \cdot 2^n$ ,  $3,000 \cdot n^2$ ,  $3,000^2$ , or  $3,000 \cdot 2n$ ?  
**d.** If this trend continues, what will be the population of Tiny Town in the year 2012?  
**e.** Does this situation show exponential growth or exponential decay?  
**f.** What is the growth factor or decay factor?
- 2. Finances** Kyle saved \$500 from a summer job. He plans to spend  $\frac{1}{10}$  of his remaining savings each week on various forms of entertainment.
- a.** How much will Kyle have left after one week?  
**b.** How much will Kyle have left after  $n$  weeks?  
**c.** Does this situation show exponential growth or exponential decay?

- 3. Savings Account** Serena put \$10 in her savings account in January. Let this be Month 0. Each month she plans to triple the amount that she deposits into the account.

**a.** Complete the table to show the amount Serena plans to deposit each month.

Month	0	1	2	3	4
Amount	\$10	\$30			

- b.** Is this a case of exponential growth or exponential decay?  
**c.** How much does Serena plan to deposit in August?
- 4. Housing** Mr. and Mrs. Boyce bought a house for \$96,000 in 2006. The real estate broker said that houses in their area were appreciating at an average annual rate of 4%.
- a.** How much would their house be worth in 2007?  
**b.** How much would their house be worth in 2008?

**Lesson 4.3 Skills Practice**  
**Radicals**

Find each root.

1.  $\sqrt{16}$

2.  $-\sqrt{9}$

3.  $\sqrt{36}$

4.  $\sqrt{196}$

5.  $\sqrt{0.81}$

6.  $-\sqrt{0.04}$

7.  $\sqrt{\frac{16}{25}}$

8.  $\sqrt{\frac{49}{100}}$

9.  $\sqrt{\frac{1}{4}}$

Simplify

10.  $\sqrt{(-5)^2}$

11.  $(\sqrt{17})^2$

12.  $3\sqrt{2} + 7\sqrt{2}$

13.  $14\sqrt{3} - 12\sqrt{3}$

14.  $\sqrt{40}$

15.  $\sqrt{72}$

16.  $\sqrt{99}$

17.  $\sqrt{24}$

18.  $\sqrt{48}$

19.  $3\sqrt{5} \cdot \sqrt{5}$

20.  $\sqrt{2} \cdot \sqrt{10}$

21.  $\sqrt{5} \cdot \sqrt{60}$

22.  $\sqrt{16b^4}$

23.  $\sqrt{81c^2d^4}$

24.  $\sqrt{40x^4y^6}$

25.  $\sqrt[3]{64}$

26.  $\sqrt[5]{8^5}$

27.  $-\sqrt[4]{81}$

Solve each equation.

28.  $\sqrt{x} = 7$

29.  $\sqrt{a+2} = 4$

30.  $\sqrt{c-3} = 5$

## Lesson 5.1 Skills Practice

### Rearrange Algebraic Expressions

Simplify each expression.

1.  $7a + a$

2.  $k - k$

3.  $m + 3m + 8$

4.  $10b - b + 1$

5.  $9j + 8j - 7j$

6.  $6y + 3y + 6y - 2y$

7.  $3q + 2q - q$

8.  $18 + 7x - 12 + 5x$

9.  $12a + 3 + 18 - 9a$

10.  $13c - 7 + c - d$

11.  $5b + b - 4b + 1 - 2b$

12.  $2(v - 5) + 7v + 4$

13.  $5(r + 9) - 5$

14.  $1 - 4(u - 1)$

15.  $-7(w - 4) + 3w - 27$

16.  $-8 - 7(y + 2)$

17.  $-18(c - 1) - 18$

18.  $12(n - 4) - 3n$

19.  $5m - 9 + 4m$

20.  $-7 + g + 1 - 6g$

21.  $x - 9x + 3 + 8x - 3$

22.  $6(r - 4) + r + 30 - 7r$

23.  $-5 + 5a - 4 - 2a + 3a$

24.  $21 - 8(v + 3) + 3 + 7v$

25.  $4x - 9 + 3x + 6 - 9x - 4$

26.  $p - 2 + 1 - p + 1 + 2p$

27.  $11f + 6 - f + 4 + 13f - 9$

28.  $3(d - 4) + 2 - 2d + 1 - d$

29.  $1 - s + 2 + 2s - 3s + 1$

30.  $5 - 9k + 1 + k - 2(7 - k)$

31.  $1 - g + 5 - 2g + 3(g - 2)$

32.  $7h + 1 - h + 4 - 2 - 8h$

33.  $-12 + 7(d - 1) + 14 - d$

## Lesson 5.2 Skills Practice

### Monomials, Binomials, and Trinomials

Multiply or divide.

1.  $2w^2 \cdot 5w^2$

2.  $(-6t^7)(5t^2)$

3.  $(3u^5)(-9u^6)$

4.  $\frac{12n^5}{4n^2}$

5.  $\frac{24t^9}{6t^3}$

6.  $\frac{-21s^6t^3}{3s^2t}$

7.  $3x(x - 4)$

8.  $-4(5a + 3b)$

9.  $2x(5 + 3x)$

10.  $8b(2b - 5)$

11.  $9(4 - 3k)$

12.  $-12a(3 + 6a)$

13.  $\frac{6x^2 + 8x}{2x}$

14.  $\frac{24a + 16b}{8}$

15.  $\frac{-15x^2 - 10x}{5x}$

16.  $(m + 4)(m + 1)$

17.  $(t + 4)(t - 3)$

18.  $(3c + 1)(c - 2)$

19.  $(d - 1)(5d - 4)$

20.  $(2m + 2)(3m - 3)$

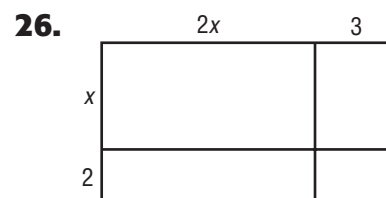
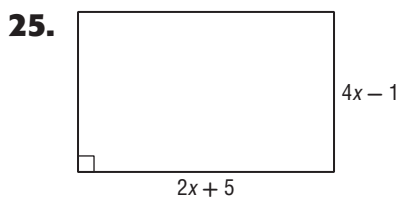
21.  $(4c + 1)(2c + 1)$

