GLENCOE MATHEMATICS

Pre-Algebra

Chapter 8
Resource Masters

Mc Graw Hill **Glencoe McGraw-Hill**

Consumable Workbooks

Many of the worksheets contained in the Chapter Resource Masters booklets are available as consumable workbooks in both English and Spanish.

Study Guide and Intervention Workbook	0-07-827794-9
Study Guide and Intervention Workbook (Spanish)	0-07-827795-7
Skills Practice Workbook	0-07-827788-4
Skills Practice Workbook (Spanish)	0-07-827790-6
Practice Workbook	0-07-827789-2
Practice Workbook (Spanish)	0-07-827791-4

Answers for Workbooks The answers for Chapter 8 of these workbooks can be found in the back of this Chapter Resource Masters booklet.

Spanish Assessment Masters Spanish versions of forms 2A and 2C of the Chapter 8 Test are available in the *Pre-Algebra Spanish Assessment Masters* (0-07-830412-1).

Glencoe/McGraw-Hill

A Division of The McGraw·Hill Companies

Pre-Algebra Chapter 8 Resource Masters

CONTENTS

iii

Teacher's Guide to Using the
Chapter 8 Resource Masters

The *Fast File* Chapter Resource system allows you to conveniently file the resources you use most often. The *Chapter 8 Resource Masters* includes the core materials needed for Chapter 8. These materials include worksheets, extensions, and assessment options. The answers for these pages appear at the back of this booklet.

All of the materials found in this booklet are included for viewing and printing in the *Pre-Algebra TeacherWorks* CD-ROM.

Vocabulary Builder
Pages vii-viii include a student study tool that presents up to twenty of the key vocabulary terms from the chapter. Students are to record definitions and/or examples for each term. You may suggest that students highlight or star the terms with which they are not familiar.

When to Use Give these pages to students before beginning Lesson 8-1. Encourage them to add these pages to their Pre-Algebra Study Notebook. Remind them to add definitions and examples as they complete each lesson.

Study Guide and Intervention
Each lesson in Pre-Algebra addresses one or two objectives. There is one Study Guide and Intervention master for each lesson.

When to Use Use these masters as reteaching activities for students who need additional reinforcement. These pages can also be used in conjunction with the Student Edition as an instructional tool for students who have been absent.

Skills Practice
There is one master for each lesson. These provide computational practice at a basic level.

When to Use These masters can be used with students who have weaker mathematics backgrounds or need additional reinforcement.

Practice
There is one master for each lesson. These problems more closely follow the structure of the Practice and Apply section of the Student Edition exercises. These exercises are of average difficulty.

When to Use These provide additional practice options or may be used as homework for second day teaching of the lesson.

Reading to Learn Mathematics
One master is included for each lesson. The first section of each master asks questions about the opening paragraph of the lesson in the Student Edition. Additional questions ask students to interpret the context of and relationships among terms in the lesson. Finally, students are asked to summarize what they have learned using various representation techniques.

When to Use This master can be used as a study tool when presenting the lesson or as an informal reading assessment after presenting the lesson. It is also a helpful tool for ELL (English Language Learner) students.

Enrichment
There is one extension master for each lesson. These activities may extend the concepts in the lesson, offer an historical or multicultural look at the concepts, or widen students' perspectives on the mathematics they are learning. These are not written exclusively for honors students, but are accessible for use with all levels of students.

When to Use These may be used as extra credit, short-term projects, or as activities for days when class periods are shortened.

Assessment Options

The assessment masters in the *Chapter 8 Resource Masters* offer a wide range of assessment tools for intermediate and final assessment. The following lists describe each assessment master and its intended use.

Chapter Assessment

Chapter Tests
- *Form 1* contains multiple-choice questions and is intended for use with basic level students.
- *Forms 2A and 2B* contain multiple-choice questions aimed at the average level student. These tests are similar in format to offer comparable testing situations.
- *Forms 2C and 2D* are composed of free-response questions aimed at the average level student. These tests are similar in format to offer comparable testing situations. Grids with axes are provided for questions assessing graphing skills.
- *Form 3* is an advanced level test with free-response questions. Grids without axes are provided for questions assessing graphing skills.

  All of the above tests include a free-response Bonus question.

- The **Open-Ended Assessment** includes performance assessment tasks that are suitable for all students. A scoring rubric is included for evaluation guidelines. Sample answers are provided for assessment.
- A **Vocabulary Test**, suitable for all students, includes a list of the vocabulary words in the chapter and ten questions assessing students' knowledge of those terms. This can also be used in conjunction with one of the chapter tests or as a review worksheet.

Intermediate Assessment
- Four free-response **quizzes** are included to offer assessment at appropriate intervals in the chapter.
- A **Mid-Chapter Test** provides an option to assess the first half of the chapter. It is composed of both multiple-choice and free-response questions.

Continuing Assessment
- The **Cumulative Review** provides students an opportunity to reinforce and retain skills as they proceed through their study of Pre-Algebra. It can also be used as a test. This master includes free-response questions.
- The **Standardized Test Practice** offers continuing review of pre-algebra concepts in various formats, which may appear on the standardized tests that they may encounter. This practice includes multiple-choice, grid-in, and open-ended questions. Bubble-in and grid-in answer sections are provided on the master.

Answers
- Page A1 is an answer sheet for the Standardized Test Practice questions that appear in the Student Edition on pages 430–431. This improves students' familiarity with the answer formats they may encounter in test taking.
- The answers for the lesson-by-lesson masters are provided as reduced pages with answers appearing in red.
- Full-size answer keys are provided for the assessment masters in this booklet.

8 Reading to Learn Mathematics
Vocabulary Builder

This is an alphabetical list of key vocabulary terms you will learn in Chapter 8. As you study this chapter, complete each term's definition or description. Remember to add the page number where you found the term. Add these pages to your Pre-Algebra Study Notebook to review vocabulary at the end of the chapter.

Vocabulary Term	Found on Page	Definition/Description/Example
best-fit line		
boundary		
constant of variation VEHR-ee-AY-shuhn		
direct variation		
function		
half plane		
linear equation LIHN-ee-uhr		

8 Reading to Learn Mathematics

Vocabulary Builder (continued)

Vocabulary Term	Found on Page	Definition/Description/Example
rate of change		
slope		
slope-intercept form IHNT-uhr-SEHPT		
substitution		
system of equations		
vertical line test		
x-intercept		
y-intercept		

8-1 Study Guide and Intervention
Functions

| Function	A special relation in which each member of the domain is paired with exactly one member in the range.
Vertical Line Test	Move a pencil or straightedge from left to right across the graph of a relation. • If it passes through no more than one point on the graph, the graph represents a function. • If it passes through more than one point on the graph, the graph does not represent a function.

Since functions are relations, they can be represented using ordered pairs, tables, or graphs.

Example **Determine whether each relation is a function. Explain.**

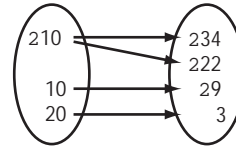**a.** {(−10, −34), (0, −22), (10, −9), (20, 3)}

Domain (x) **Range (y)**

```
210 ────────── 234
  0 ────────── 222
 10 ──────────  29
 20 ──────────   3
```
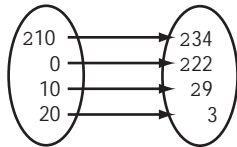
Because each element in the domain is paired with only one value in the range, this is a function.

b.

x	−10	−10	10	20
y	−34	−22	−9	3

Domain (x) **Range (y)**

```
210 ────────── 234
              222
 10 ──────────  29
 20 ──────────   3
```

Because −10 in the domain is paired with −34 and −22 in the range, this is not a function.

Exercises

Determine whether each relation is a function. Explain.

1. {(−5, 2), (3, −3), (1, 7), (3, 0)}

2. {(2, 7), (−5, 20), (−10, 20), (−2, 10), (1, 20)}

3.

x	1	−3	8	−8	20
y	2	6	6	5	11

4.

x	8	1	−5	1	−10
y	−2	3	7	7	13

8-1 Skills Practice

Functions

Determine whether each relation is a function. Explain.

1. {(3, −8), (3, 2), (6, −1), (2, 2)}

2. {(0, 1), (−4, −3), (−3, 6), (3, 6)}

3. {(−6, 3), (2, −2), (0, 8), (1, 1)}

4. {(1, 8), (−6, 21), (−11, 21), (−3, 11), (0, 21)}

5.

x	1	−3	8	−8	20
y	2	6	6	5	11

6.

x	4	11	8	−13	−4
y	2	−4	1	2	20

7.

x	−1.2	1.1	1.7	−1.2	1.0
y	2.8	2.3	−2.4	2.3	2.6

8.

x	7	0	−6	1	−11
y	−1	4	8	8	14

9.

10.

11.

12.
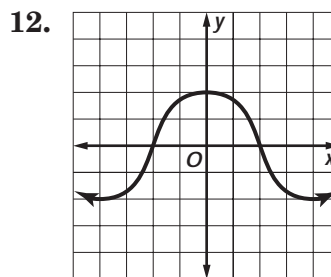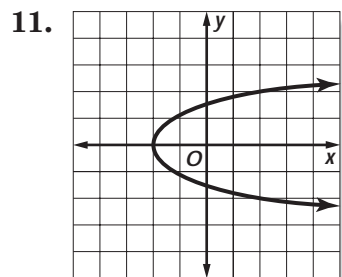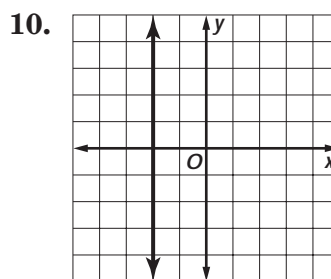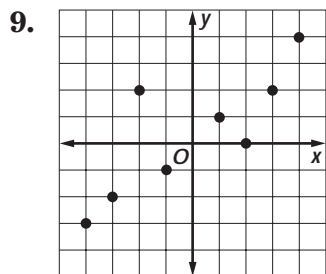
8-1 Practice

Functions

Determine whether each relation is a function. Explain.

1. {(4, −5), (0, −9), (1, 0), (7, 0)}

2. {(5, −12), (−1, −2), (8, −5), (4, −2), (3, −5)}

3. {(−2, −3), (6, −8), (4, 2), (6, −5), (2, −5)}

4. {(5, 2), (−2, 15), (−7, 15), (1, 5), (4, 15), (−7, 2)}

5.

x	4	−5	11	−5	23
y	−3	1	1	0	6

6.

x	7	14	11	−10	−1
y	−3	−9	−4	−3	15

7.

x	−3.0	3.5	4.1	−3.0	3.4
y	4.2	3.7	−3.8	3.7	4.0

8.

x	11	4	−2	4	−7
y	−7	−2	2	2	6

EMPLOYMENT For Exercises 9–12, use the table, which shows the percent of employed men and women in the U.S. labor force every five years from 1980 to 2000.

9. Is the relation (year, percent of men) a function? Explain.

10. Describe how the percent of employed men is related to the year.

11. Is the relation (year, percent of women) a function? Explain.

12. Describe how the percent of employed women is related to the year.

| Employed Members of Labor Force		
Year	Men (% of male population)	Women (% of female population)
1980	77.4	51.5
1985	76.3	54.5
1990	76.4	57.5
1995	75.0	58.9
2000	78.9	67.3

Source: U.S. Census Bureau

8-1 Reading to Learn Mathematics

Functions

Pre-Activity   *How can the relationship between actual temperatures and windchill temperatures be a function?*

Do the activity at the top of page 369 in your textbook. Write your answers below.

a. On grid paper, graph the temperatures as ordered pairs (actual, windchill).

b. Describe the relationship between the two temperature scales.
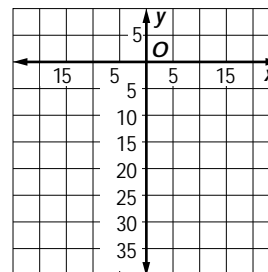
c. When the actual temperature is $-20°F$, which is the best estimate for the windchill: $-46°F$, $-28°F$, or $0°F$? Explain.

Reading the Lesson

Write a definition and give an example of each new vocabulary word or phrase.

Vocabulary	Definition	Example
1. function		
2. vertical line test		

3. For a relation to be a function, each element in the _____ must have only one corresponding element in the _____ .

4. Explain what is meant by the phrase "distance is a function of time."

Helping You Remember

5. You have learned various ways to determine whether a relation is a function. Choose which method is the easiest for you to use, then write a few sentences explaining how that method relates to the other methods.
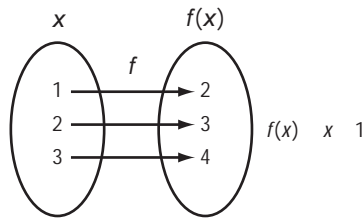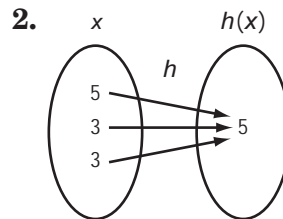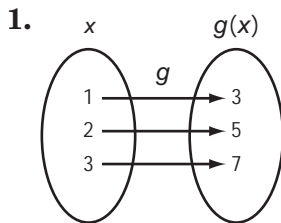
8-1 Enrichment

Emmy Noether

Emmy Noether (1882−1935) was a German mathematician and a leading figure in modern abstract algebra. Her contributions helped change the role of women in German universities and advanced the mathematical progress of the time. Noether fought and overcame rules that once prevented her from becoming a faculty member. Her most notable work pertains to linear transformations of non-commutative algebras and their structures.

A linear equation is an example of a **transformation**, unless it is the equation for a vertical line. In a transformation, a given rule transforms each number in one set, the **domain**, into one and only one number in another set, the **range**. In graphing linear equations, the domain is usually the set of real numbers and the range is either the set of real numbers or a subset of the real numbers. Each value of x is transformed into some value of y.

Transformation f is shown in the diagram below. The transformation takes each element of the domain {1, 2, 3} and adds 1 to produce the corresponding value in the range. Functional notation is used to show the rule $f(x) = x+1$.
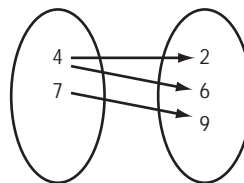
$$
\begin{array}{ccc}
x & & f(x) \\
1 & \xrightarrow{\ f\ } & 2 \\
2 & \longrightarrow & 3 \\
3 & \longrightarrow & 4
\end{array}
\qquad f(x) \quad x \quad 1
$$

Use functional notation to write the rule for each transformation.

1.
$$
\begin{array}{ccc}
x & & g(x) \\
1 & \xrightarrow{\ g\ } & 3 \\
2 & \longrightarrow & 5 \\
3 & \longrightarrow & 7
\end{array}
$$

2.
$$
\begin{array}{ccc}
x & & h(x) \\
5 & \xrightarrow{\ h\ } & \\
3 & \longrightarrow & 5 \\
3 & \longrightarrow &
\end{array}
$$

3. What do you think is a **non-commutative** algebra?

4. Explain whether the diagram below shows a transformation.

$$
\begin{array}{ccc}
4 & \longrightarrow & 2 \\
7 & \longrightarrow & 6 \\
& & 9
\end{array}
$$

8-2 Study Guide and Intervention

Linear Equations in Two Variables

A function can be represented with an equation. An equation such as $y = 1.50x$ is called a linear equation. A linear equation in two variables is an equation in which the variables appear in separate terms and neither variable contains an exponent other than 1.

Linear Equations $y = x + 1,\ y = -2x,\ y = \frac{1}{3}x$

Nonlinear Equations $y = x^2 + 1,\ y = -2x^3,\ y = \frac{3}{x},\ xy = 4$

Solutions of a linear equation are ordered pairs that make the equation true. One way to find solutions is to make a table.

Example 1   **Complete the table. Use the results to write four solutions of $y = 4x - 10$. Write the solution as ordered pairs.**

x	y = 4x − 10	y	(x, y)
−1	$y = 4(-1) - 10$	−14	(−1, −14)
0	$y = 4(0) - 10$	−10	(0, −10)
1	$y = 4(1) - 10$	−6	(1, −6)
2	$y = 4(2) - 10$	−2	(2, −2)

Example 2   **A linear equation can also be represented by a graph. The coordinates of all points on a line are solutions to the equation. Graph $y = 4x - 10$ by plotting ordered pairs.**

Plot the points found in Example 1. Connect the points using a straight line.
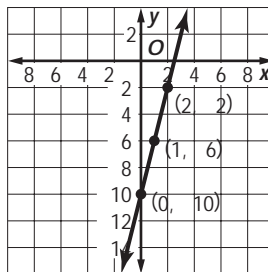
Exercises

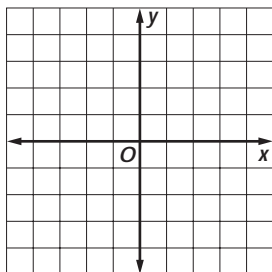**Find four solutions of each equation. Write the solutions as ordered pairs.**
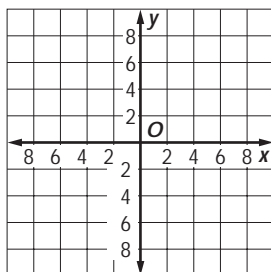
1. $y = 2x + 4$ **2.** $y = -3x - 7$ **3.** $4x + y = 5$

Graph each equation by plotting ordered pairs.
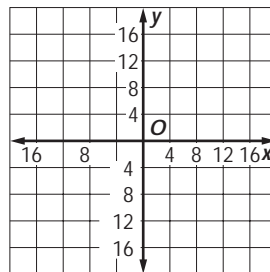
4. $y = -4x$ **5.** $y = x + 6$ **6.** $-2x + y = 8$

8-2 Skills Practice

Linear Equations in Two Variables

Find four solutions of each equation. Write the solutions as ordered pairs.