22.  $(5a - 2)(2a - 3)$

23.  $(4b - 2)(4b - 1)$

24.  $(x - y)(2x - y)$

Write a product of binomials to represent the area of each figure. Then expand the expression.





**Lesson 5.3 Skills Practice****Special Products**

Find each product.

1.  $(n + 3)^2$

2.  $(x + 4)(x + 4)$

3.  $(y - 7)^2$

4.  $(t - 3)(t - 3)$

5.  $(b + 1)(b - 1)$

6.  $(a - 5)(a + 5)$

7.  $(p - 4)^2$

8.  $(z + 3)(z - 3)$

9.  $(k + 2)(k + 2)$

10.  $(r - 1)(r - 1)$

11.  $(3g + 2)(3g - 2)$

12.  $(2m - 3)(2m + 3)$

13.  $(6 + u)^2$

14.  $(r + s)^2$

15.  $(3q + 1)(3q - 1)$

16.  $(c - f)^2$

17.  $(2k - 2)^2$

18.  $(w + 3b)^2$

19.  $(3p - 4)(3p + 4)$

20.  $(t + 2u)^2$

21.  $(x - 4y)^2$

22.  $(3b + 7)(3b - 7)$

23.  $(3y - 3g)(3y + 3g)$

24.  $(s^2 + r^2)^2$

25.  $(2k + m^2)^2$

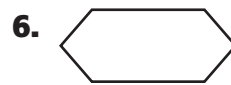
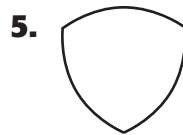
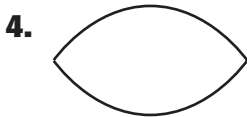
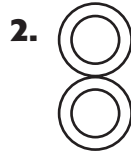
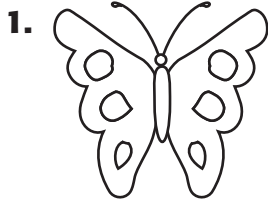
26.  $(3u^2 - n)^2$

- 27. Geometry** The length of a rectangle is the sum of two whole numbers. The width of the rectangle is the difference of the same two whole numbers. Using these facts, write a verbal expression for the area of the rectangle.

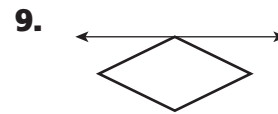
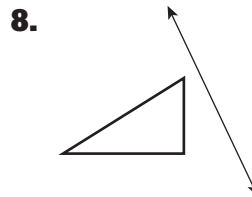
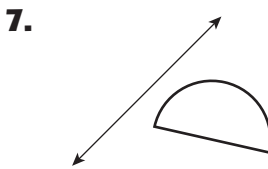
## Lesson 6.1 Skills Practice

### Symmetry and Reflection

For Exercises 1–6, draw all lines of symmetry or, if there are none, write *none*.



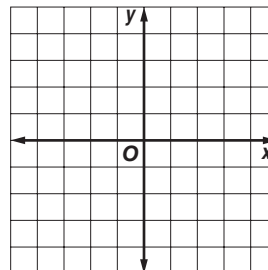
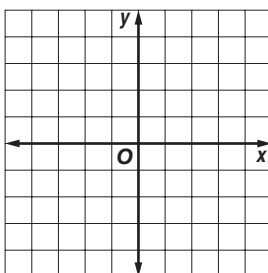
Reflect the figure over the given line.



Graph the figure with the given vertices. Then graph the image of the figure after a reflection over the given axis and write the coordinates of its vertices.

10. Triangle  $ABC$  with vertices  $A(1, 4)$ ,  $B(4, 1)$ , and  $C(2, 5)$ ;  $x$ -axis

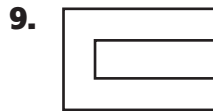
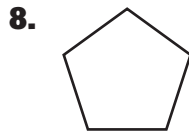
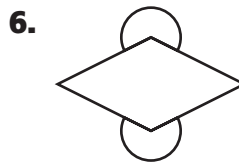
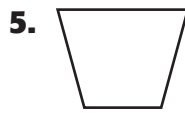
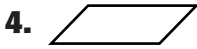
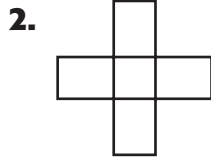
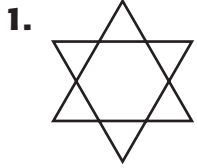
11. Triangle  $DEF$  with vertices  $D(-1, 2)$ ,  $E(-3, 1)$ , and  $F(-4, 5)$ ;  $y$ -axis



## Lesson 6.2 Skills Practice

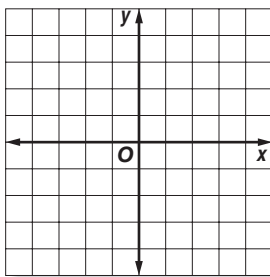
### Rotation

In Exercises 1–9, determine whether the figure has rotational symmetry. Write *yes* or *no*. If *yes*, name its angles of rotation.