1. $y = 8x - 4$ **2.** $y = -x + 12$ **3.** $4x - 4y = 24$

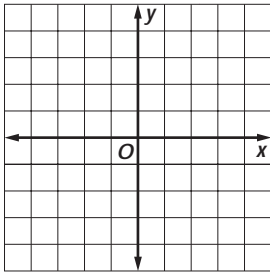**4.** $x - y = -15$ **5.** $y = 7x - 6$ **6.** $y = -3x + 8$
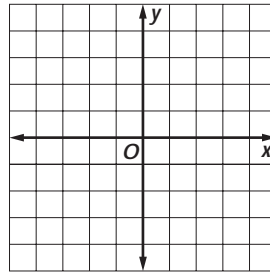
7. $y = 12$ **8.** $4x - 2y = 0$ **9.** $4x - y = 4$
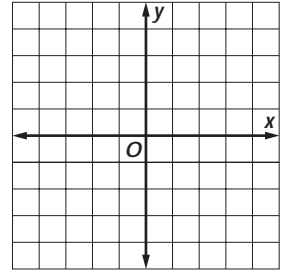
Graph each equation by plotting ordered pairs.
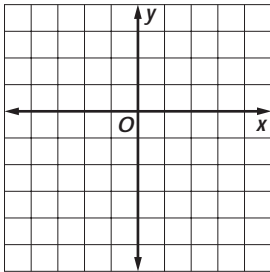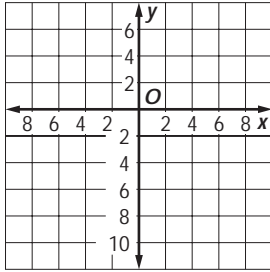
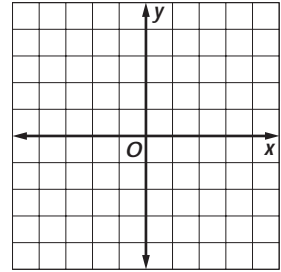**10.** $y = 3x - 2$ **11.** $y = -x + 3$ **12.** $y = -\dfrac{1}{2}x + \dfrac{3}{2}$
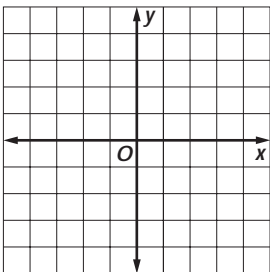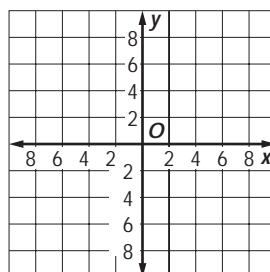
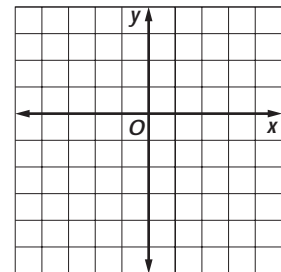**13.** $y = -2x - 5$ **14.** $y = 4x - 8$ **15.** $y = \dfrac{2}{3}x - 2$

16. $y = -5x$ **17.** $y = -2x + 6$ **18.** $y = 5x + 1$

Lesson 8-2

8-2 Practice

Linear Equations in Two Variables

Find four solutions of each equation. Write the solutions as ordered pairs.

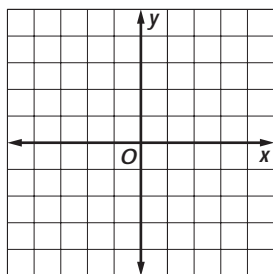**1.** $y = x - 5$

2. $y = -7$
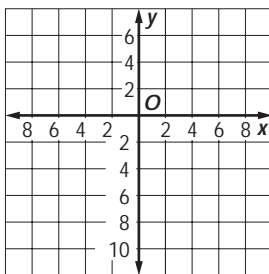
3. $y = -3x + 1$

4. $x - y = 6$

5. $y = 2x + 4$

6. $7x - y = 14$

Graph each equation by plotting ordered pairs.

7. $y = 2x - 1$

8. $y = -6x + 2$

9. $y = x + 4$
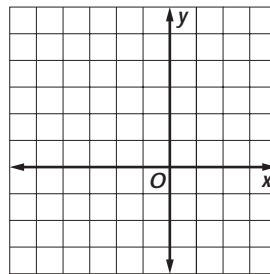
10. $y = 7$
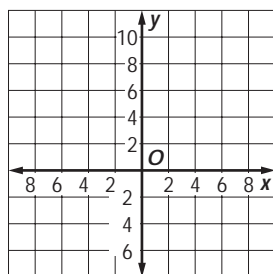
11. $y = 3x - 9$
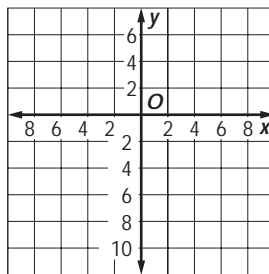
12. $y = \dfrac{1}{2}x - 6$
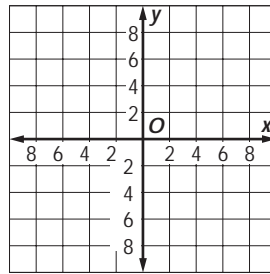
COOKING **For Exercises 13–15, use the following information.**

Kirsten is making gingerbread cookies using her grandmother's recipe and needs to convert grams to ounces. The equation $y = 0.04x$ describes the approximate number of ounces y in x grams.

13. Find three ordered pairs of values that satisfy this equation.

14. Draw the graph that contains these points.

15. Do negative values of x make sense in this case? Explain.
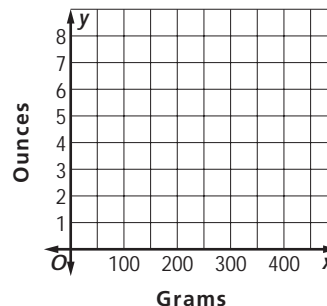
8-2 Reading to Learn Mathematics

Linear Equations in Two Variables

Pre-Activity   *How can linear equations represent a function?*

Do the activity at the top of page 375 in your textbook. Write your answers below.

a. Complete the table to find the cost of 2, 3, and 4 cans of peaches.

Number of Cans (x)	1.50x	Cost (y)
1	1.50(1)	1.50
2		
3		
4		

b. On grid paper, graph the ordered pairs (number, cost). Then draw a line through the points.

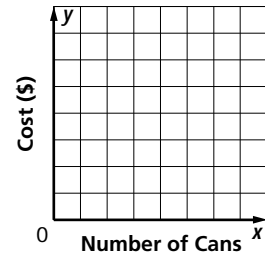**c.** Write an equation representing the relationship between number of cans x and cost y.

Reading the Lesson

Write a definition and give an example of the new vocabulary phrase.

Vocabulary	Definition	Example
1. linear equation		

2. Determine whether each equation below is linear or nonlinear and explain why.

a. $y = x + 1$

b. $y = x^2 + 1$

c. $xy = 4$

3. Solutions of a linear equation are _____ that make the equation true.

Helping You Remember

4. Work with one of your classmates translating linear equations into English. First, each of you should write a linear equation. Then trade equations and take turns reading the equations in everyday words. Second, each of you should describe a line in terms of its x and y values. Trade sentences and translate them into linear equations.

Lesson 8-2

8-2 Enrichment

Equations with Two Variables

Complete the table for each equation.

1. $y = 7 + x$

x	y
−4	
	5
	1

2. $y = 2x + 4$

x	y
6	
	12
	2

3. $y = x - 9$

x	y
3	
	−4
	−9

4. $y = 3x - 2$

x	y
2	
	−5
	7

5. $y = \dfrac{x}{4}$

x	y
8	
	4
	−6

6. $y = -6x + 1$

x	y
1	
	−11
	13

7. $y = 9 - 2x$

x	y
3	
	7
	1

8. $y = \dfrac{x + 5}{3}$

x	y
4	
	4
	−1

9. $y = \dfrac{x}{2} + 5$

x	y
8	
	8
	10

10. $y = x^2$

x	y
2	
	1
	16

11. $y = x^2 - 3$

x	y
3	
	22
	−3

12. $y = 1 - 2x$

x	y
−1	
	7
	11

8-3 Study Guide and Intervention

Graphing Linear Equations Using Intercepts

Finding Intercepts	
The *x*-intercept is the *x*-coordinate of a point where a graph crosses the *x*-axis. The y-coordinate of this point is 0.	To find the *x*-intercept, let $y = 0$ in the equation and solve for *x*.
The *y*-intercept is the *y*-coordinate of a point where a graph crosses the *y*-axis. The *x*-coordinate of this point is 0.	To find the *y*-intercept, let $x = 0$ in the equation and solve for *y*.

Example 1 **Find the x-intercept and the y-intercept for the graph of $2x + 5y = 10$.**

To find the x-intercept, let $y = 0$.

$2x + 5y = 10$ Write the equation.

$2x + 5(0) = 10$ Replace *y* with 0.

$\quad\quad x = 5$ Simplify.

To find the y-intercept, let $x = 0$.

$2x + 5y = 10$ Write the equation.

$2(0) + 5y = 10$ Replace *x* with 0.

$\quad\quad y = 2$ Simplify.

Example 2 **Graph $2x + 5y = 10$.**
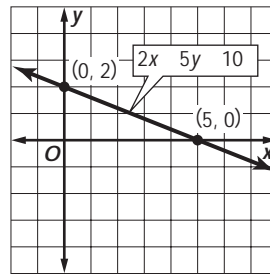
Exercises

Find the x-intercept and the y-intercept for the graph of each equation.
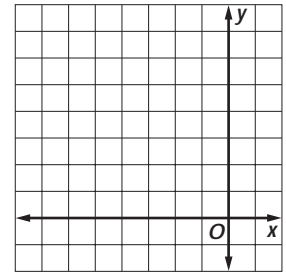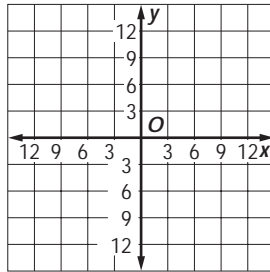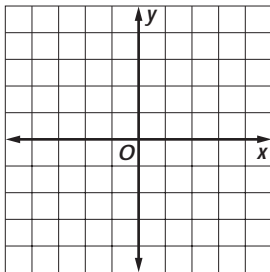
1. $y = x - 5$

2. $y - 1 = 0$

3. $3x - 2y = 12$

Graph each equation using the x- and y-intercepts.

4. $y = -3x - 3$

5. $y = x + 5$

6. $y = -x + 9$

Lesson 8-3

8-3 **Skills Practice**

Graphing Linear Equations Using Intercepts

State the *x*-intercept and the *y*-intercept of each line.

1.

2.

3.
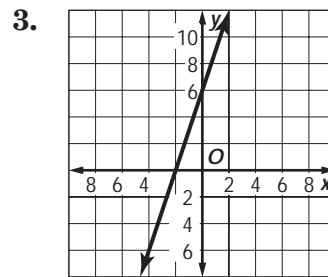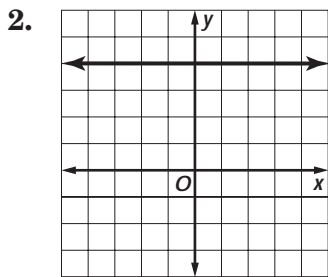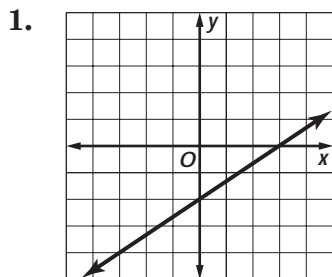
Find the *x*-intercept and the *y*-intercept for the graph of each equation.

4. $y = 2x + 6$

5. $3x - 5y = 30$

6. $y = -4x + 8$

7. $y = 7x - 14$

8. $y = 12x + 6$

9. $y = 7$

Graph each equation using the *x*- and *y*-intercepts.

10. $y = -2x + 6$
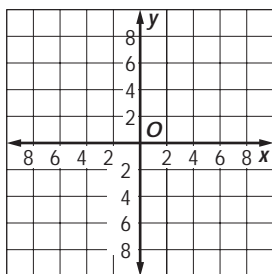
11. $y = -2$
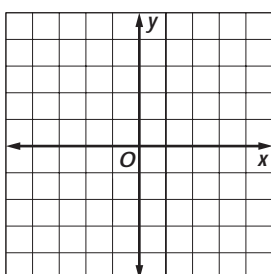
12. $y = -4x + 2$
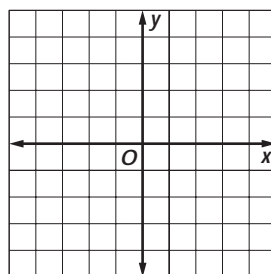
13. $y = \dfrac{2}{5}x - 2$
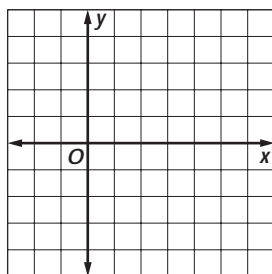
14. $x = 4$
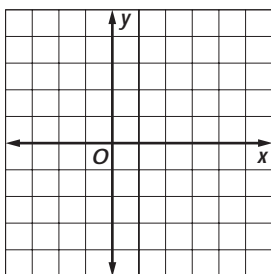
15. $y = -x + 3$
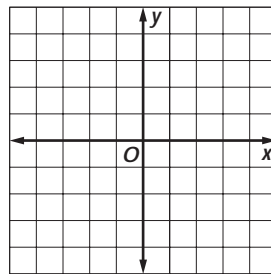
8-3 Practice

Graphing Linear Equations Using Intercepts

Find the *x*-intercept and the *y*-intercept for the graph of each equation.

1. $y = 2x - 2$

2. $y + 4 = 0$

3. $y = 3x + 9$

4. $6x + 12y = 24$

5. $5x - 3y = 15$

6. $-x - 7 = 0$

Graph each equation using the *x*- and *y*-intercepts.

7. $y = x - 7$

8. $y = -x + 5$

9. $y = 2x - 4$
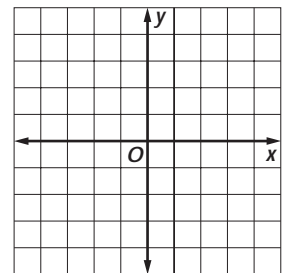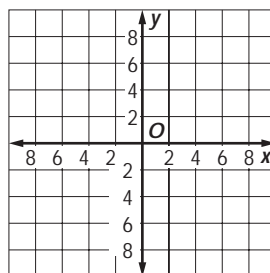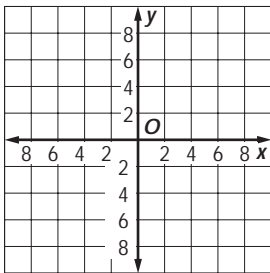
10. $y = -\dfrac{1}{7}x - 1$

11. $5x + 2y = 10$

12. $x = 2$
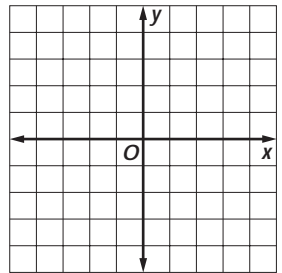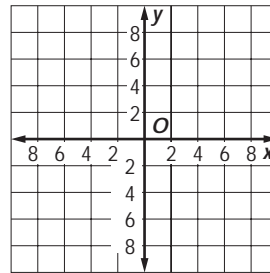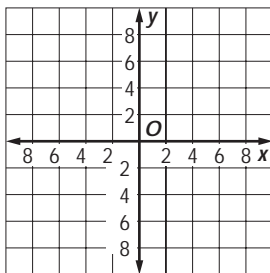
13. SAVINGS Rashid's grandparents started a savings account for him, contributing $1000. He deposits $430 each month into the account. The equation $y = 430x + 1000$ represents how much money is in the savings account after x number of months. Graph the equation and explain what the *y*-intercept means.

Lesson 8-3
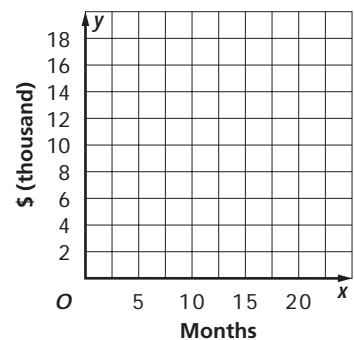
8-3 Reading to Learn Mathematics

Graphing Linear Equations Using Intercepts

Pre-Activity   *How can intercepts be used to represent real-life information?*

Do the activity at the top of page 381 in your textbook. Write your answers below.

    a. Write the ordered pair for the point where the graph intersects the *y*-axis. What does this point represent?

    b. Write the ordered pair for the point where the graph intersects the *x*-axis. What does this point represent?

Reading the Lesson

Write a definition and give an example of each new vocabulary word.

Vocabulary	Definition	Example
1. *x*-intercept		
2. *y*-intercept		

3. The _____ of the *x*-intercept is 0.

   The _____ of the *y*-intercept is 0.

4. Draw a model on the coordinate grid that shows how to graph a line using the *x*-intercept and the *y*-intercept of a line. Explain your model.
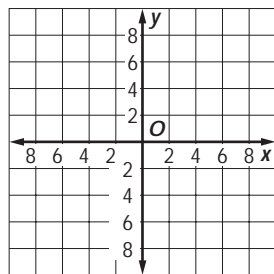
5. Is a line with no *x*-intercept vertical or horizontal? Explain.

Helping You Remember

6. The word *intercept* has many synonyms in English. Look up intercept in a thesaurus and find one or two synonyms that help you remember the mathematical meaning of the word. Explain your selection.

8-3 Enrichment

Curves

Step 1   Make a table of ordered pairs that satisfy the equation.

Step 2   Graph each point.

Step 3   Draw a smooth curve connecting the points.

If you know the graph is going to be a straight line, then you only need two points (a third one as a check). But if the graph is going to be a curved line, then you need enough points to be able to sketch a nice smooth curve. This may be 5 or more points.

Sketch a smooth curve through the points shown. The right side of the first curve has been done for you.

1.

2.

3.
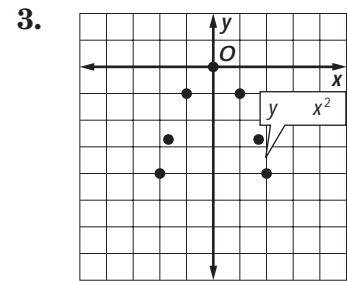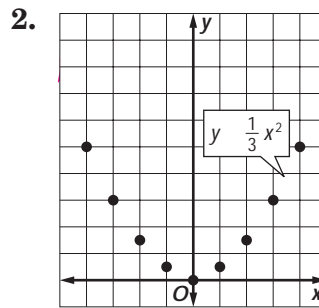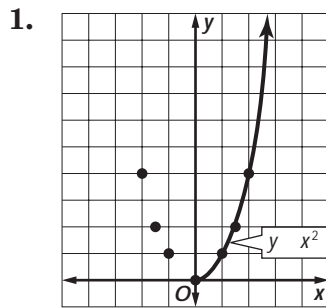
Graph each equation.