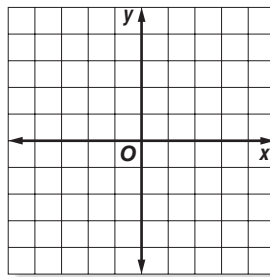


Graph the figure with the given vertices. Then graph the image of the figure after the indicated rotation about the origin and write the coordinates of its vertices.

10. Triangle  $ABC$  with vertices  $A(1, 5)$ ,  $B(3, 4)$ , and  $C(4, 0)$ ;  $90^\circ$  counterclockwise



11. Triangle  $FGH$  with vertices  $F(4, 2)$ ,  $G(1, 1)$ , and  $H(1, 5)$ ;  $180^\circ$

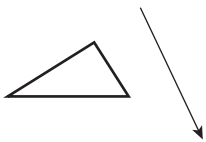


## Lesson 6.3 Skills Practice

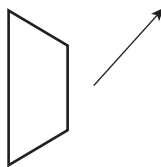
### Translations, Dilations, and Combined Transformations

In Exercises 1–3, translate the figure using the given vector.

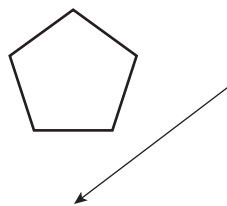
1.



2.

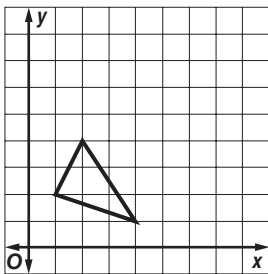
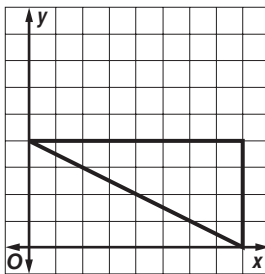


3.



In Exercises 4 and 5, dilate the figure with the given scale factor.

4. Scale factor 2

5. Scale factor  $\frac{1}{4}$ 

6. Draw the image of the figure under a dilation with scale factor 3 and the given projection point.



**Lesson 7.1 Skills Practice****Equations**

Solve each equation by backtracking. Check your solution.

1.  $\frac{n}{3} - 8 = -2$

2.  $\frac{3}{4}q - 7 = 8$

3.  $\frac{2}{3}g + 6 = -12$

4.  $\frac{c-5}{4} = 3$

5.  $3(2c - 5) = 21$

6.  $2\left(\frac{a}{5} + 6\right) = 12$

Solve each equation by doing the same thing to both sides. Check your solution.

7.  $2 - 3b = 7b + 12$

8.  $4d - 11 = 2d + 7$

9.  $2a - 3 = 9a - 10$

10.  $5b = 21 + 4b$

11.  $16k - 23 = 6k - 13$

12.  $6h - 34 = -6h + 14$

13.  $c - 2 = 3c + 14$

14.  $-4p - 7 = 5p + 11$

15.  $5d = 9d - 18$

Solve each equation. Check your solution.

16.  $3(f + 2) + 9 - 5f = 13$

17.  $5 = 4(n + 2) - n$

18.  $6 + 6(2t - 1) = 3$

19.  $4(2b - 6) + 11 + 8b = -13$

20.  $4(x + 3) - x = 0$

21.  $9t - 21 + 3t + 10 = 1$

## Lesson 7.2 Skills Practice

### Inequalities

List all the integers that satisfy the inequality.

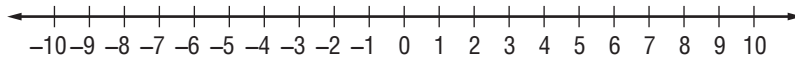
1.  $-1 \leq x < 3$

2.  $-6 < n < -1$

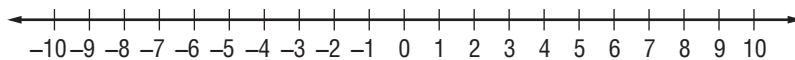
3.  $-1 < y < 1$

Graph all values for which the inequality is true.

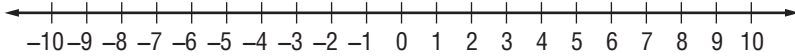
4.  $b > -5$



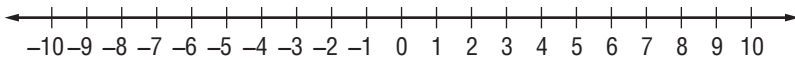
5.  $q < -7$



6.  $x \geq 0$



7.  $k \leq -2$



Solve each inequality.

8.  $a + 4 < 10$

9.  $c + 5 < 9$

10.  $d - 1 \geq 8$

11.  $x - 7 \leq -8$

12.  $3t \leq 15$

13.  $3w \geq 30$

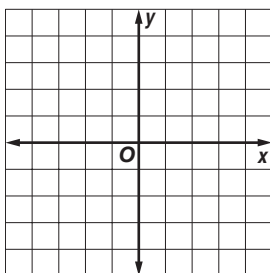
14.  $4n + 8 < 24$

15.  $6y + 1 \leq 19$

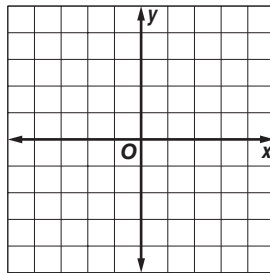
16.  $2r - 8 > 6$

Graph each inequality.

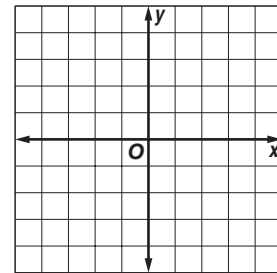
17.  $y \geq x - 5$



18.  $y > 3x$



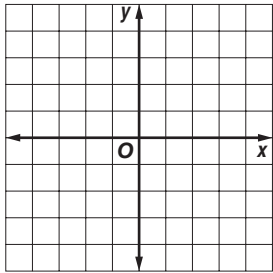
19.  $y \leq 2x + 4$



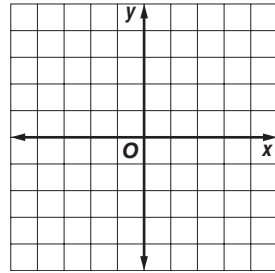
**Lesson 7.3 Skills Practice****Solve Systems of Equations**

Solve each system of equations by graphing.

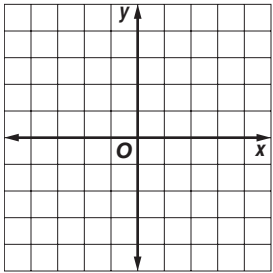
$$\begin{aligned} 1. \quad & y = -x + 3 \\ & y = x - 1 \end{aligned}$$



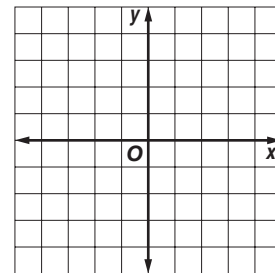
$$\begin{aligned} 2. \quad & y = x + 1 \\ & y = -2x - 2 \end{aligned}$$



$$\begin{aligned} 3. \quad & y = 3x + 5 \\ & y = -x - 3 \end{aligned}$$



$$\begin{aligned} 4. \quad & y = -\frac{1}{2}x + 4 \\ & y = 3x - 3 \end{aligned}$$



Use elimination to solve each system of equations.

$$\begin{aligned} 5. \quad & x - y = 1 \\ & x + y = 3 \end{aligned}$$

$$\begin{aligned} 6. \quad & 3a + 4b = 2 \\ & 4a - 4b = 12 \end{aligned}$$

$$\begin{aligned} 7. \quad & 6x - 2y = 32 \\ & 4x - 2y = 18 \end{aligned}$$

$$\begin{aligned} 8. \quad & x + y = -9 \\ & 5x - 2y = 32 \end{aligned}$$

$$\begin{aligned} 9. \quad & 3x + 2y = -9 \\ & x - y = -13 \end{aligned}$$

$$\begin{aligned} 10. \quad & 2x + 5y = 3 \\ & -x + 3y = -7 \end{aligned}$$

Use substitution to solve each system of equations.

$$\begin{aligned} 11. \quad & y = 4x \\ & x + y = 5 \end{aligned}$$

$$\begin{aligned} 12. \quad & y = 2x \\ & x + 3y = -14 \end{aligned}$$

$$\begin{aligned} 13. \quad & y = x - 1 \\ & x + y = 3 \end{aligned}$$

$$\begin{aligned} 14. \quad & x = y - 7 \\ & x + 8y = 2 \end{aligned}$$

$$\begin{aligned} 15. \quad & y = 3x + 8 \\ & 5x + 2y = 5 \end{aligned}$$

$$\begin{aligned} 16. \quad & 2x - 3y = 21 \\ & y = 3 - x \end{aligned}$$

## Lesson 8.1 Skills Practice

### Use Graphs and Tables to Solve Equations

Maria tossed a ball into the air. Its height,  $h$  feet, after  $t$  seconds is given by the equation  $h = 48t - 16t^2$ . Use this information to do Exercises 1–5.

- Find the height of the ball after 1 second.
- Find the height of the ball after 2 seconds.
- Find the maximum height the ball reaches and the time it takes it to reach that height.
- Sketch the graph of the equation on your calculator.
- Use your graph to solve the equation  $48t - 16t^2 = 20$ .

In Exercises 6–9, Juanita is crocheting an afghan with an area  $A$  close to 24 square feet. The length is 1 foot more than the width  $w$ .

- Write an equation for the area of Juanita's afghan using  $A$  for area and  $w$  for width.
- Complete the table from the equation.

$w$	1	2	3	4	5	6
$A$						

- Between which two consecutive numbers should  $w$  be to make the area close to 24 square feet?
- Find a value of  $w$  rounded to the nearest hundredth to make the area as close as possible to 24 square feet.

**Solve.**

- Use your calculator's table feature to approximate the solution of the equation  $2a(a - 4) = 30$  to the nearest hundredth.



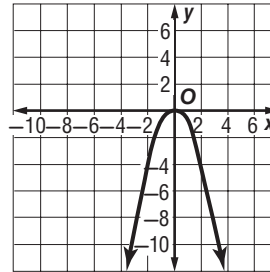
## Lesson 8.2 Skills Practice

### Quadratic Relationships

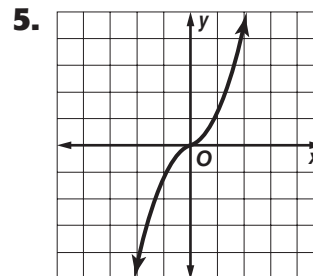
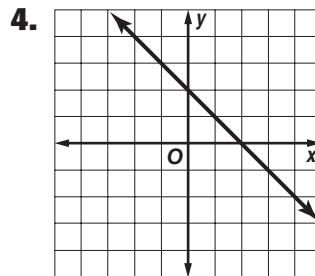
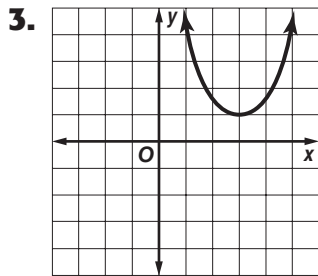
In Exercises 1 and 2, refer to the table and graph.