4. $y = 2x^2$

x	−2	−1.5	−1	0	1	−1.5	2
y	8	4.5	2	0			
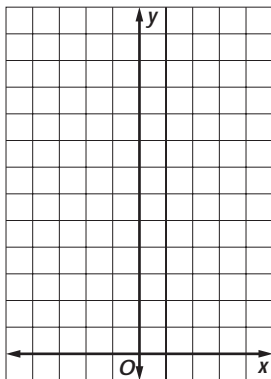
5. $y = x^2 + 2$

x	−3	−2	−1	0	1	2	3
y							

6. $y = x^2 − 1$

x	−3	−2	−1	0	1	2	3
y							

Lesson 8-3
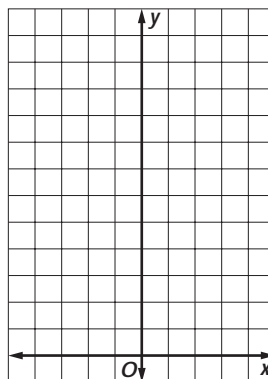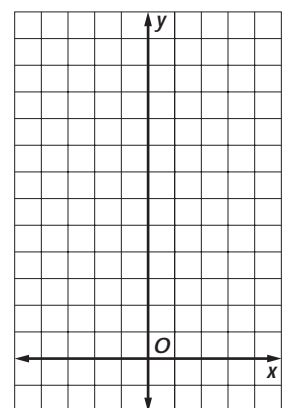
8-4 Study Guide and Intervention
Slope

Slope describes the steepness of a line.

slope $= \dfrac{\text{rise}}{\text{run}}$ ← vertical change

Note that the slope is the same for any two points on a straight line.

Symbols $m = \dfrac{y_2 - y_1}{x_2 - x_1}$, where $x_2 \neq x_1$

Model
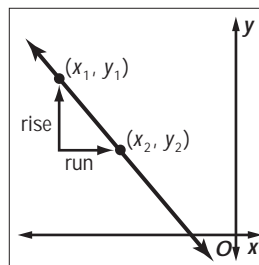
Example **Find the slope of the line.**

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$ Definition of slope

$m = \dfrac{4 - 1}{9 - 5}$ $(x_1, y_1) = (5, 1),$
                 $(x_2, y_2) = (9, 4)$

$m = \dfrac{3}{4}$

The slope is $\dfrac{3}{4}$.
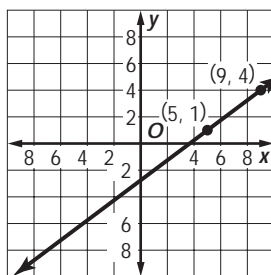
Exercises

Find the slope of each line.

1.

2.

3.
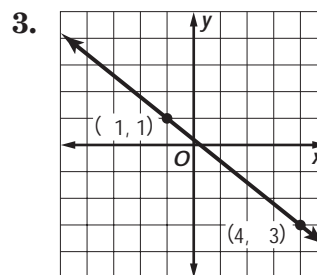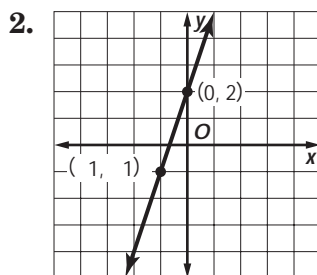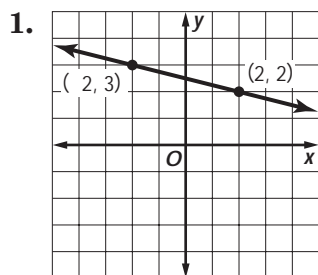
Find the slope of the line that passes through each pair of points.

4. $A(2, 2), B(-5, 4)$ **5.** $L(5, 5), M(4, 2)$ **6.** $R(7, -4), S(7, 3)$

8-4 Skills Practice

Slope

Find the slope of each line.

1.

2.

3.

4.

5.

6.
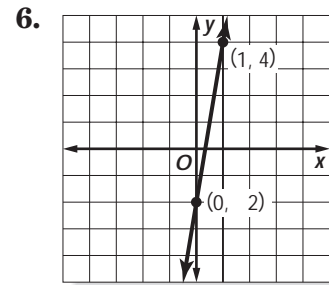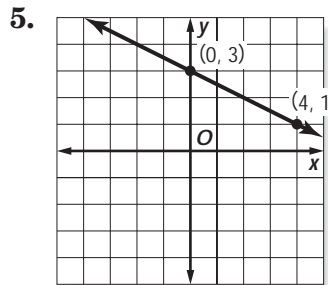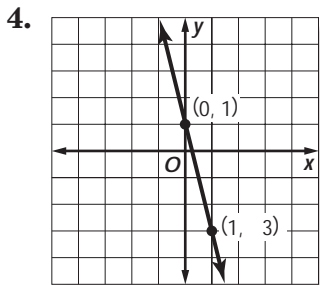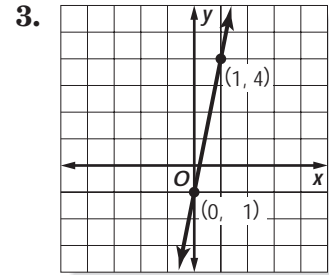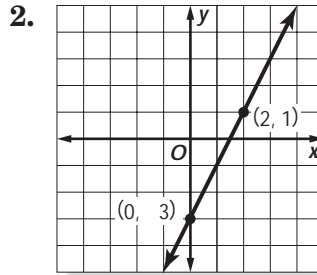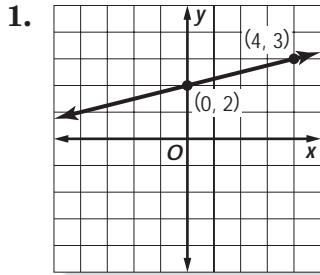
Find the slope of the line that passes through each pair of points.

7. $A(1, -5), B(6, -7)$

8. $C(7, -3), D(8, 1)$

9. $E(7, 2), F(12, 6)$

10. $G(8, -3), H(11, -2)$

11. $J(5, -9), K(0, -12)$

12. $L(-4, 6), M(5, 3)$

13. $P(2, -2), Q(7, -1)$

14. $R(-5, -2), S(-5, 3)$

15. $T(5, -6), U(8, -12)$

16. $P(10, -2), Q(3, -1)$

17. $R(6, -5), S(7, 3)$

18. $T(1, 8), U(7, 8)$

19. CAMPING A family camping in a national forest builds a temporary shelter with a tarp and a 4-foot pole. The bottom of the pole is even with the ground, and one corner is staked 5 feet from the bottom of the pole. What is the slope of the tarp from that corner to the top of the pole?

20. ART A rectangular painting on a gallery wall measures 7 meters high and 4 meters wide. What is the slope from the upper left corner to the lower right corner?

Lesson 8-4

8-4 Practice

Slope

Find the slope of each line.

1.

2.

3.
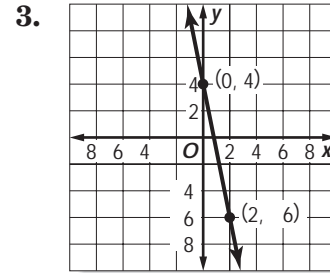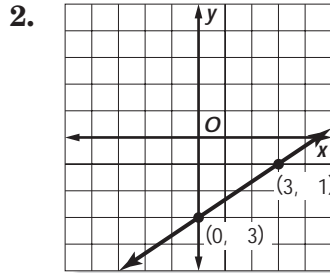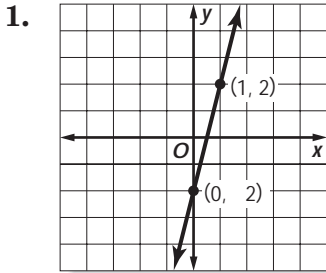
Find the slope of the line that passes through each pair of points.

4. $A(-10, 6)$, $B(-5, 8)$

5. $C(7, -3)$, $D(11, -4)$

6. $E(5, 2)$, $F(12, -3)$

7. $G(-15, 7)$, $H(-10, 6)$

8. $J(13, 0)$, $K(-3, -12)$

9. $L(-5, 3)$, $M(-4, 9)$

10. $P(12, 2)$, $Q(18, -2)$

11. $R(-2, -3)$, $S(-2, -5)$

12. $T(-13, 8)$, $U(21, 8)$

13. CAKES A wedding cake measures 2 feet high in the center and the diameter of the bottom tier is 12 inches. What is the slope of the cake?

14. INSECTS One particularly large ant hill found in 1997 measured 40 inches wide at the base and 18 inches high. What was the slope of the ant hill?

15. ARCHAEOLOGY Today, the Great Pyramid at Giza near Cairo, Egypt, stands 137 meters tall, coming to a point. Its base is a square with each side measuring 230 meters wide. What is the slope of the pyramid?

16. BUSINESS One warehouse uses 8-foot long ramps to load its forklifts onto the flat beds of trucks for hauling. If the bed of a truck is 2 feet above the ground and the ramp is secured to the truck at its end, what is the slope of the ramp while in operation?

8-4 Reading to Learn Mathematics
Slope

Pre-Activity   *How is slope used to describe roller coasters?*

Do the activity at the top of page 387 in your textbook. Write your answers below.

    a. Use the roller coaster to write the ratio $\dfrac{\text{height}}{\text{length}}$ in simplest form.

    b. Find the ratio of a hill that has the same length but is 14 feet higher than the hill on page 387. Is this hill steeper or less steep than the original?

Reading the Lesson

Write a definition and give an example of the new vocabulary word.

	Vocabulary	Definition	Example
1.	slope		

Complete each sentence.

2. Slope is _____ for any two points on the line.

3. A line that slopes downward from left to right has a _____ slope.

4. A line that slopes upward from left to right has a _____ slope.

5. A horizontal line has a _____ slope.

6. The slope of a vertical line is _____ .

Helping You Remember

7. For each graph, draw a line with the given slope.
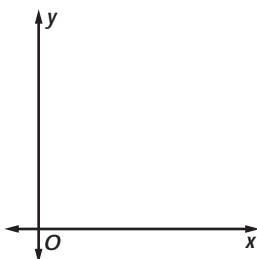
a. Positive   **b. Negative**   **c. Zero**   **d. Undefined**

Lesson 8-4
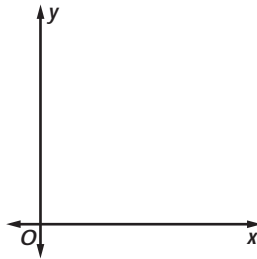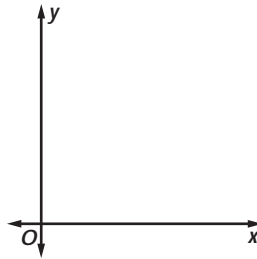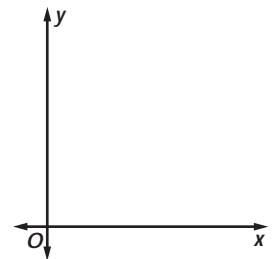
8-4 Enrichment

Investments

The graph below represents two different investments. Line A represents an initial investment of $30,000 at a bank paying passbook-savings interest. Line B represents an initial investment of $5000 in a profitable mutual fund with dividends reinvested and capital gains accepted in shares. By deriving the equation, $y = mx + b$, for A and B, a projection of the future can be made.
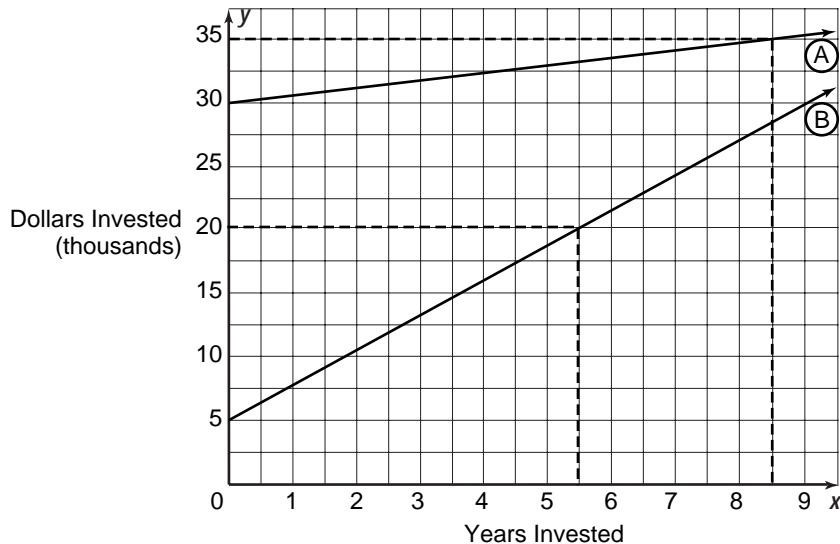
Solve.
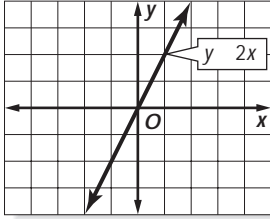
1. The y-intercept, b, is the initial investment. Find b for each of the following.

    a. line A **b.** line B

2. The slope of the line, m, is the rate of return. Find m for each of the following.

    a. line A **b.** line B

3. What are the equations of each of the following lines?

    a. line A **b.** line B

Answer each of the following, assuming that the growth of each investment continues in the same pattern.

4. What will be the value of the mutual fund after the 11th year?

5. What will be the value of the bank account after the 11th year?

6. When will the mutual fund and the bank account be of equal value?

7. In the long term, which investment has the greater payoff?

8-5 Study Guide and Intervention

Rate of Change

Rate of Change	A change in one quantity with respect to another quantity	$\text{slope} = \dfrac{\text{change in } y}{\text{change in } x}$
Direct Variation	A special type of linear equation that describes rate of change x and y both increase or both decrease at the same rate—y varies directly with x. Slope, or rate of change, k, is called the **constant of variation.**	$y = kx$, where $k \neq 0$

Example 1 **Find the rate of change for the linear function represented in the table.**

$\text{rate of change} = \text{slope}$

$\qquad = \dfrac{\text{change in } y}{\text{change in } x}$

$\qquad = \dfrac{2}{1}$ or 2 For each time increase of 1h, the temperature increases by 2°C.

Time (h)	x	0	1	2	3
Temperature (°C)	y	0	2	4	6

Example 2 **Write an equation relating x and y from Example 1.**

Step 1 Find the value of k.

$y = kx$ Direct variation

$2 = k(1)$ Replace y with 2 and x with 1.

$2 = k$ Simplify.

Step 2 Use k to write an equation.

$y = kx$ Direct variation

$y = 2x$ Replace k with 2.

Exercises

1. Find the rate of change for the linear function.

Time (h)	x	0	2	4	6
Distance Flown (mi)	y	0	1000	2000	3000

Suppose y varies directly with x. Write an equation relating x and y.

2. $y = 14$ when $x = 7$ **3.** $y = 3$ when $x = 5$ **4.** $y = 2$ when $x = -4$

Lesson 8-5

8-5 Skills Practice

Rate of Change

Find the rate of change for each linear function.

1.
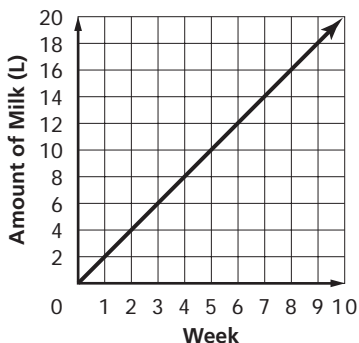
2.

Year	Salary ($)
x	y
1	21,000
2	23,500
3	26,000
4	28,500

3.
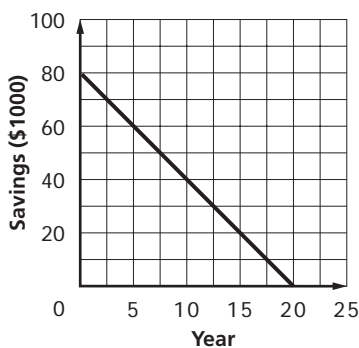
4.

Month	Number of Employees
x	y
0	0
2	22
4	44
6	66

Suppose y varies directly with x. Write an equation relating x and y.

5. $y = 2$ when $x = -7$

6. $y = 8$ when $x = -1$

7. $y = 1$ when $x = -2$

8. $y = 18$ when $x = 6$

9. $y = 5$ when $x = 25$

10. $y = 3$ when $x = 12$

11. $y = 1.5$ when $x = 5$

12. $y = 9$ when $x = -3$

13. $y = 1$ when $x = -5$

14. $y = 21$ when $x = 3$

15. $y = 54$ when $x = -6$

16. $y = 12$ when $x = -4$

8-5 Practice

Rate of Change

Find the rate of change for each linear function.

1.
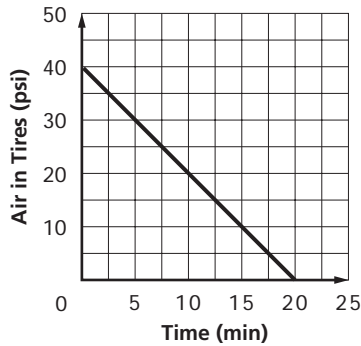
2.

Time (h)	Distance (km)
x	y
0	0
5	510
10	1020
15	1530

Suppose y varies directly with x. Write an equation relating x and y.

3. $y = -6$ when $x = -2$

4. $y = -27$ when $x = 9$

5. $y = 4$ when $x = 16$

6. $y = 10$ when $x = 2$

7. $y = -42$ when $x = 7$

8. $y = 3$ when $x = 36$

9. $y = 4.5$ when $x = -9$

10. $y = 11$ when $x = 33$

11. $y = 25$ when $x = -5$

12. $y = 63$ when $x = 7$

13. $y = 48$ when $x = -4$

14. $y = 26$ when $x = 13$

TRAFFIC MANAGEMENT   For Exercises 15 and 16, use the following information.

San Diego reserves express lanes on the freeways for the use of carpoolers. In order to increase traffic flow during rush hours, other drivers may use the express lanes for a fee. The toll varies directly with the number of cars on the road. The table shows a sample of possible tolls.

Toll ($)	Traffic Volume (vehicles/h)
1.00	521
2.00	1042
3.00	1563
4.00	2084

15. Write an equation that relates the toll x and traffic volume y.

16. Predict the number of vehicles at a peak time if the toll increases to $6.00.

17. OFFICE SUPPLIES   The cost of paper varies directly with the number of reams of paper purchased. If 2 reams cost $9.60, find the cost of 41 reams.

Lesson 8-5

8-5 Reading to Learn Mathematics

Rate of Change

Pre-Activity   *How are slope and speed related?*

Do the activity at the top of page 393 in your textbook. Write your answers below.

    a. For every 1-hour increase in time, what is the change in distance?

    b. Find the slope of the line.

    c. Make a conjecture about the relationship between slope of the line and speed of the car.

Reading the Lesson

Write a definition and give an example of each new vocabulary phrase.

Vocabulary	Definition	Example
1. rate of change		
2. direct variation		
3. constant of variation		

Complete each sentence.

4. Rates of change can be described using _____ .

5. Direct variation is a special type of _____ equation.

Helping You Remember

6. The word *ratio* comes from the Latin word meaning rate and can also mean proportion or relation. Direct variation is often called direct proportion. Look up *ratio* in the dictionary. Then use this information to explain the relationship between rate of change and direct variation.

8-5 Enrichment

Fibonacci Sequence

The first fifteen terms of the **Fibonacci sequence** are shown below.

   1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610

In addition to the fact that each term is the sum of the two previous terms, there are other interesting relationships.

Complete.

1. Find the sum of the first four terms.

2. Find the sum of the first five terms.

3. Find the sum of the first six terms.

4. What is the relationship between the sums and terms in the sequence?

5. Use your answer from Exercise 4 above to predict the sum of the first 10 terms, and of the first 12 terms. Check your answers by finding the sums.

6. Divide each of the first 15 terms by 4. Make a list of the remainders. What pattern do you see in the remainder sequence?

7. The sums of the squares of consecutive terms of the Fibonacci sequence are shown below. Complete the next three lines of this pattern.

   $1^2 + 1^2 = 1 \times 2$

   $1^2 + 1^2 + 2^2 = 2 \times 3$

   $1^2 + 1^2 + 2^2 + 3^2 = 3 \times 5$

   $1^2 + 1^2 + 2^2 + 3^2 + 5^2 = 5 \times 8$

Lesson 8-5

8-6 Study Guide and Intervention
Slope-Intercept Form

The **slope-intercept form** of a line makes it easy to graph the line:

$y = mx + b$ **Example:** $y = 3x + 2$

slope $= m$ slope $= 3$

y-intercept $= b$ y-intercept $= 2$

Example   **Graph $y = -4x - 3$ using the slope and y-intercept.**

Step 1   Find the slope and y-intercept.
slope $= -4$ y-intercept $= -3$

Step 2   Graph the y-intercept point at $(0, -3)$.

Step 3   Write the slope -4 as $\dfrac{-4}{1}$. Use the slope
to locate a second point on the line.

$m = \dfrac{-4}{1}$ change in y: down 4 units
change in x: right 1 unit

Step 4   Draw a line through the two points.

Step 5   Check by locating another point on the line and substituting the coordinates
into the original equation.
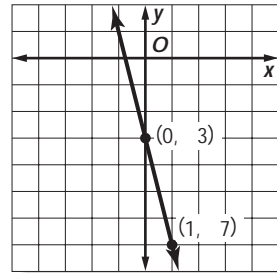
Exercises

Given the slope and y-intercept, graph each line.

1. slope $= 4$,
    y-intercept $= -1$
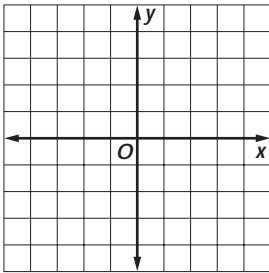
2. slope $= 6$,
    y-intercept $= 4$
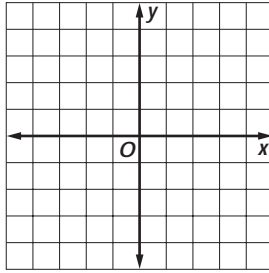
3. slope $= -\dfrac{1}{4}$,
    y-intercept $= 5$
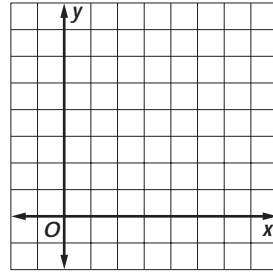
Graph each equation using the slope and y-intercept.

4. $y = 3x - 2$
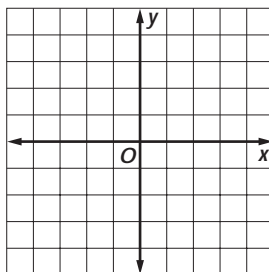
5. $y = \dfrac{2}{3}x + 3$
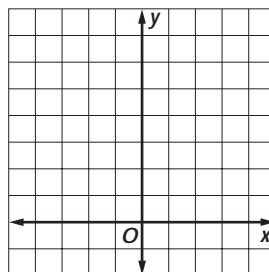
6. $y = 5x - 3$
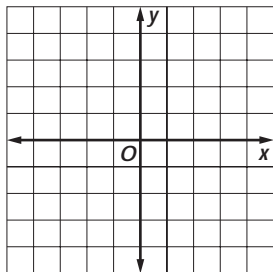
8-6 Skills Practice

Slope-Intercept Form

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

1. $y = 12x - 4$

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

3. $3x - y = 6$

Given the slope and *y*-intercept, graph each line.

4. slope $= -2$,
   y-intercept $= 2$

5. slope $= \frac{1}{2}$,
   y-intercept $= 4$

6. slope $= \frac{2}{3}$,
   y-intercept $= -3$
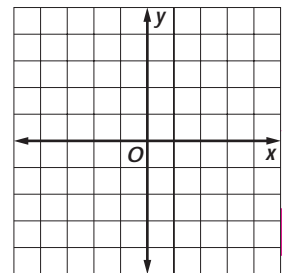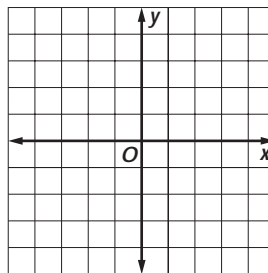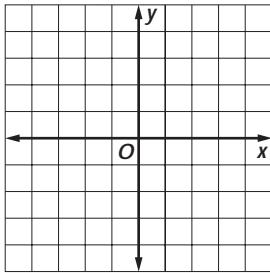
Graph each equation using the slope and *y*-intercept.

7. $y = 5x - 1$

8. $y = \frac{1}{2}x + 4$

9. $y = -x + 2$
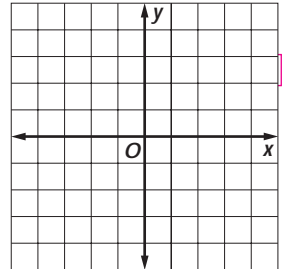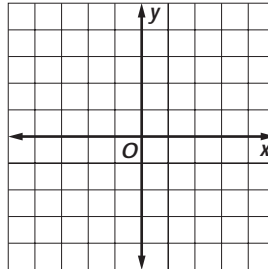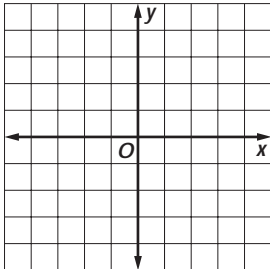
10. $y = 2x + 2$

11. $y = -4x + 2$

12. $y = x - 3$
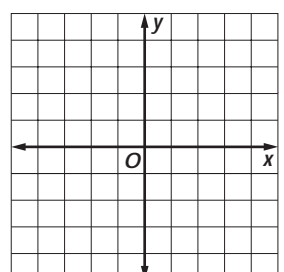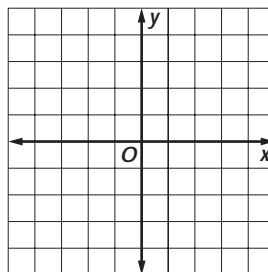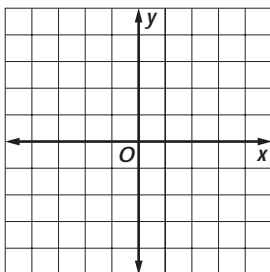
8-6 Practice

Slope-Intercept Form

Given the slope and *y*-intercept, graph each line.

1. slope $= \frac{3}{4}$,
y-intercept $= -3$
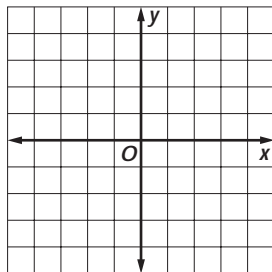
2. slope $= \frac{5}{6}$,
y-intercept $= 1$
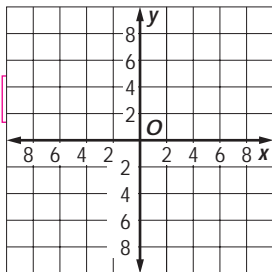
3. slope $= 1$,
y-intercept $= 5$
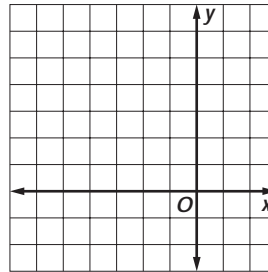
Graph each equation using the slope and *y*-intercept.

4. $y = -\frac{1}{2}x - 4$
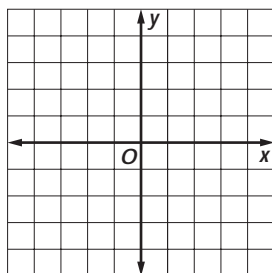
5. $y = x - 4$
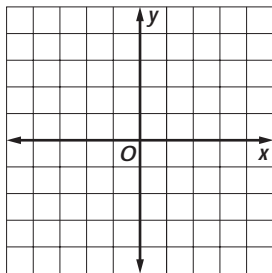
6. $y = -6x + 3$
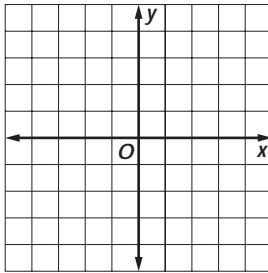
EXERCISE   For Exercises 7 and 8, use the following information.

A person weighing 150 pounds burns about 320 Calories per hour walking at a moderate pace. Suppose that the same person burns an average of 1500 Calories per day through basic activities. The total Calories *y* burned by that person can be represented by the equation $y = 320x + 1500$, where *x* represents the number of hours spent walking.

7. Graph the equation using the slope and *y*-intercept.
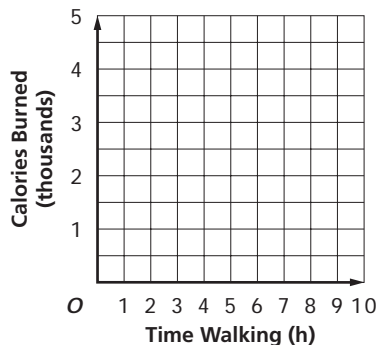
8. State the slope and *y*-intercept of the graph of the equation and describe what they represent.

8-6 Reading to Learn Mathematics

Slope-Intercept Form

Pre-Activity *How can knowing the slope and y-intercept help you graph an equation?*

Do the activity at the top of page 398 in your textbook. Write your answers below.

a. On the same coordinate plane, use ordered pairs or intercepts to graph each equation in a different color.
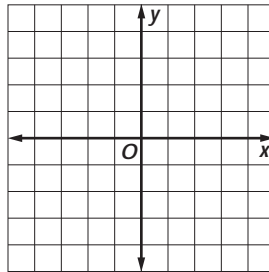
b. Find the slope and the *y*-intercept of each line. Complete the table.

Equation	Slope	*y*-Intercept
$y = 2x + 1$		
$y = \frac{1}{3}x - 3$		
$y = -2x + 1$		

c. Compare each equation with the value of its slope and *y*-intercept. What do you notice?

Reading the Lesson

Write a definition and give an example of the new vocabulary phrase.

Vocabulary	Definition	Example
1. slope-intercept form		

2. Sometimes you must solve an equation for _____ before you can write the equation in slope-intercept form.

3. Explain why $y = mx + b$ is called the slope-intercept form.

Helping You Remember

4. Mathematicians debate the origin of the slope-intercept form of a line, particularly the use of m to represent slope. Make up a mnemonic phrase to help you remember the slope-intercept form.

8-6 Enrichment

Translations and Reflections

The lines on graph paper can help you draw slide images of figures.

1. Graph $\triangle ABC$ with vertices $A(1, 1)$, $B(-3, 4)$, and $C(-3, -4)$. Draw $\triangle A'B'C'$, the translation image of $\triangle ABC$, where the slide is 3 units to the right. Name the coordinates of the image of each vertex.

2. Draw $\triangle JKL$ with vertices $J(-4, 3)$, $K(0, 2)$, and $L(-2, 0)$. Let $\triangle J'K'L'$ be the image of $\triangle JKL$ under a slide of 4 units to the right and then a slide of 3 units up. Graph $\triangle J'K'L'$. Name the coordinates of the vertices of $\triangle J'K'L'$.
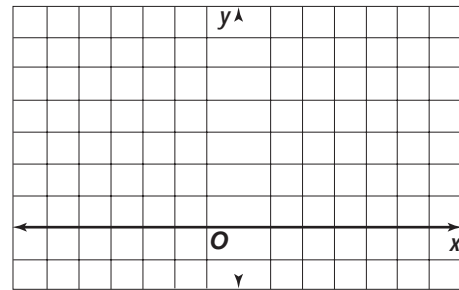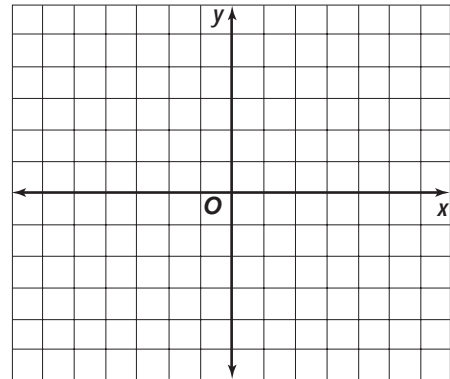
3. Draw $\overline{A'B'}$, the image formed by reflecting $\overline{AB}$ over the y-axis. Then draw $\overline{A''B''}$, the image formed by reflecting $\overline{A'B'}$ over the x-axis. What are the coordinates of A'' and B''? What is the relationship between the coordinates of the endpoints of $\overline{AB}$ and those of $\overline{A''B''}$?
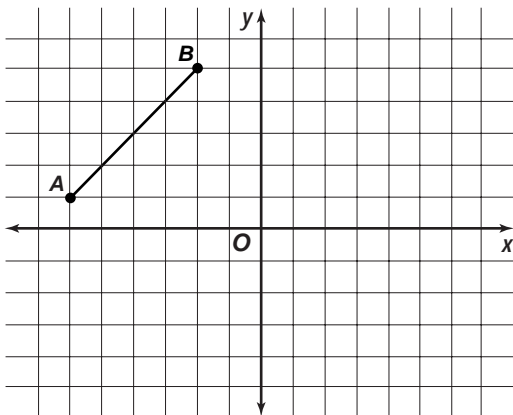
4. Draw $\overline{P'Q'}$, the reflection image of $\overline{PQ}$ over the y-axis. Draw $\overline{P''Q''}$, the reflection image of $\overline{P'Q'}$ over the x-axis. Find the slopes of $\overline{PQ}$, $\overline{P'Q'}$, and $\overline{P''Q''}$. What is the relationship between the slopes of $\overline{PQ}$ and $\overline{P''Q''}$?
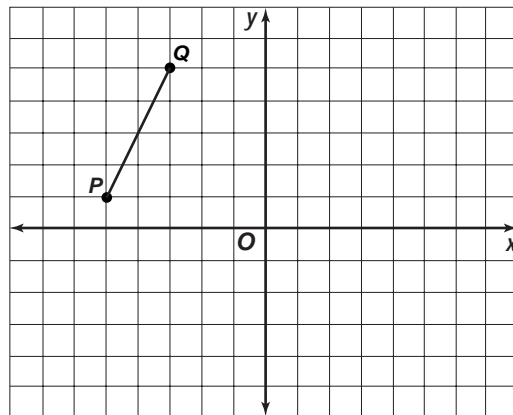
8-7 Study Guide and Intervention

Writing Linear Functions

If you know the slope and *y*-intercept, you can write the equation of a line by substituting these values in $y = mx + b$.

Example 1

Write an equation in slope-intercept form for each line.

a. slope $= -\dfrac{1}{4}$, *y*-intercept $= -3$

$y = mx + b$ Slope-intercept form

$y = -\dfrac{1}{4}x + (-3)$ Replace *m* with $-\dfrac{1}{4}$ and *b* with −3.

$y = -\dfrac{1}{4}x - 3$ Simplify.

b. slope $= 0$, *y*-intercept $= -9$

$y = mx + b$ Slope-intercept form

$y = 0x + (-9)$ Replace *m* with 0 and *b* with −9.

$y = -9$ Simplify.

Example 2

Write an equation in slope-intercept form for the line passing through (–4, 4) and (2, 7).

Step 1   Find the slope *m*.

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$ Definition of slope

$m = \dfrac{7 - 4}{2 - (-4)}$ or $\dfrac{1}{2}$ $(x_1, y_1) = (-4, 4),$ $(x_2, y_2) = (2, 7)$

Step 2   Find the *y*-intercept *b*. Use the slope and the coordinates of either point.

$y = mx + b$ Slope-intercept form

$4 = \dfrac{1}{2}(-4) + b$ Replace (x, y) with $(-4, 4)$ and *m* with $\dfrac{1}{2}$.

$6 = b$ Simplify.

An equation is $y = \dfrac{1}{2}x + 6$.

Exercises

Write an equation in slope-intercept form for each line.

1. slope $= 1$,
   y-intercept $= 2$

2. slope $= -\dfrac{3}{4}$,
   y-intercept $= -5$

3. slope $= 0$,
   y-intercept $= -3$

Write an equation in slope-intercept form for the line passing through each pair of points.

4. (6, 2) and (3, 1)

5. (8, 8) and (−4, 5)

6. (7, −3) and (−5, −3)

8-7 Skills Practice

Writing Linear Functions

Write an equation in slope-intercept form for each line.