$x$	-3	-2	-1	0	1	2	3
$y$	-9	-4	-1	0	-1	-4	-9

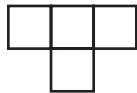
- Describe the graph.
- What is the line of symmetry?



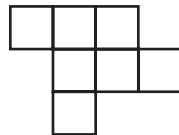
In Exercises 3–5, tell whether each graph could represent a quadratic relationship. Explain how you decided.



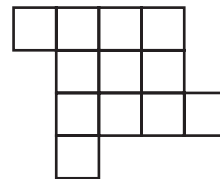
In Exercises 6–9, use the figures showing the pattern of the tiles.



Stage 1



Stage 2



Stage 3

6. Complete the table giving the area in square units  $A$  of Stage  $n$ .

$n$	1	2	3	4	5	6
$A$	4	7	12			

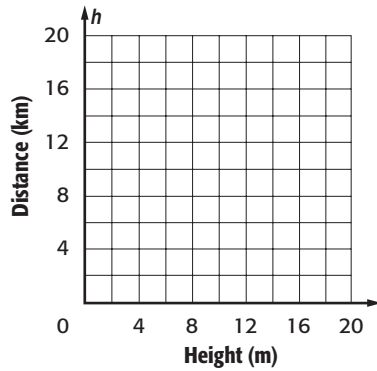
- Describe the pattern.
- Draw the next two stages.
- Write an equation relating the area  $A$  to the number of the stage  $n$ .

## Lesson 8.3 Skills Practice

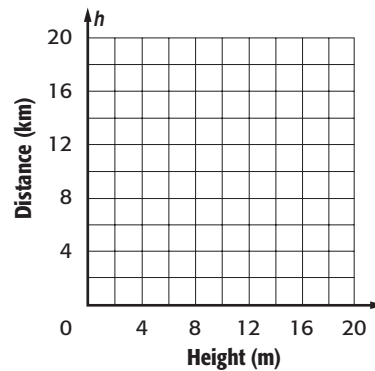
### Families of Quadratics

Use a table of values to graph each equation.

1.  $y = x^2 - 4$

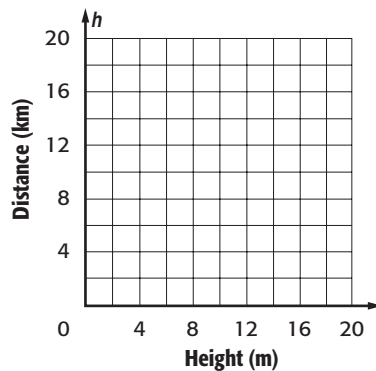


2.  $y = -x^2 - 4x + 1$

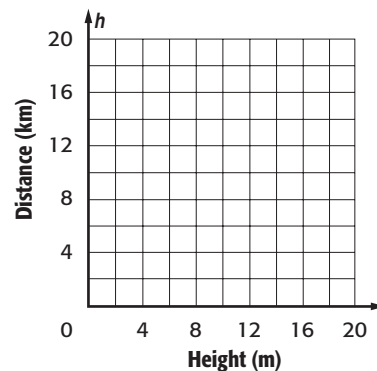


Identify the values of  $a$ ,  $b$ , and  $c$  in each quadratic equation. Identify the vertex as a maximum or minimum. Graph the relationship. State the coordinates of the vertex.

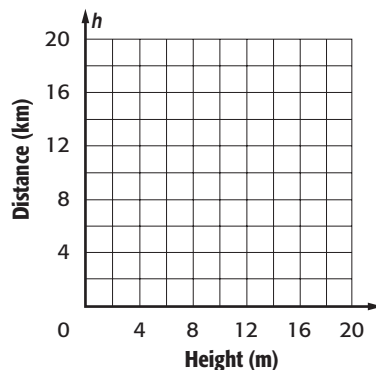
3.  $y = 2x^2$



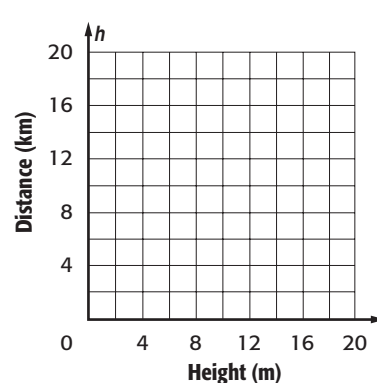
4.  $y = x^2 - 2x - 5$



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



6.  $y = -x^2 - 2x + 2$

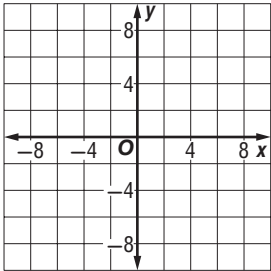


## Lesson 8.4 Skills Practice

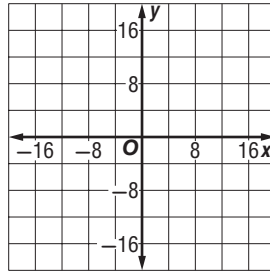
### Inverse Variation

Graph each inverse variation.

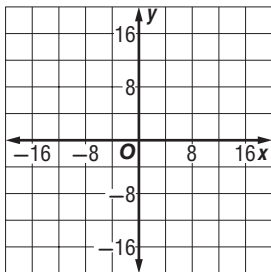
1.  $xy = 10$



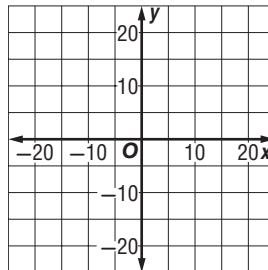
2.  $xy = -36$



3.  $xy = 48$



4.  $xy = -45$



Determine whether the equation represents a direct variation, an inverse variation, or neither.