1. slope = 7,
   y-intercept = 2

2. slope = −5,
   y-intercept = −3

3. slope = $\frac{3}{5}$,
   y-intercept = 6

4. slope = −6,
   y-intercept = 7

5. slope = $\frac{2}{7}$,
   y-intercept = 1

6. slope = $\frac{4}{3}$,
   y-intercept = −4
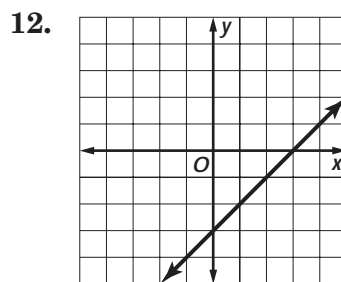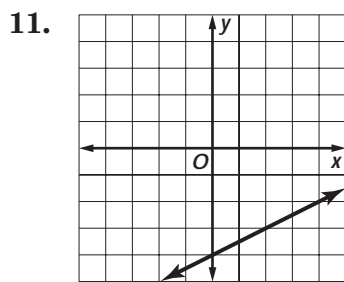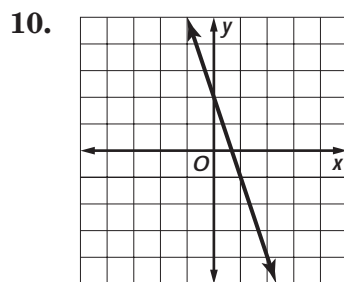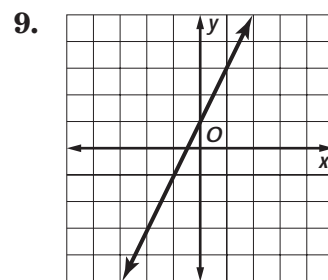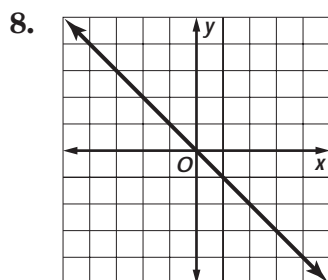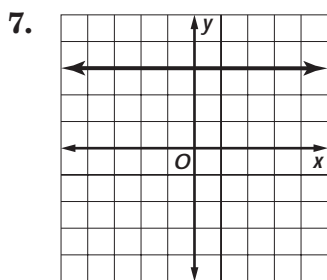
7.

8.

9.

10.

11.

12.

Write an equation in slope-intercept form for the line passing through each pair of points.

13. (9, −1) and (6, −2)

14. (12, 5) and (−4, 1)

15. (10, −6) and (−2, −6)

16. (4, 6) and (1, 3)

17. (6, 3) and (−6, 9)

18. (8, −4) and (−4, −1)

19. (5, 0) and (2, −3)

20. (12, −2) and (6, 2)

21. (−5, 10) and (3, −6)

8-7 Practice

Writing Linear Functions

Write an equation in slope-intercept form for each line.

1. slope = 3,
   y-intercept = −2

2. slope = 0,
   y-intercept = 7

3.

4.
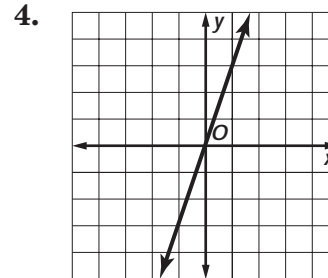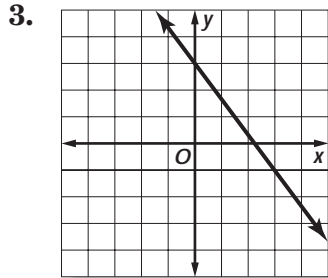
Write an equation in slope-intercept form for the line passing through each pair of points.

5. (9, 0) and (6, −1)

6. (8, 6) and (−8, 2)

7. (7, −5) and (−4, −5)

8. (2, 7) and (−1, 4)

9. (4, 4) and (−8, 10)

10. (0, 2) and (−3, 14)

BUSINESS   For Exercises 11 and 12, use the following information.

Flourishing Flowers charges $125 plus $60 for each standard floral arrangement to deliver and set up flowers for a banquet.

11. Write an equation in slope-intercept form that shows the cost y for flowers for x number of arrangements.

12. Find the cost of providing 20 floral arrangements.

INSULATION   For Exercises 13 and 14, use the following information.

Renata González wants to increase the energy efficiency of her house by adding to the insulation previously installed. The better a material protects against heat loss, the higher its R-value, or resistance to heat flow. The table shows the R-value of fiberglass blanket insulation per inch of thickness. The existing insulation in Renata's attic has an R-value of 10.

R-value	Thickness (in.)
0.0	0
3.2	1
6.4	2
9.6	3

Source: Oak Ridge National Laboratory

13. Write an equation in slope-intercept form that shows the total R-value y in the attic if she adds x number of inches of additional insulation.

14. Estimate the total R-value in the attic if she adds 6 inches of insulation.

8-7 Reading to Learn Mathematics

Writing Linear Functions

Pre-Activity   *How can you model data with a linear equation?*

Do the activity at the top of page 404 in your textbook. Write your answers below.

a. Graph the ordered pairs (chirps, temperature). Draw a line through the points.

Temperature (°F) (y-axis: 10, 20, 30, 40, 50, 60, 70)
Number of Chirps (x-axis: 0, 5, 10, 15, 20, 25, 30, 35)
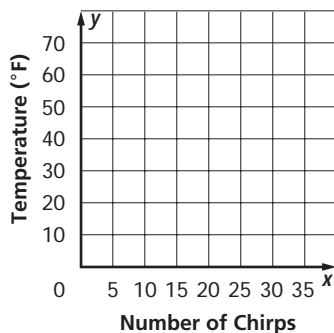
b. Find the slope and the *y*-intercept of the line. What do these values represent?

c. Write an equation in the form $y = mx + b$ for the line then translate the equation into a sentence.

Reading the Lesson

1. Explain how you can use the following information to write the slope-intercept form of a line.

   a. graph of a line

   b. two points on a line

   c. a table of values

8-7 Enrichment

Problem Solving: Gathering Data

When investors decide to buy or sell stock, they usually base their decisions on data. They read stock market reports, investigate companies they are interested in, and look at economic trends. This activity focuses on reading stock market reports.

To read a stock market report, you need to become familiar with the terms that are used, the facts and figures that are published in the newspaper, and the methods used to keep track of the stocks.

Many newspapers print stock reports such as the New York Stock Exchange (NYSE) report. The final entry for each stock is a fraction or mixed number that is positive (indicating a gain in value) or negative (indicating a loss).

Find the New York Stock Exchange (NYSE) report in the business section of your local Sunday newspaper. Using just those stocks that begin with A, B, or C, tally the number of stocks that had each of the gains and losses listed below.

+2 points or more		+1.00		−.12		−1.12	
+1.87		+.87		−.25		−1.25	
+1.75		+.75		−.37		−1.37	
+1.62		+.62		−.50		−1.50	
+1.50		+.50		−.62		−1.62	
+1.37		+.37		−.75		−1.75	
+1.25		+.25		−.87		−1.87	
+1.12		+.12		−1.00		−2 points or more	
		No change					

1. Did more stocks gain in value or lose value?

2. How did the market do as a whole?

3. How did the newspapers describe the trading this week?

4. Make a scatterplot that shows how two specific stocks change over the period of one week. Use their daily closing prices.

5. Is there any relationship between the two stocks you chose? Explain why or why not.

8-8 Study Guide and Intervention

Best-Fit Lines

A **best-fit** line is a line that is very close to most of the data points. You can use best-fit lines to make predictions from real-world data.

Example 1 Make a scatter plot and draw a best-fit line for the data in the table.

Year	Percent of Population	Year	Percent of Population
1970	60.4	1995	66.6
1980	63.8	1997	67.1
1985	64.8	1998	67.1
1990	66.5	1999	67.1

Source: U.S. Census Bureau

U.S. Civilian Labor Force
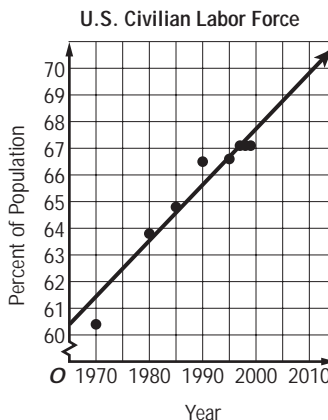
Source: U.S. Census Bureau

Example 2 Use the best-fit line in example 1 to predict the percent of the population in the U.S. labor force in 2010.

Use the extended line to find the *y* value for an *x* value of 2010—about 70. A prediction for the percent of the U.S. population in the labor force in 2010 is approximately 70 percent.

Exercises

Use the table that shows the number of girls who participated in high school athletic programs in the United States from 1973 to 1998.

1. Make a scatter plot and draw a best-fit line.
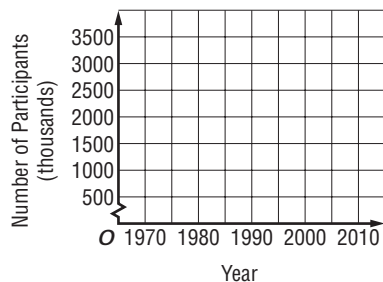
Year	1973	1978	1983	1988	1993	1998
Number of Participants (thousands)	817	2083	1780	1850	1997	2570

Source: U.S. Census Bureau

2. Use the best-fit line to predict the number of female participants in 2008.

8-8 Skills Practice

Best-Fit Lines

CONSTRUCTION   For Exercises 1 and 2, use the table that shows the average hourly wage of U.S. construction workers from 1980 to 1999.

Year	Average Hourly Earnings ($)
1980	9.94
1985	12.32
1990	13.77
1995	15.09
1999	17.13

Source: U.S. Census Bureau

1. Make a scatter plot and draw a best-fit line.
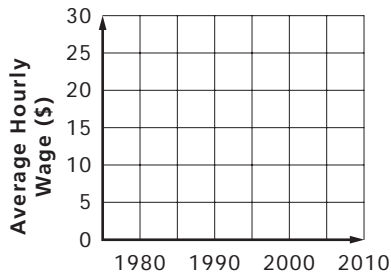
2. Use the best-fit line to predict the average hourly wage of construction workers in 2010.

MINING   For Exercises 3 and 4, use the table that shows the number of persons employed in mining from 1980 to 1999.

Year	Employees (thousands)
1980	1027
1985	927
1990	709
1995	581
1999	535

Source: U.S. Census Bureau
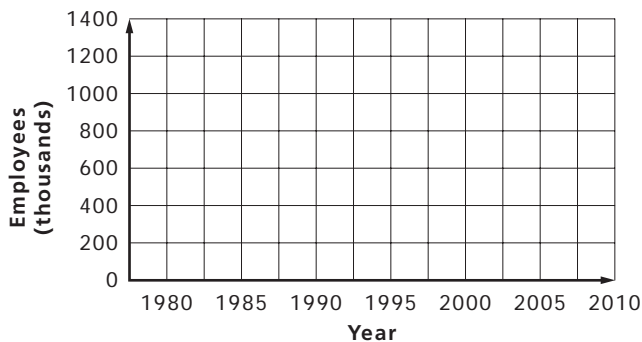
3. Make a scatter plot and draw a best-fit line.

Source: U.S. Census Bureau

4. Write an equation for the best-fit line and use it to predict the number of persons employed in mining in 2010.

Lesson 8-8

8-8 Practice

Best-Fit Lines

BEVERAGES For Exercises 1 and 2, use the table that shows the amount of whole milk consumed per person in the United States from 1993 to 1997.

Year	Gallons per Person
1993	9.4
1994	10.7
1995	11.6
1996	12.5
1997	13.1

Source: U.S. Census Bureau

1. Make a scatter plot and draw a best-fit line.
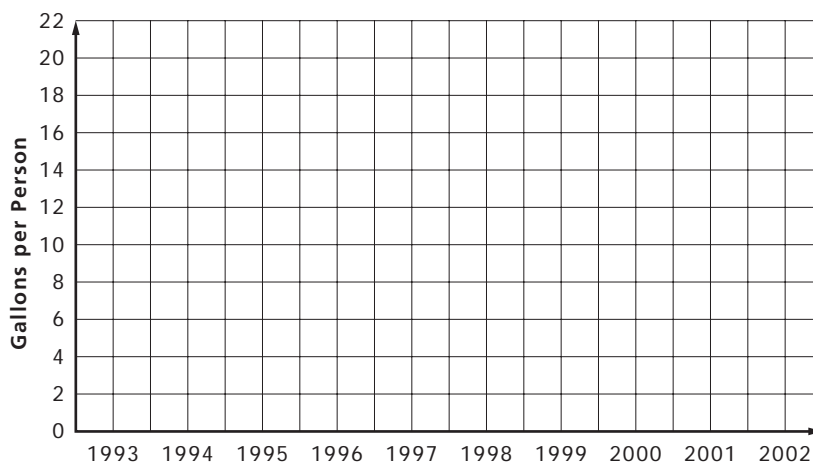
2. Use the best-fit line to predict the amount of whole milk consumed per person in 2002.

EDUCATION For Exercises 3 and 4, use the table that shows the number of students graduating from medical school in the United States from 1980 to 2000.

Year	Graduates
1980	15,113
1985	16,318
1990	15,398
1995	15,888
2000	16,112

Source: U.S. Census Bureau
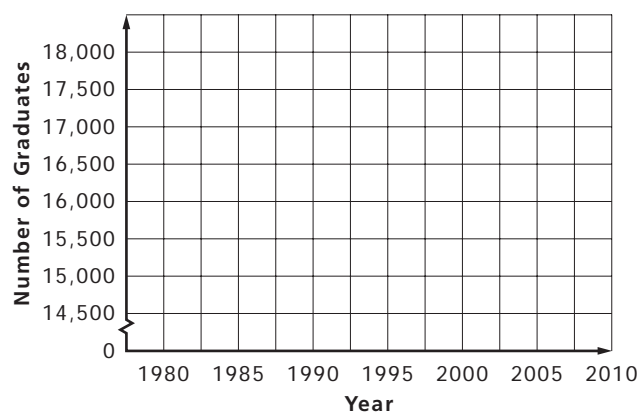
3. Make a scatter plot and draw a best-fit line.

Source: U.S. Census Bureau

4. Write an equation for the best-fit line and use it to predict the number of medical school graduates in 2010.

8-8 Reading to Learn Mathematics

Best-Fit Lines

Pre-Activity *How can a line be used to predict life expectancy for future generations?*

Do the activity at the top of page 409 in your textbook. Write your answers below.

a. Use the line drawn through the points to predict the life expectancy of a person born in 2010.

b. What are some limitations in using a line to predict life expectancy?

Reading the Lesson

Write a definition and give an example of the new vocabulary phrase.

Vocabulary	Definition	Example
1. slope intercept form		

2. A best-fit line can be used when the data points approximate a _____ relationship.

3. Explain what a prediction equation is.

Helping You Remember

4. Complete the following concept map showing the steps needed to find a prediction equation and make a prediction.

Step 1
• Select _____ _____ on the line.
• Find the _____.

Step 2
• Find the _____.
• Write the _____ in _____ _____.

Step 3
• Write the equation of the _____.
• Replace _____ in the equation with the *x*-value of a _____ on the line.
• _____ to find *y*.

Lesson 8-8
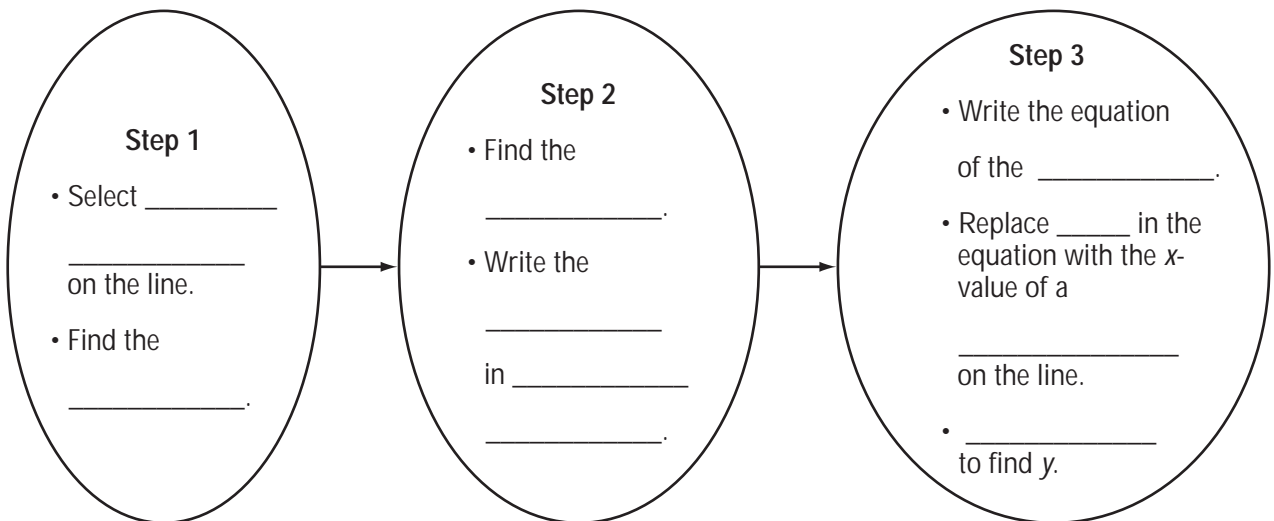
8-8 Enrichment

Line of Best Fit

Each point on the graph shows the relation between the number of people attending the Roxy Cinema and the number of cars in the parking lot.

A line is drawn that appears to lie close to most of the points. This is called the *line of best fit*. Here is how to find the equation of this line.

The line passes through $(100, 40)$ and $(300, 120)$. Use the slope intercept form.

Attendance and Parking
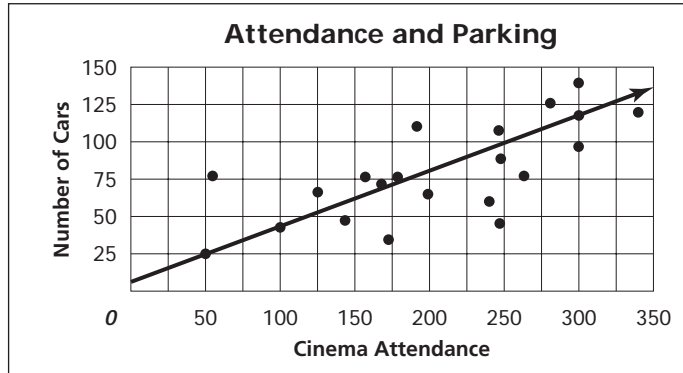
$m = \dfrac{y_2 - y_1}{x_2 - x_1}$ Definition of slope

$m = \dfrac{120 - 40}{300 - 100}$ $(x_1, y_1) = (100,40)$
$(x_2, y_2) = (300,120)$

$= \dfrac{80}{200}$ or $\dfrac{2}{5}$ Simplify.

$y = mx + b$ Slope-intercept form

$40 = \dfrac{2}{5}(100) + b$ Replace (x, y) with $(100, 40)$ and m with $\dfrac{2}{5}$.

$0 = b$ Simplify.

So an equation for the line is $y = \dfrac{2}{5}x + 0$ or $y = \dfrac{2}{5}x$.

Solve each problem.

1. Suppose the owner of the Roxy decides to increase the seating capacity of the theater to 1000. How many cars should the parking lot be prepared to accommodate?

2. The points $(240, 60)$ and $(340, 120)$ lie on the scatter plot. Write an equation for the line through these points.

3. Do you think the equation in Exercise 2 is a good representation of the relationship in this problem? Explain.

4. Suppose the equation for the relationship between attendance at the theater and cars in the parking lot is $y = 2x + 20$. What might you suspect about the users of the parking lot?

8-9 Study Guide and Intervention
Solving Systems of Equations

Two linear equations together are called a system of equations. One method for solving a system of equations is to graph the equations on the same coordinate plane. Another way to solve a system of equations is by using **substitution.**

Example 1 Solve the system of equations by graphing.

$y = -2x + 1$

$y = x - 2$

The graphs appear to intersect at $(1, -1)$. Check this estimate by substituting the coordinates into each equation.

CHECK: $y = -2x + 1$ $\qquad$ $y = x - 2$

$-1 \overset{?}{=} -2(1) + 1$ $\qquad$ $-1 \overset{?}{=} 1 - 2$

$-1 \overset{?}{=} -1 \checkmark$ $\qquad$ $-1 = -1 \checkmark$
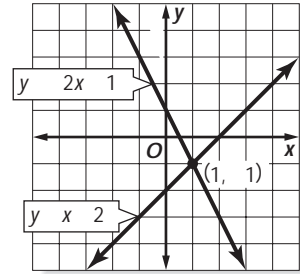
Example 2 Solve the system of equations by substitution.

$y = -3x + 1$

$y = -2$

Since y must have the same value in both equations, you can replace y with -2 in the first equation.

$y = -3x + 1$ $\qquad$ Write the first equation.

$-2 = -3x + 1$ $\qquad$ Replace y with -2.

$1 = x$ $\qquad$ Solve for x.

The solution of this system of equations is $(1, -2)$. Check by graphing.

Exercises

Solve each system of equations by graphing.

1. $y = 3x - 6$
$\quad y = -x + 2$
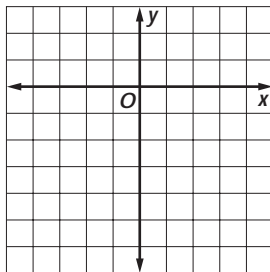
2. $x - y = 4$
$\quad x + 2y = -2$
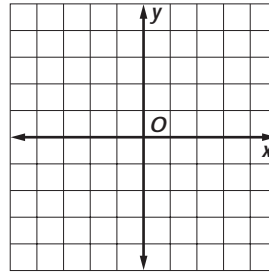
Solve each system of equations by substitution.

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

4. $2x - y = 1$
$\quad x = 1$

5. $7x + 2y = 11$
$\quad y = -5$

Lesson 8-9

8-9 Skills Practice

Solving Systems of Equations

Solve each system of equations by graphing.

1. $y = 4x - 2$
$y = -x + 3$
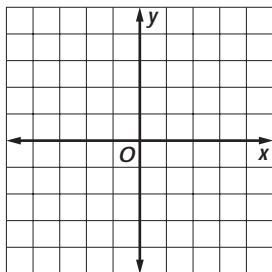
2. $y = -2x + 3$
$4x + 2y = -8$
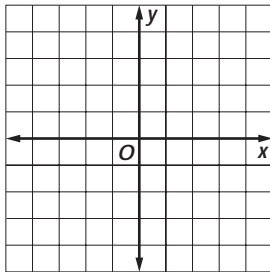
3. $y = -3x - 2$
$y = x - 2$
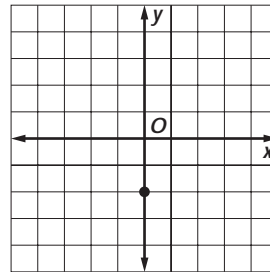
4. $x + y = 4$
$y = 2x + 1$
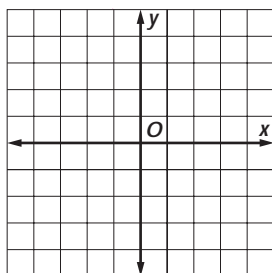
5. $3x + 4y = 12$
$y = -\dfrac{3}{4}x + 3$
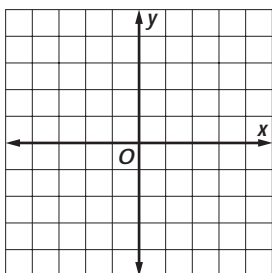
6. $y = -2x - 4$
$y = x + 2$
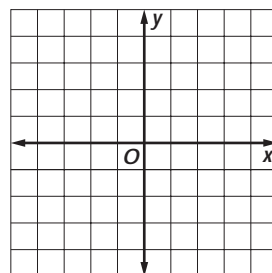
Solve each system of equations by substitution.

7. $y = 3x - 9$
$y = 3$

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

9. $y = \dfrac{1}{2}x - 2$
$y = 4$

10. $y = 6x$
$x = \dfrac{1}{2}$

11. $2x + y = 8$
$y = 2$

12. $x - y = 10$
$y = 3$

8-9 Practice

Solving Systems of Equations

Solve each system of equations by graphing.

1. $y = \frac{2}{3}x - 7$
$2x - 3y = 21$
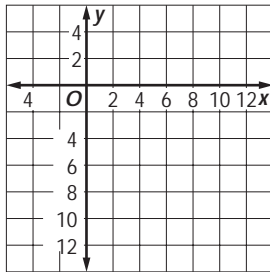
2. $y = -x + 2$
$y = 3x - 2$
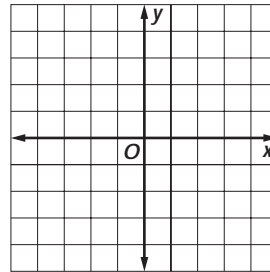
3. $y = -3x + 6$
$3x - y = 6$
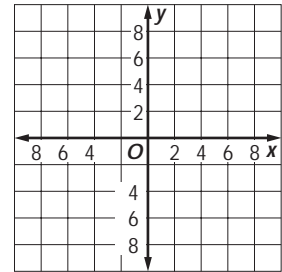
Solve each system of equations by substitution.

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

5. $y = -4x + 3$
$y = -5$

6. $4x + y = 2$
$y = -2$

7. $x - 5y = 15$
$y = -3$

8. $y = 3x - 9$
$x = 1$

9. $5x - 2y = 7$
$y = 4$

SHOPPING   **For Exercises 10–12, use the following information and the table.**

At-Home Dry Cleaning		
Brand	**Price per Kit**	**Price per Refill**
A	$8.00	$1.00
B	$9.00	$0.50

Two brands of at-home dry cleaning products sell both start-up kits and refill packets. Each start-up kit does five loads of dry cleaning. Each refill does one load.

10. Write a system of equations that represents the cost *y* for *x* number of loads.

11. Solve the system of equations. Explain what the solution means.

12. If you do nine loads of dry cleaning, which brand would be less expensive? Explain.

Lesson 8-9

8-9 Reading to Learn Mathematics

Solving Systems of Equations

Pre-Activity *How can a system of equations be used to compare data?*

Do the activity at the top of page 414 in your textbook. Write your answers below.

a. Write an equation to represent the income from each job. Let *y* equal the salary and let *x* equal the number of hours worked. (*Hint*: Income = hourly rate · number of hours worked + bonus.)

b. Graph both equations on the same coordinate plane.

c. What are the coordinates of the point where the two lines meet? What does this point represent?
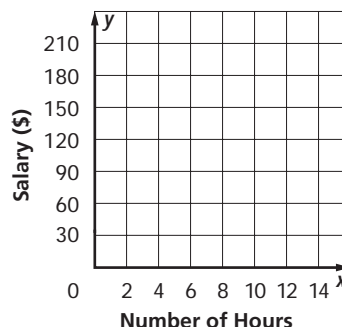
Reading the Lesson

Write a definition and give an example of each new vocabulary word or phrase.

Vocabulary	Definition	Example
1. system of equations		
2. substitution		

3. The _____ of a system of equations is the coordinates of the point where the graphs of the equations _____ .

4. If two equations have the same graph, there are _____ solutions to that system of equations.

Helping You Remember

5. Review the Study Tip on page 415 in your textbook. Complete each section of the chart with the number of solutions and an explanation, model, or logical proof for the situation.

Different Slopes	Same Slope, Different *y*-Intercepts	Same Slope, Same *y*-Intercept

8-9 Enrichment

Graphing Systems of Equations

Because checking accounts vary from one financial institution to another, educated consumers should carefully weigh the options offered by various institutions when choosing a checking account.

The four equations below describe the cost of four different checking accounts. In each equation, C represents the monthly cost in dollars, and n represents the number of checks written. Find the cost for the number of checks written in each account.

Account 1 $C = 0.1n + 1.50$		Account 2 $C = 0.2n + 1.00$		Account 3 $C = 0.25n + 0.75$		Account 4 $C = 0.05n + 1.75$	
n	C	n	C	n	C	n	C
0		0		0		0	
2		2		3		2	
5		4		5		5	
8		5		6		9	
12		8		8		14	
15		10		9		20	

Graph and label each account on the grid.
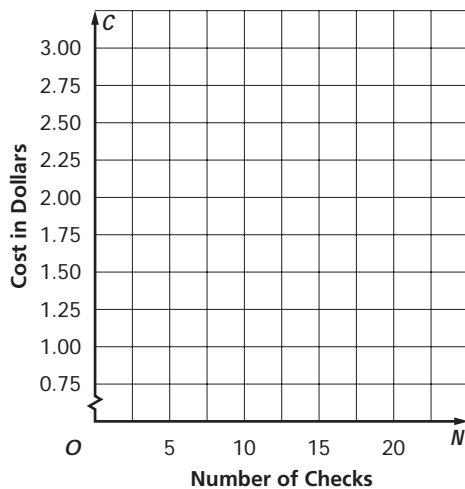
1. The *break-even point* of the graph is the point at which the costs of the accounts are the same. What is the break-even point for these accounts?

2. Which account should be chosen by a consumer who writes fewer than five checks per month?

3. Which account should be chosen by a consumer who writes more than five checks per month?

8-10 Study Guide and Intervention

Graphing Inequalities

To graph a linear inequality, first graph the **boundary**. Test any point to determine which region is the solution, or **half plane**. Shade this region. You can also use inequalities to solve real-world problems.

Example

GARDENING   Marisol has 10 square feet in her garden for planting squash and peppers. How many square feet can she plant of each?

Squash	plus	peppers	is at most	10 square feet.
x	$+$	y	$\leq$	10

$x + y \leq 10$ Write the inequality.

$\quad y \leq -x + 10$ Subtract x from each side.

Graph $y \leq -x + 10$ as a solid line since the boundary is part of the graph. The origin is part of the graph since $0 \leq -0 + 10$. Thus, the coordinates of all points in the shaded region are possible solutions.
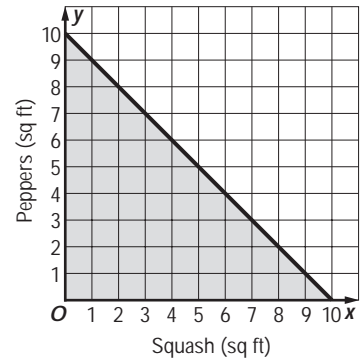
$(7, 3) = 7$ square feet of squash, 3 square feet of peppers

$(4, 6) = 4$ square feet of squash, 6 square feet of peppers

$(2, 7) = 2$ square feet of squash, 7 square feet of peppers

Exercises

LEISURE   Use the following information for Exercises 1–3.
Fred and Roya have $500 to spend on ballroom dancing classes. Each foxtrot class costs $16 per couple and each salsa lesson costs $20 per couple.

1. Write an inequality to represent this situation.

2. Graph the inequality.
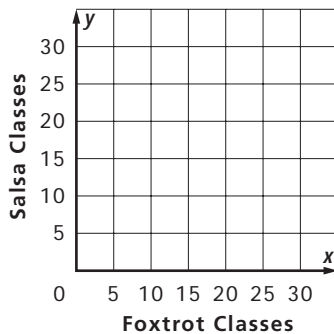
3. Use the graph to determine how many of each type of dance class Fred and Roya can take.

8-10 Skills Practice

Graphing Inequalities

Graph each inequality.

1. $y > x + 2$
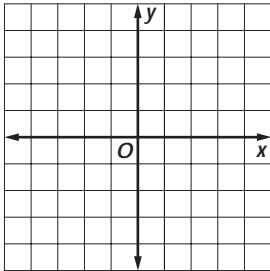
2. $y \leq x - 4$
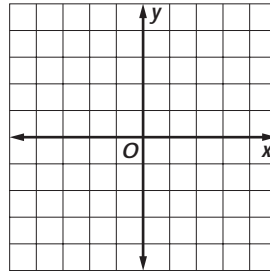
3. $y \geq \dfrac{1}{2}x$
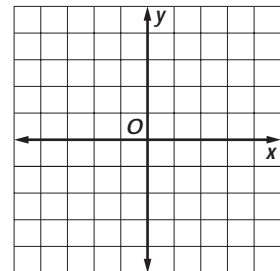
4. $y < 2x - 3$
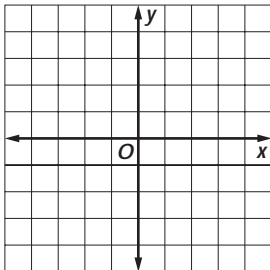
5. $y \geq -\dfrac{1}{3}x + 3$
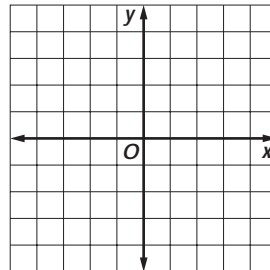
6. $y < 3x$
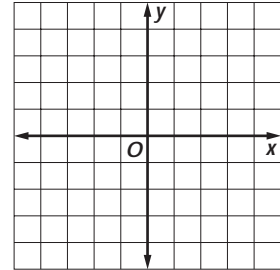
PACKING   **For Exercises 7–9, use the following information.**

The Gelbs are moving to a new home and want to pack efficiently. The boxes they are using can hold 10 pounds each. Suppose that each book weighs 1 pound and every sweater weighs 2 pounds. Assume that the boxes are large enough to hold any combination of books and sweaters weighing 10 pounds or less.

7. Write an inequality to represent this situation.

8. Graph the inequality.
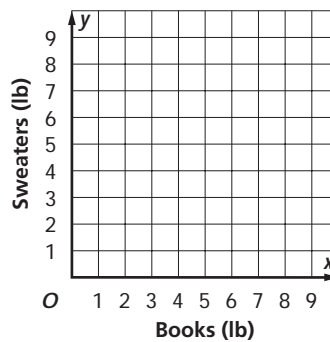
9. Use the graph to determine how many books and how many sweaters each box can hold.

Lesson 8-10

8-10 Practice

Graphing Inequalities

Graph each inequality.

1. $y > -x - 5$
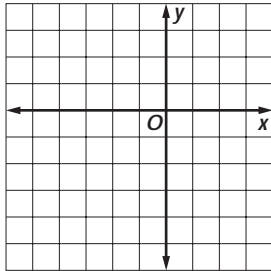
2. $y \le 2$
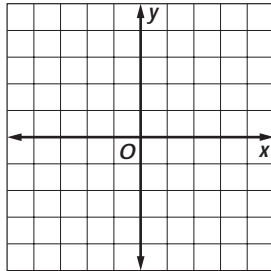
3. $y \ge x + 6$
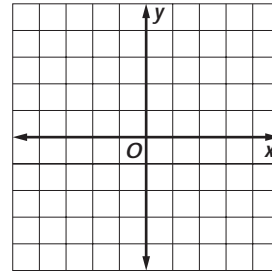
DRIVING **For Exercises 4–6, use the following information.**

Sarah needs to spend at least 90 hours driving in order to qualify to take a driver's test. She can either drive with a licensed instructor or her parent or guardian.

4. Write an inequality to represent this situation.

5. Graph the inequality.

6. Use the graph to determine how many hours Sarah can drive with an instructor or a parent.
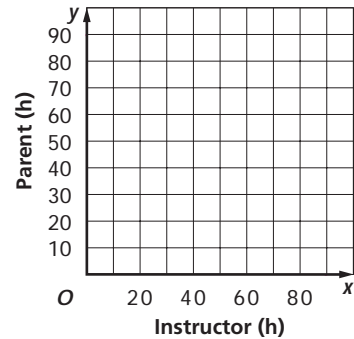
READING **For Exercises 7–9, use the following information.**

Jai joined a reading club for the summer. He pledged to read more than 200 points worth of reading material. Books count 10 points each while other materials such as magazines, poems, or short stories count 2 points each.

7. Write an inequality to represent this situation.

8. Graph the inequality.

9. Use the graph to determine how many books and how many pieces of other material Jai needs to read to meet his commitment.
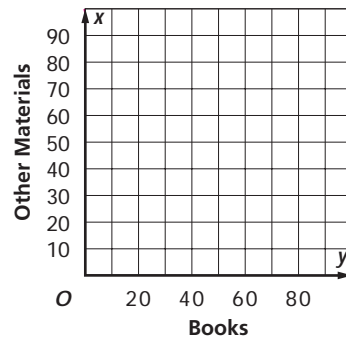
8-10 Reading to Learn Mathematics

Graphing Inequalities

Pre-Activity ***How can shaded regions on a graph model inequalities?***

Do the activity at the top of page 419 in your textbook. Write your answers below.

a. Substitute $(-4, 2)$ and $(3, 1)$ in $y > 2x + 1$. Which ordered pair makes the inequality true?

b. Substitute $(-4, 2)$ and $(3, 1)$ in $y < 2x + 1$. Which ordered pair makes the inequality true?

c. Which area represents the solution of $y < 2x + 1$?

Reading the Lesson

Write a definition and give an example of each new vocabulary word or phrase.

Vocabulary	Definition	Example
1. boundary		
2. half plane		

3. If an inequality contains $\geq$ or $\leq$, then use a _____ line to indicate that the boundary _____ included in the graph.

4. If an inequality contains $>$ or $<$, then use a _____ line to indicate that the boundary _____ included in the graph.

Helping You Remember

5. Suppose that for the next seven days, you can have either an apple or an orange with your lunch. Graph all possible solutions on a coordinate grid. Assume that each day you have exactly one whole fruit.
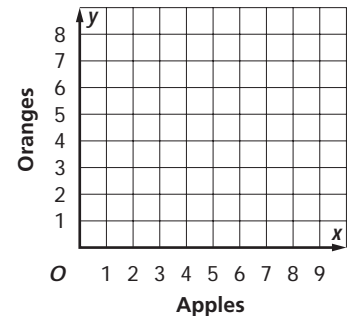
Then suppose that you have a total of 3.5 apples and 2.5 oranges during the seven days. Plot this solution point on the grid and shade the region containing this point. What advantages does graphing the inequality have over graphing just the points?