5.  $xy = 3$

6.  $y = 3x + 5$

7.  $y = 3x$

8.  $y = \frac{3}{x}$

9.  $y = \frac{x}{3}$

10.  $y = 3$

**11. Potatoes** Marsha can peel 8 potatoes in 20 minutes. At this rate, how long will it take her to peel 20 potatoes? Does this situation represent a direct variation or an inverse variation?

**12. Painting** It takes Marcus 6 hours to paint the ceiling by himself. If three friends join him, how long will it take the four of them to paint the ceiling? Does this situation represent a direct variation or an inverse variation?

**Lesson 8.5 Skills Practice****Conjectures**

Make a conjecture about whether the relationship between  $x$  and  $y$  is linear, quadratic, or neither. Explain how you decide.

1.

$x$	1	2	3	4	5	6
$y$	2	4	8	16	32	64

2.

$x$	1	2	3	4	5	6
$y$	7	11	15	19	23	27

3.

$x$	1	2	3	4	5	6
$y$	7	16	27	40	55	72

4.

$x$	1	2	3	4	5	6
$y$	-4	-3	0	5	12	21

5. Roberto makes the conjecture that the product of two odd numbers is an odd number. He writes the following proof:

$$(2n + 1)(2n + 1) = 4n^2 + 4n + 1$$

Since  $4n^2$  and  $4n$  are both divisible by 2, they are both even and their sum is even. The number 1 is odd, so the final sum is odd.

a. What is wrong with Roberto's proof?

b. Write a correct proof of his conjecture.

**Lesson 9.1 Skills Practice****Backtracking**

Solve each equation by backtracking. Show the flowchart you use.

1.  $\sqrt{5a-4} = 4$

2.  $\sqrt{n} = 7$

Solve each equation by backtracking.

3.  $\sqrt{\frac{p}{4-3}} = 8$

4.  $\frac{6}{m} = 4$

5.  $\frac{2}{4c+6} = 1$

6.  $\sqrt{3-k} = 1.5$

7.  $b^2 - 6 = 75$

8.  $(t+4)^2 = 36$

9.  $z^3 = 64$

10.  $(4b-2)^2 - 7 = 18$

11.  $(2-c)^3 = -8$

12.  $(2x-4)^2 - 9 = 40$

13.  $g^2 - 7 = 2$

14.  $d^2 = 4$

15.  $(6x-8)^2 = 0$

16.  $3\sqrt{r+1} = 2$

**Lesson 9.2 Skills Practice**  
**Factoring**

Factor each trinomial.

**1.**  $t^2 + 8t + 12$

**2.**  $n^2 + 7n + 12$

**3.**  $p^2 + 9p + 20$

**4.**  $b^2 + 9b + 18$

**5.**  $n^2 + 3n - 18$

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

**7.**  $y^2 - 5y - 6$

**8.**  $g^2 + 3g - 10$

**9.**  $s^2 + 4s - 12$

**10.**  $x^2 - x - 12$

**11.**  $w^2 - w - 6$

**12.**  $y^2 - 6y + 8$

**13.**  $x^2 - 8x + 15$

**14.**  $b^2 - 9b + 8$

**15.**  $c^2 - 15c + 56$

**16.**  $-4 - 3m + m^2$

Solve each equation by factoring.

**17.**  $x^2 - 6x + 8 = 0$

**18.**  $b^2 - 7b + 12 = 0$

**19.**  $m^2 + 5m + 6 = 0$

**20.**  $d^2 + 7d + 10 = 0$

**21.**  $y^2 - 2y - 24 = 0$

**22.**  $p^2 - 3p = 18$

**23.**  $b^2 + 2b = 35$

**24.**  $a^2 + 14a = -45$

**25.**  $n^2 - 36 = 5n$

**26.**  $w^2 + 30 = 11w$

## Lesson 9.3 Skills Practice

### Completing the Square

Solve each equation by taking the square root of each side.

1.  $c^2 - 12c + 36 = 4$

2.  $w^2 - 10w + 25 = 16$

3.  $b^2 + 16b + 64 = 9$

4.  $y^2 + 2y + 1 = 4$

5.  $r^2 + 4r + 4 = 1$

6.  $a^2 - 8a + 16 = 16$

Find the value of  $c$  that makes each trinomial a perfect square.

7.  $g^2 + 6g + c$

8.  $y^2 + 4y + c$

9.  $a^2 - 14a + c$

10.  $n^2 - 2n + c$

11.  $s^2 - 18s + c$

12.  $p^2 + 20p + c$

Solve each equation by completing the square.

13.  $x^2 + 4x - 12 = 0$

14.  $v^2 - 8v + 15 = 0$

15.  $q^2 + 6q = 7$

16.  $r^2 - 2r = 15$

17.  $m^2 - 14m + 30 = 6$

18.  $b^2 + 12b + 21 = 10$

19.  $z^2 - 4z - 5 = 0$

20.  $y^2 - 6y + 5 = 0$

21.  $r^2 - 8r + 12 = 0$

22.  $p^2 - 2p = 15$

23.  $a^2 + 10a = -9$

24.  $g^2 + 8g = -7$

## Lesson 9.4 Skills Practice

### The Quadratic Formula

Solve each equation by using the Quadratic Formula. Round to the nearest tenth if necessary.