Lesson 8-10

8-10 **Enrichment**

Graphing Systems of Inequalities

Suppose you are given the following system of inequalities.

$$y \geq x + 2$$
$$y \leq -2x - 1$$

The solution of this system is the set of all ordered pairs that satisfy both inequalities. To find the solution, graph each inequality. The intersection of the graphs represents the solution.

The graphs of the equations $y = x + 2$ and $y = -2x - 1$ are the boundaries of each region. The solution of the system is the region that contains ordered pairs that are solution of *both* inequalities.

For example, $(-6, 2)$ is a solution of the system. Check by substituting the coordinates into each inequality.
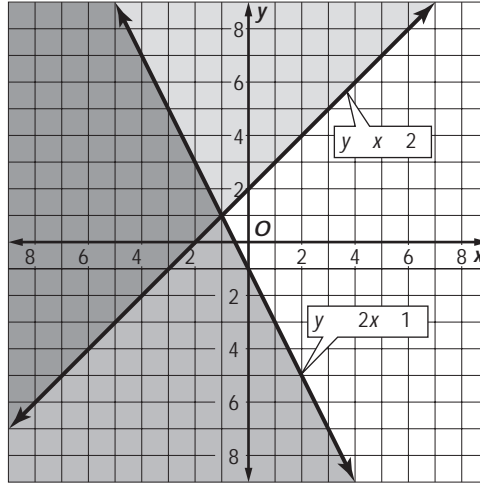
Solve each system by graphing. State one solution of each system.

1. $y \geq 2x + 1$
　　$y \leq -x + 1$
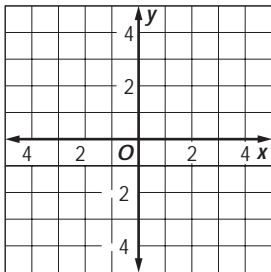
2. $y < -2$
　　$y - x > 1$
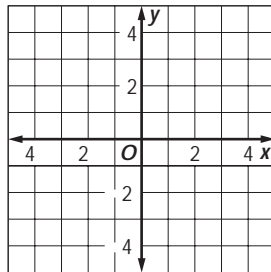
3. $y \geq x - 3$
　　$y \geq -x - 1$
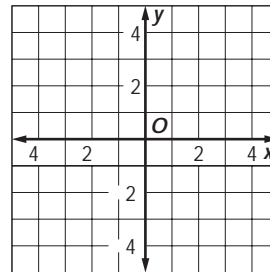
4. $2y + x < 4$
　　$3x - y > 6$
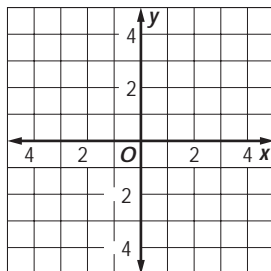
5. $y > x + 1$
　　$y < x + 3$
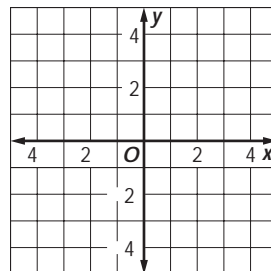
6. $x \geq 1$
　　$y + x \leq 3$
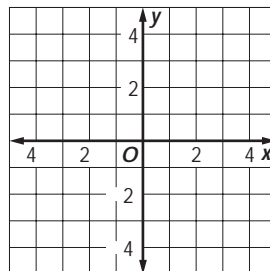
8 **Chapter 8 Test, Form 1**

SCORE _____

Write the letter for the correct answer in the blank at the right of each question.

1. Determine which relation is a function.
   A. {(3, 0), (0, 3), (5, 4), (0,1)}
   B. {(0, 0), (0, 3), (0, 4), (0,1)}
   C. {(−1, 0), (0, 3), (−1, 4), (5, 2)}
   D. {(3, 0), (2, 3), (5, 4), (6, 1)}

   1. _____

2. The relation {(5, 0), (1, 9), (2, 4)} is *not* a function when which ordered pair is added to the set?
   A. (3, 0)   **B.** (9, 1)   **C.** (−6, −8)   **D.** (2, 7)

   2. _____

3. The table shows the projected ratio of males to females at various ages in the year 2025. Determine whether this relation is a function and describe the relationship between the age of the population and the ratio of males to females.

Age	14	24	44	64	74
Ratio	1.05	1.042	98.0	94.0	83.0

   Source: www.infoplease.com

   A. Function; as the age increases, the ratio increases.
   B. Function; as the age increases, the ratio decreases.
   C. Not a function; as the age increases, the ratio increases.
   D. Not a function; as the age increases, the ratio decreases.

   3. _____

4. Which of the following is *not* a solution of the equation $y = 3x − 4$?
   A. (2, 2)   **B.** (4, 8)   **C.** (0, −4)   **D.** (−1, −1)

   4. _____

5. Which set of ordered pairs can be used to graph $y = x − 2$.
   A. (−1, −3), (1, −1), (3, 1)
   B. (−1, 3), (1, −1), (3, −1)
   C. (−3, −1), (1, −1), (1, 3)
   D. (−1, −3), (1, 1), (−3, −1)

   5. _____

6. Find the *x*-intercept and the *y*-intercept for the graph of $y = 3x − 4$.
   A. $−4; \frac{4}{3}$ **B.** $4; −\frac{4}{3}$ **C.** $\frac{4}{3}; −4$ **D.** $−\frac{4}{3}; 4$

   6. _____

7. Draw a graph of the equation with intercepts (0, 4) and (−4, 0) to determine which other point the line passes through.
   A. (1, 3)   **B.** (3, −1)   **C.** (−1, 3)   **D.** (3, 1)

   7. _____

8. Find the slope of the line that passes through the points $A(0, 2)$ and $B(5, 0)$.
   A. 2   **B.** $\frac{5}{2}$ **C.** $−\frac{2}{5}$ **D.** $−\frac{5}{2}$

   8. _____

9. The slope of a horizontal line is _____?_____ .
   A. undefined   **B.** 0   **C.** positive   **D.** negative

   9. _____

10. Suppose y varies directly with x and $y = 12$ when $x = 6$. Write an equation relating x and y.
    A. $y = 12x$ **B.** $y = 6x$ **C.** $y = \frac{1}{2}x$ **D.** $y = 2x$

    10. _____

Assessment

8 **Chapter 8 Test, Form 1** *(continued)*

11. The table shows the temperature of a potato placed in a 300° oven. What is the rate of change of temperature of the potato in the first 20 minutes?

t (minutes)	0	10	20	30	40
T (temperature)	70	95	130	200	270

   A. 130°   **B.** $\dfrac{13}{7}$ **C.** 3° per minute   **D.** 5° per minute **11.** _____

12. State the slope and the *y*-intercept for the graph of $y = -4x$.
   A. −4; none   **B.** 1; −4   **C.** 4; −1   **D.** −4; 0   **12.** _____

13. Write an equation in slope-intercept form to represent the table of values.

x	2	3	5	6
y	−3	−4	−6	−7

   A. $y = -x - 1$ **B.** $y = \dfrac{3}{2}x - 1$ **C.** $y = x - 2$ **D.** $y = -\dfrac{2}{5}x + 2$ **13.** _____

14. The graph of a line goes through the point at (0, 2) and has slope 2. Which point is also on the graph of the line?
   A. (1, 4)   **B.** (2, 2)   **C.** (1, 2)   **D.** (2, 4)   **14.** _____

For Questions 15 and 16, the scatter plot at the right shows the relationship between the age and value of a used car in each of four years.
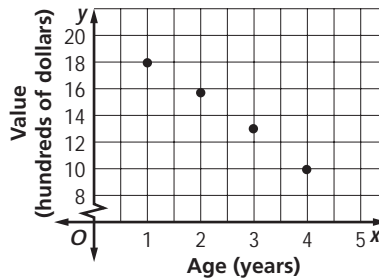
15. Which of the following is the best estimate for the slope of the best-fit line for the data?
   A. 5000   **B.** −5
   C. 5   **D.** −250   **15.** _____

16. Use a best-fit line to predict the value of the car after five years.
   A. $4,700   **B.** $2,100   **C.** $8,300   **D.** $10,000   **16.** _____

17. Find the solution of the system of equations graphed.
   A. (−2, 2)   **B.** (0, 2) and (−2, 0)
   C. (2, −2)   **D.** (0, −1) and (1, 0)   **17.** _____
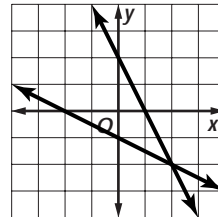
18. Solve the system of equations $2x + y = 2$
    at the right by substitution. $y = 0$
   A. (−4, −3)   **B.** (0, 1)   **C.** $\dfrac{1}{3}, -\dfrac{2}{3}$ **D.** (1, 0)   **18.** _____

19. The graph of $y \leq 2x$ is the region _____?_____ the graph of $y = 2x$.
   A. below   **B.** above   **C.** on or below   **D.** on or above   **19.** _____

20. Determine which ordered pair is a solution of the inequality $y < -4x + 7$.
   A. (−1, 11)   **B.** (0, 8)   **C.** (1, 2)   **D.** (2, 0)   **20.** _____

Bonus The price of buying gasoline varies directly with the   **B:** _____
number of gallons bought. If five gallons of gas cost
$7.50, what is the rate of change of this linear function?

468

8 **Chapter 8 Test, Form 2A** SCORE _____

Write the letter for the correct answer in the blank at the right of each question.

1. Determine which relation is *not* a function.
   A. {(3, 2), (2, −3), (−1, 4), (−6, −5)}   **B.** {(0, 4), (2, 2), (−2, −2), (0, 8)}
   C. {(−3.5, 2), (−3, 3), (−4, 4), (4, 4)}   **D.** {(1, 1), (0.5, −2), (5, 4), (−1, 1)}   1. _____

2. Which of the following values of c makes the relation {(0, 1), (1, 2), (2, 2), (c, 4)} a function?
   A. 1   **B.** −2   **C.** 0   **D.** None of these   2. _____

3. The table shows the median years that workers of various ages had worked for their current employer. Determine whether this relation is a function, and describe the relationship between age and length of time with the current employer. **Source:** www.infoplease.com

Age	24	34	44	54	64
Years with Employer	1.2	2.8	5.3	8.3	10.2

   A. Function; as the worker gets older, the median years of work increases.
   B. Function; as the worker gets older, the median years of work decreases.
   C. Not a function; as the worker gets older, the median years of work increases.
   D. Not a function; as the worker gets older, the median years of work decreases.   3. _____

4. Which of the following is a solution of $3x - 2y = 6$?
   A. (2, 3)   **B.** (0, 3)   **C.** (3, 0)   **D.** (4, 3)   4. _____

5. Which set of ordered pairs can be used to graph $y = -x + 1$?
   A. (−1, −2), (0, 1), (1, 0)   **B.** (−1, 2), (0, 1), (1, 0)
   C. (−1, 2), (0, 0), (1, 2)   **D.** (−1, −2), (0, −1), (−1, 0)   5. _____

6. Find the x-intercept and the y-intercept of the graph of $2x + 4y = 6$.
   A. 3; 6   **B.** 3; $\frac{3}{2}$ **C.** −3; 3   **D.** 2; 4   6. _____

7. Draw a graph of the equation with intercepts (0, −2) and (1, 0) to determine which other point the line passes through.
   A. (−1, −4)   **B.** (−2, −5)   **C.** (3, 2)   **D.** (1, 1)   7. _____

8. Find the slope of the line that passes through the points $A(-6, 2)$ and $B(5, -1)$.
   A. −1   **B.** $\frac{3}{11}$ **C.** $-\frac{11}{3}$ **D.** $-\frac{3}{11}$ 8. _____

9. What is the slope of the line $x = -3$?
   A. −3   **B.** 0   **C.** undefined   **D.** 1   9. _____

10. In 1996, the number of visitors to water parks was 5.1 million, while in 1999, the number of visitors dropped to 4.7 million. What was the rate of change? **Source:** *Amusement Business*
    A. 200   **B.** 7.8% decrease
    C. 0.4 million people   **D.** 133,333 fewer people per year   10. _____

Assessment

8 **Chapter 8 Test, Form 2A** *(continued)*

11. The number of yards y varies directly as the number of feet x. Write an equation converting x feet to y yards, using the fact that there are three feet in a yard.

   A. $y = 3x$ **B.** $y = \frac{1}{3}x$ **C.** $y = 36x$ **D.** $y = \frac{1}{36}x$ **11.** _____

12. Find the slope and the y-intercept for the graph of $y = -4$.

   A. -4; none   **B.** 1; -4 **C.** 0; -4 **D.** -4; 0 **12.** _____

13. Write an equation in slope-intercept form to represent the table of values.

x	-4	8	12	16
y	-6	9	14	19

   A. $y = \frac{4}{5}x - 1$ **B.** $y = x - 1$ **C.** $y = \frac{4}{5}$ **D.** $y = \frac{5}{4}x - 1$ **13.** _____

14. The graph of a line goes through the point at $(0, 3)$ and has slope $\frac{1}{2}$. Which point is also on the graph of the line?

   A. $(1, 5)$ **B.** $(-2, 4)$ **C.** $(1, 2)$ **D.** $(2, 4)$ **14.** _____

For Questions 15 and 16, the scatter plot at the right shows the relationship between height of the hill and speed of a roller coaster.
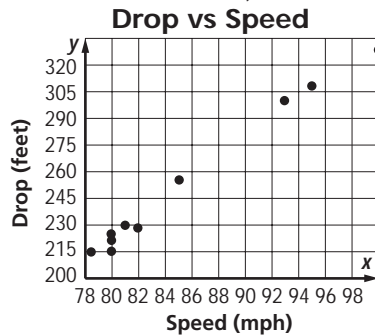
15. Which of the following could be the slope of the best-fit line for the data?

   A. 5   **B.** -5

   C. 50   **D.** $\frac{1}{5}$ **15.** _____

16. Predict the height of a hill for a roller coaster that has a speed of 90 mph.

   A. 330 ft   **B.** 270 ft   **C.** 320 ft   **D.** 210 ft   **16.** _____

17. Solve the system of equations at the right by graphing .

   $x + 2y = 0$
   $y = -0.5x$

   A. $(0, 0)$ **B.** no solution

   C. infinitely many solutions   **D.** $(-0.5, 2)$ **17.** _____

18. Solve the system of equations at the right by substitution.

   $2x + 2y = 2$
   $x = 1$

   A. $(-4, -3)$ **B.** $(0, -1)$ **C.** $\left(\frac{3}{4}, -\frac{1}{4}\right)$ **D.** $(1, 0)$ **18.** _____

19. The graph of $y \leq -2x + 5$ is the region ___?___ the line $y = -2x + 5$.

   A. below   **B.** above   **C.** on or below   **D.** on or above   **19.** _____

20. Determine which ordered pair is *not* a solution of the inequality $y < -3x + 4$.

   A. $(-1, 6)$ **B.** $(0, 4)$ **C.** $(1, -7)$ **D.** $(1, 0)$ **20.** _____

Bonus In a certain linear equation, the rate of change of y with respect to x is two. Write the equation if the $(0, 1)$ is a solution.   **B:** _____

8 **Chapter 8 Test, Form 2B**

SCORE _____

Write the letter for the correct answer in the blank at the right of each question.

1. Determine which relation is *not* a function.
   A. {(−2, 3), (2, −3), (1, 5), (6, −3)}   **B.** {(0, −4), (2, 2), (−2, −2), (3, 2)}
   C. {(−3, 2), (−4, 4), (−3, 3), (4, 4)}   **D.** {(1, 1), (2, 1), (3, 1), (−1, 1)}   **1.** _____

2. Which of the following values of d makes the relation
{(5, 0), (3, 1), (1, 1), (d, 4)} a function?
   A. −1   **B.** 3   **C.** 5   **D.** None of these   **2.** _____

3. The table shows the percent of households of a given income that have computers. Determine whether this relation is a function, and describe the relationship between the household income and the percent of those households that have computers. **Source:** www.census.gov

Household Income ($)	12,500	22,500	30,000	42,500	62,500	75,000
Percent with Computer	13	23	31.7	45.6	60.6	75.9

   A. Function; as income rises, the number of computers in each household increases.
   B. Function; as income rises, the percent of homes with computers increases.
   C. Not a function; as income rises, the number of computers in each household increases.
   D. Not a function; as income rises, the percent of homes with computers increases.   **3.** _____

4. Which of the following is *not* a solution of $4x + 3y = 6$?
   A. (−3, 6)   **B.** (0, 2)   **C.** (1, −2)   **D.** (3, −2)   **4.** _____

5. Which set of ordered pairs can be used to graph $y = -2x - 1$?
   A. (−5, 9), (1, −3), (4, 9)   **B.** (−2, −5), (1, −1), (5, 9)
   C. (−2, −5), (0, −1), (4, −3)   **D.** (−5, 9), (−2, 3), (4, −9)   **5.** _____

6. Find the x-intercept and the y-intercept of the graph of $x - 3y = 2$.
   A. 2; $-\dfrac{2}{3}$ **B.** −3; 1   **C.** 5; 1   **D.** 1; −3   **6.** _____

7. Draw a graph of the equation with intercepts (5, 0) and (0, 2) to determine which other point the line passes through.
   A. (3, 1)   **B.** (−5, 4)   **C.** (−1, 2)   **D.** (−3, 3)   **7.** _____

8. Find the slope of the line that passes through the points $A(-3, 1)$ and $B(2, -5)$.
   A. −6   **B.** $-\dfrac{1}{6}$ **C.** $-\dfrac{6}{5}$ **D.** $-\dfrac{5}{6}$ **8** _____

9. What is the slope of the line $y = -3$?
   A. −3   **B.** 0   **C.** undefined   **D.** 1   **9.** _____

10. College tuition and fees in the year 2000 averaged $3510 a year at four-year public institutions compared to $3217 in 1998. What was the rate of change?
   A. $293   **B.** $146.50 per year   **C.** $3363.50   **D.** 9.11%   **10.** _____

Assessment

8 **Chapter 8 Test, Form 2B** *(continued)*

11. The number of feet y varies directly as the number of inches x. Write a direct variation equation that converts x inches to y feet, using the fact that there are twelve inches in a foot.