1.  $u^2 - 49 = 0$

2.  $n^2 - n - 20 = 0$

3.  $s^2 - 5s - 36 = 0$

4.  $b^2 + 11b + 30 = 0$

5.  $c^2 - 7c = -3$

6.  $p^2 + 4p = -1$

7.  $a^2 - 9a + 22 = 0$

8.  $x^2 + 6x + 3 = 0$

9.  $2x^2 + 5x - 7 = 0$

10.  $2b^2 - 3b = -1$

11.  $2p^2 + 5p + 4 = 0$

12.  $2g^2 + 7g = 9$

13.  $3t^2 + 2t - 3 = 0$

14.  $3x^2 - 7x - 6 = 0$

State the value of the discriminant for each equation. Then determine the number of real roots of the equation.

15.  $q^2 + 4q + 3 = 0$

16.  $m^2 + 2m + 1 = 0$

17.  $a^2 - 4a + 10 = 0$

18.  $w^2 + 6w + 7 = 0$

19.  $z^2 - 2z - 7 = 0$

20.  $y^2 - 10y + 25 = 0$

21.  $2d^2 + 5d - 8 = 0$

22.  $2s^2 + 6s + 12 = 0$

23.  $2u^2 - 4u + 10 = 0$

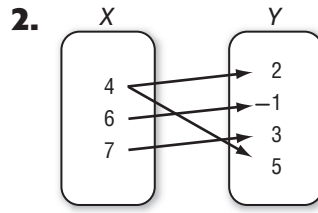
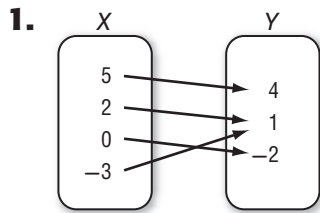
24.  $3b^2 + 7b + 3 = 0$



## Lesson 10.1 Skills Practice

### Functions

Determine whether each relation is a function.



3. 

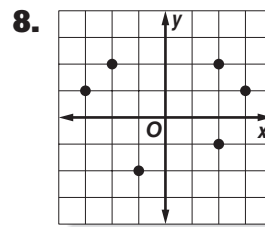
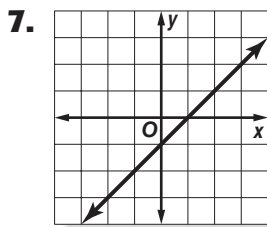
x	y
4	-5
-1	-10
0	-9
1	-7
9	1

4. 

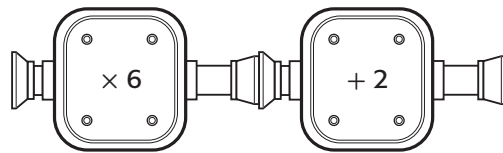
x	y
2	7
5	-3
3	5
-4	-2
5	2

5.  $\{(2, 5), (4, -2), (3, 3), (5, 4), (-2, 5)\}$

6.  $\{(6, -1), (-4, 2), (5, 2), (4, 6), (6, 5)\}$



9. Use the function machine. If the input is 4, what is the output?



10. Find the domain of  $f(x) = \frac{1}{(x+3)}$ .

If  $f(x) = 3x - 2$  and  $g(x) = x^2 - x$ , find each value.

11.  $f(4)$

12.  $f(8)$

13.  $f(-2)$

14.  $g(2)$

15.  $g(-3)$

16.  $g(-6)$

17.  $f(2) + 1$

18.  $f(1) - 1$

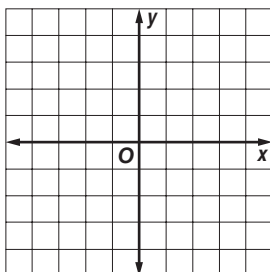
19.  $g(0)$

## Lesson 10.2 Skills Practice

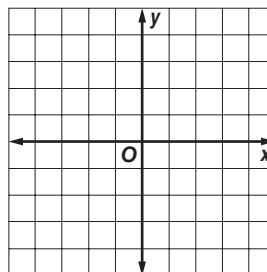
### Graphs of Functions

Graph each function. Find the range, coordinates of the vertex, and equation of the line of symmetry of each.

1.  $f(x) = (x + 4)^2 - 1$



2.  $f(x) = (x - 1)^2 - 2$



3. The graph of  $g$  is translated 9 units to the left of the graph of  $f(x) = 2^x$ . Write an equation for the function  $g$  so that the graph of  $g$  has the same shape as the graph of  $f$ .

4. a. Complete the square to rewrite  $f(x) = x^2 + 4x - 2$  in the form  $f(x) = a(x - h)^2 + k$ .

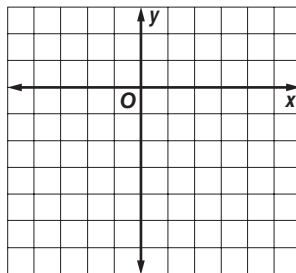
b. Find the line of symmetry.

c. Find the coordinates of the vertex.

5. a. Find the  $x$ -intercepts of the parabola  $g(x) = (x - 6)(x + 4)$ .

b. Use the  $x$ -intercepts to find the line of symmetry and the vertex.

c. Sketch the parabola.

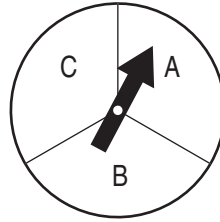


## Lesson 11.1 Skills Practice

### Counting Strategies

In Exercises 1-2, the spinner at the right is spun twice.

1. Draw a tree diagram to represent the situation.
2. What is the probability of getting at least one A?



For each situation in Exercises 3–4, make a tree diagram to show the sample space. Then give the total number of possible outcomes.

3. You can choose between a hamburger and a hot dog, and you have a choice of potato salad or macaroni salad.
4. You can plant a garden with roses, zinnias, or cosmos in yellow, red, orange, or purple.
5. Two number cubes are rolled. How many outcomes are possible?
6. Draw a tree diagram to find the number of outcomes if a number cube is rolled and a coin is tossed.

Find the probability of each event in Exercises 7–9.

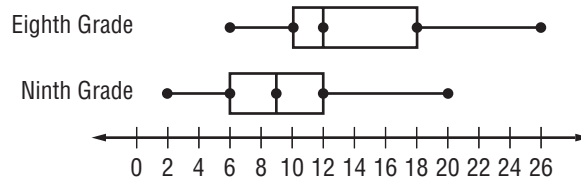
7. A coin is tossed twice. What is the probability of getting two tails?
8. What is the probability of rolling a 4 or higher on a six-sided number cube.
9. What is the probability of rolling an even number on an eight-sided die if all the possibilities are equally likely.
10. A hat comes in black, red, or white and in medium or large. Draw a tree diagram to determine the number of outcomes. Then find the probability that a hat would be black and large if all the possibilities are equally likely.
11. A customer has a choice of peach or vanilla yogurt topped with peanuts, granola, walnuts, or almonds. Make an organized list to determine the number of possible outcomes. Then find the probability that the next customer chooses peach yogurt topped with peanuts if each possibility is equally likely.

12. In how many ways can 5 friends be lined up for a picture?

## Lesson 11.2 Skills Practice

### Modeling with Data

**Television** The number of hours eighth and ninth graders from one school spent watching television per week is shown below. Use the box-and-whisker plots in Exercises 1–3.

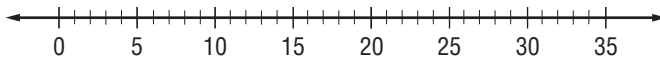


- How many hours do the middle 50% of the eighth and ninth graders spend watching television per week?
- Half of the eighth graders watch television at least how many hours or more per week?
- Half of the ninth graders watch television no more than how many hours per week?

**Life Science** For Exercises 4–7, refer to the table at the right. It shows average life spans of 21 mammals.

- Find the lower extreme, lower quartile, median, upper quartile, and upper extreme.
- Draw a box-and-whisker plot of the data.

Life Span (yr)				
5	12	4	3	12
12	6	5	8	35
7	8	12	10	12
10	3	7	1	12
10				



- What fraction of the data is between 5 and 12?
- Find the range.

**Lesson 12.1 Skills Practice****Work with Algebraic Fractions**

Find the values of the variable that make the expression undefined.

1.  $\frac{2p}{p-7}$

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

3.  $\frac{k+2}{k^2-4}$

4.  $\frac{3x+15}{x^2-25}$

Simplify each expression.

5.  $\frac{21bc}{28bc^2}$

6.  $\frac{12m^2n}{24mn^3}$

7.  $\frac{n+6}{3n+18}$

8.  $\frac{4}{4x+4}$

Find each product or quotient.

9.  $\frac{14}{c} \cdot \frac{c}{2}$

10.  $\frac{3m}{2} \cdot \frac{n}{12}$

11.  $\frac{4m-6}{18} \cdot \frac{9}{2}$

12.  $\frac{a+7}{a} \cdot \frac{a+5}{a+7}$

13.  $\frac{c}{d} \cdot \frac{d}{c^2}$

14.  $\frac{x^3}{y^2} \div \frac{x}{y}$

15.  $\frac{x+1}{x+5} \div \frac{2x+2}{x+5}$

16.  $\frac{2n+6}{n-4} \div \frac{n+3}{n-4}$

17.  $\frac{3b+3}{b+2} \div (b+1)$

18.  $\frac{4m^3}{np^2} \div \frac{2m}{np}$

## Lesson 12.2 Skills Practice

### Add and Subtract Algebraic Fractions

Find each sum.

1.  $\frac{2y}{5} + \frac{y}{5}$

2.  $\frac{4r}{9} + \frac{5r}{9}$

3.  $\frac{3k}{14} + \frac{5k}{14}$

4.  $\frac{t}{9} + \frac{t-5}{9}$

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

6.  $\frac{g+2}{4} + \frac{g-8}{4}$

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

8.  $\frac{3}{8a^2} + \frac{5}{2a}$

9.  $\frac{m+3}{2m} + \frac{m-2}{m}$

10.  $\frac{5}{y+2} + \frac{1}{y-6}$

Find each difference.

11.  $\frac{6x}{5} - \frac{3x}{5}$

12.  $\frac{7n}{10} - \frac{3n}{10}$

13.  $\frac{8a}{11} - \frac{7a}{11}$

14.  $\frac{3p}{2} - \frac{p}{2}$

15.  $\frac{t+3}{7} - \frac{t}{7}$

16.  $\frac{c+8}{4} - \frac{c+6}{4}$

17.  $\frac{5}{4r} - \frac{2}{r^2}$

18.  $\frac{5x}{3y^2} - \frac{2x}{9y}$

19.  $\frac{x}{(x+2)} - \frac{4}{x}$

20.  $\frac{(d-1)}{6} - \frac{3}{d}$

Solve each equation. Make sure your answer does not cause any denominator to be zero.

21.  $\frac{5}{c} = \frac{2}{c+3}$

22.  $\frac{3}{q} = \frac{5}{q+4}$

23.  $\frac{7}{m+1} = \frac{12}{m+2}$

24.  $\frac{3m}{2} - \frac{1}{4} = \frac{10m}{8}$

25.  $\frac{s-3}{10} + \frac{s-5}{5} = \frac{1}{2}$

26.  $\frac{m-4}{m} - \frac{m-11}{m+4} = \frac{1}{m}$