   A. $y = 3x$ **B.** $y = \frac{1}{3}x$ **C.** $y = 12x$ **D.** $y = \frac{1}{12}x$ 11. _____

12. State the slope and the y-intercept for the graph of $y = 3$.

   A. 0; 3   **B.** undefined; 3   **C.** 1; 0   **D.** 0; 0   12. _____

13. Write an equation in slope-intercept form to represent the table of values.

x	−6	3	9	12
y	7	1	−3	−5

   A. $y = -x - 3$ **B.** $y = -\frac{2}{3}x + 3$ **C.** $y = \frac{3}{2}x$ **D.** $y = \frac{1}{3}x + 3$ 13. _____

14. The graph of a line goes through $(0, -2)$ and has slope $\frac{1}{3}$. What point is also on the graph of the line?

   A. $(3, 3)$ **B.** $(1, 1)$ **C.** $(3, -1)$ **D.** $(-1, -5)$ 14. _____

For Questions 15 and 16, the scatter plot at the right shows the relationship between the year and the percent of cities having youth curfews.

Percent of US Cities with Youth Curfews
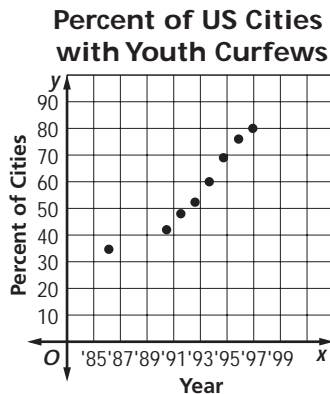
15. Which of the following could be the slope of the best-fit line for the data?

   A. 7   **B.** −7

   C. 70   **D.** 0.70   15. _____

16. Predict the percent of cities having youth curfews in 1999.

   A. 95   **B.** 65   **C.** 70   **D.** 80   16. _____

17. Solve the system of equations at the right by graphing. $x + 2y = 0$ $x + 2y = 5$

   A. $(0, 0)$ and $(1, 2)$ **B.** no solution

   C. infinitely many solutions   **D.** $(-0.5, 2)$ 17. _____

18. Solve the system of equations at the right by substitution. $y = 3$ $1 = x - y$

   A. $\left(\frac{6}{5}, \frac{1}{5}\right)$ **B.** $(2, -3)$ **C.** $(4, 3)$ **D.** no solutions   18. _____

19. The graph of $y > 3x - 4$ is the region ____?____ the graph of $y = 3x - 4$.

   A. on and above   **B.** on and below   **C.** above   **D.** below   19. _____
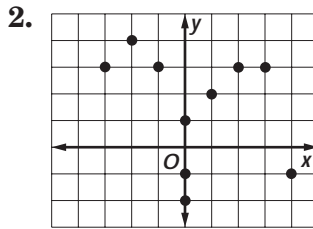
20. Determine which ordered pair is a solution of the inequality $y < 2x - 3$.

   A. $(0, -5)$ **B.** $(2, 3)$ **C.** $(1, -1)$ **D.** $(-1, 1)$ 20. _____

Bonus In a certain linear equation, the rate of change of y with respect to x is 3. Write the equation if $(0, -2)$ is a solution of the equation.   **B:** _____

8 Chapter 8 Test, Form 2C

SCORE _____

For Questions 1 and 2, determine whether each relation is a function.

1. $\{(-2, 0), (0, 0), (2, 0), (3, 3)\}$ 2.

1. _____

2. _____

3. The table shows the percent of people in the U.S. that are enrolled in post-secondary education for various ages. Is this relation a function? Describe the relationship between age and the percent of people enrolled in higher education.
Source: www.census.gov

3. _____

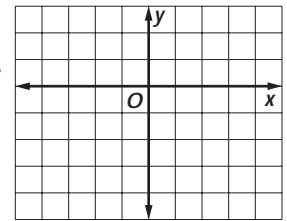| Age	19	29	39	49	59	69
Percent Enrolled	51	15	9	6	3	1

4. Find four solutions of $5x + 3y = -3$. Write the solutions as ordered pairs.

4. _____

5. Graph $y = 3x - 4$ by plotting ordered pairs.

5.

6. Find the x-intercept and the y-intercept for the graph of $y = 5x + 10$.

6. _____

7. Graph $3x - 2y = 6$ using the x- and y- intercepts.

7.
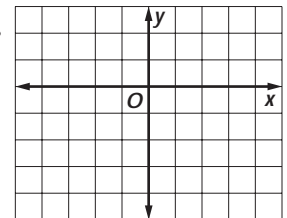
8. Use the graph at the right. Find the slope of the line.
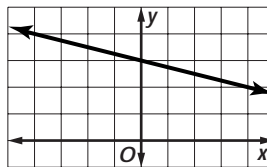
8. _____

9. Find the slope of the line that passes through the points $A(3, -1)$ and $B(3, 5)$.

9. _____

10. The table shows the percent of adults who used computers from 1984–1993. What is the rate of change from 1984 to 1993? **Source:** www.census.org

10. _____

Year	1984	1989	1993
Percent of Adults	18	28	36

11. State the slope and the y-intercept of the graph of $4x - 3y = 6$.

11. _____

473 *Glencoe Pre-Algebra*

Assessment

8 **Chapter 8 Test, Form 2C** *(continued)*

12. The number of kilometers y in a measure varies directly as the number of miles x. Write a direct variation equation that could be used to convert miles to kilometers, if 5 miles is about 8.045 kilometers.

12. _____

13. State the slope and the y-intercept of a graph that represents the linear data in the table.

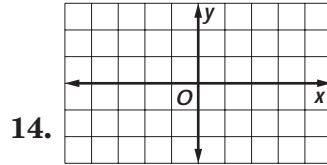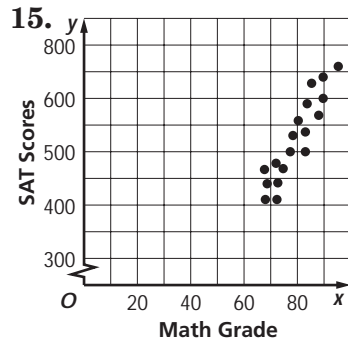| x	-1	1	5	7
y	8	0	-16	-24

13. _____

14. Graph a line with slope $-\dfrac{3}{2}$ and y-intercept 1.

14.

For Questions 15 and 16, use the scatter plot at the right that shows SAT scores and overall math grades.

15. Draw a best-fit line for the data.
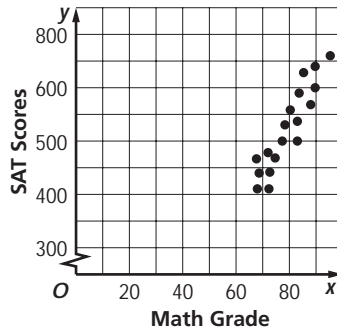
15.

16. Predict the SAT score of a student whose overall math grade is 55.

16. _____

17. Solve the system of equations at the right by graphing.
$$y = 2x - 3$$
$$y = 3x - 4$$
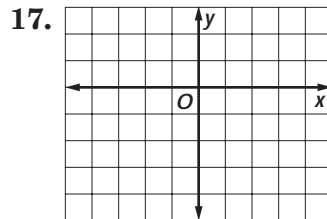
17.

18. Solve the system of equations at the right by substitution.
$$x + 5y = 7$$
$$x = 2$$

18. _____

19. Graph $y < 2x + 1$.
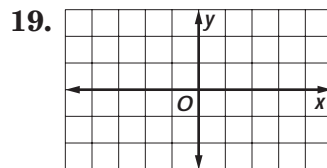
19.

20. Punch is to be made using orange juice and ginger-ale. Write an inequality showing how many gallons of each could be used if the punch is made in a ten-gallon container.

20. _____

Bonus Water is being pumped out of a pool. The number of gallons of water W left in the pool at time t in minutes can be modeled by $W(t) = -7t + 350$. Find the y-intercept and explain what it represents in this problem.

B: _____

8 **Chapter 8 Test, Form 2D**   SCORE _____

For Questions 1 and 2, determine whether each relation is a function.

1. $\{(-2, 4), (0, 5), (2, 4),$
   $(3, 5), (-2, 1), (1, 4)\}$

2.

1. _____

2. _____
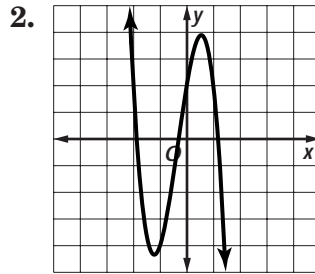
3. The table shows the average commuting time for workers
   in cities. Is this relation a function? Describe the relationship
   between the working population and the average time spent
   commuting. **Source:** www.census.gov

Number of Workers (hundred thousands)	38	16	12	5	4
Time of Commute (minutes)	35.3	26.5	24.8	24.4	21.6

3. _____

4. Find four solutions of $4x - 3y = 2$. Write the solutions as
   ordered pairs.

4. _____

5. Graph $y = -2x + 3$ by plotting ordered pairs.

5.
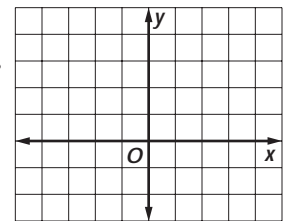
6. Find the x-intercept and the y-intercept of the graph of
   $y = 4x - 12$.

6. _____

7. Graph $2x - 3y = -6$ using the x- and y-intercepts.
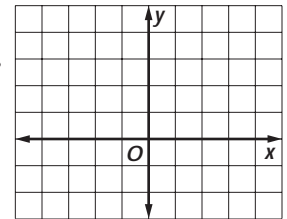
7.

8. Use the graph at the right. Find the
   slope of the line.
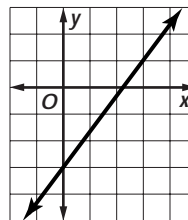
9. Find the slope of the line that
   passes through the points $A(5, -1)$
   and $B(3, -1)$.

8. _____

9. _____

10. The table shows the percent of adults who used computers
    from 1984 through 1993. What was the rate of change from
    1989 to 1993? **Source:** www.census.org

Year	1984	1989	1993
Percent of Adults	18	28	36

10. _____

11. State the slope and the y-intercept of the graph of
    $5x - 2y = 6$.

11. _____

Assessment

8 **Chapter 8 Test, Form 2D** *(continued)*

12. The number of miles y in a measure varies directly as the number of kilometers x. Write a direct variation equation that could be used to convert kilometers to miles, if 5 kilometers is about 3.1075 miles.

12. _____

13. State the slope and the y-intercept of a graph that represents the linear data in the table.

x	-1	1	5	7
y	-14	-4	16	26

13. _____

14. Graph a line with slope $\dfrac{3}{2}$ and y-intercept -1.
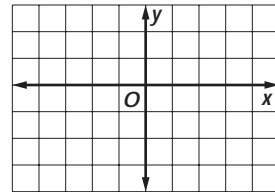
14.

For Questions 15 and 16, use the scatter plot at the right that shows the relationship between the blood pressure and ages of different people.

15. Draw a best-fit line for the data.

15.
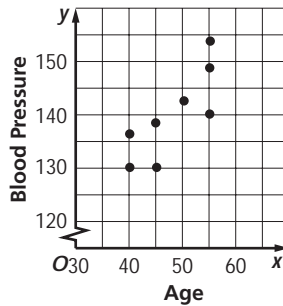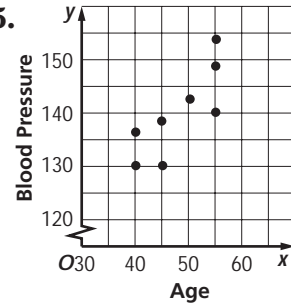
16. Predict the blood pressure of a 20-year old.

16. _____

17. Solve the system of equations at the right by graphing.

$y = 2x + 1$

$y = \dfrac{1}{2}x + 4$

17.
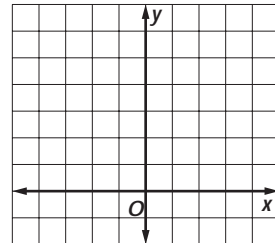
18. Solve the system of equations at the right by substitution.

$x + 2y = 6$

$x = 8$

18. _____

19. Graph $y > 3x - 1$.

19.
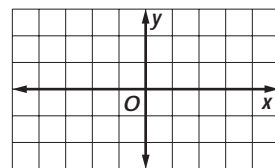
20. Garden soil is made by mixing sand and peat moss. Sand costs \$1 per pound and peat moss costs \$2 per pound. Write an inequality showing how many pounds of each could be purchased for a maximum of \$10.

20. _____

Bonus The profits P in dollars from a lemonade stand can be modeled by the equation $P(x) = 0.25x - 6.50$, where x represents the number of glasses sold. Find the y-intercept and explain what it represents in this problem.

B: _____

8 **Chapter 8 Test, Form 3**

For Questions 1 and 2, determine whether each relation is a function.

1. $\{(-2, -4), (0, 5), (2, 4), (3, 5), (-2, 1), (1, 4)\}$

2.

1. _____
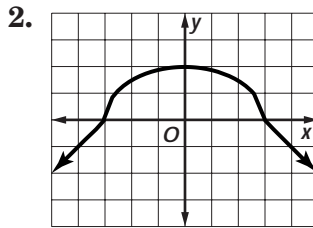
2. _____

3. The table shows a relationship between x and y. Is this relation a function? Describe the relationship between x and y.

x	−5	4	−2	7	14	9
y	27	20	22	24	17	18

3. _____

4. Find four solutions of $16x - 4y = 32$. Write the solutions as ordered pairs.

4. _____

5. Graph $3y = -4x + 9$ by plotting ordered pairs.

5.
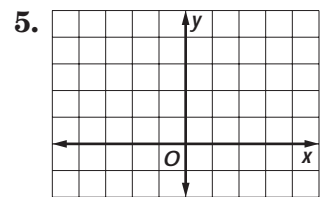
6. The equation $y = \dfrac{5}{9}x - \dfrac{160}{9}$ is used to convert x degrees Fahrenheit to y degrees Celsius. Name the x-intercept of this line and describe what it means.

6. _____

7. Graph $15x - 5y = 45$ using the x- and y-intercepts.

7.
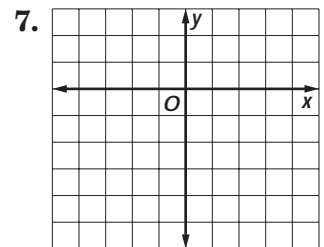
8. Find the slope of the line.
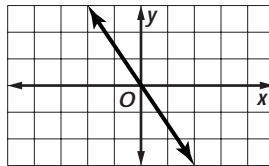
8. _____

9. Find the value of b so that the slope of the line passing through the points $A(5, -8)$ and $B(-1, b)$ is -2.

9. _____

10. The table shows the percent of children aged 3 to 17 who used computers at school from 1984 through 1993. What was the rate of change from 1989 to 1993? **Source:** www.census.gov

Year	1984	1989	1993
Percent	28	46	61

10. _____

11. State the slope and the y-intercept of the graph of $6x - 16y = 48$.

11. _____

Assessment

8 Chapter 8 Test, Form 3 *(continued)*

12. The number of quarts *y* in a measure varies directly as the number of liters *x*. Write a direct variation equation that could be used to convert liters to quarts, if 2 liters is about 2.114 quarts.

13. Graph a line with slope 1.2 and *y*-intercept −2.

14. Use the table of values to write an equation in slope-intercept form.

x	−3	−1	3	5
y	−16	−2	26	40

For Questions 15 and 16, use the scatter plot at the right that shows the relationship between the temperature rating and the cost of different sleeping bags.

15. Draw the best-fit line for the data and find the rate of change.

12. _____

13.

14. _____

15.

_____
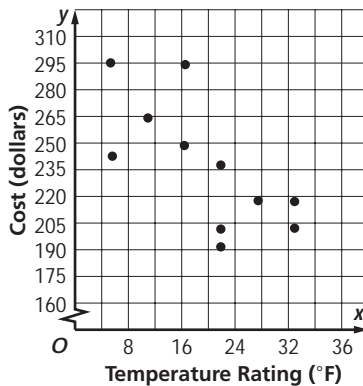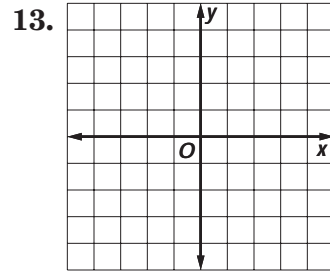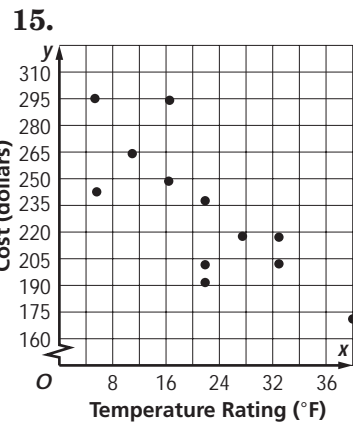
16. Predict the cost of a sleeping bag rated to 0°.

17. Estimate the solution of the system of equations by graphing. $y = 4x - 3$ and $y = 4x + 3$

18. Solve the system of equations by substitution. $3x - 2y = 0$ and $y = -3$

Louis makes $30 for each yard he mows and $20 for each lawn he weeds. He wants to make at least $150 each week.

19. Write an inequality to represent this situation.

20. State one possible solution in which he earns $150 and one in which he earns more than $150.

Bonus *Fine Fone* charges a monthly fee of $30 plus $0.30 for every minute called. *Cell Service* charges $15 each month plus $0.60 per minute. How many minutes must be called for the monthly bill to be the same for these competitors? What will be the monthly bill?

16. _____

17.

18. _____

19. _____

20. _____

B: _____

8 **Chapter 8 Open-Ended Assessment**   SCORE _____
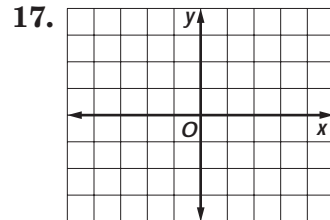
Demonstrate your knowledge by giving a clear, concise solution to each problem. Be sure to include all relevant drawings and justify your answers. You may show your solution in more than one way or investigate beyond the requirements of the problems.

1. A corporation has a goal of increasing sales by $300,000 each year. Sales for the first year were $925,000. Write an equation in slope-intercept form that describes this situation. What is the meaning of the slope and *y*-intercept of your equation?

2. A second goal of this corporation is to limit the increase in expenses each year to less than $115,000. Expenses the first year were $532,000. Write an inequality that describes this situation. What is the goal for expenses in the 5th year?

3. The fee for renting a VCR for a business meeting is given by $y = 4x + 18$, where x is the number of hours rented and y is the total rental fee in dollars.
   a. Find three solutions of the equation and draw the graph.
   b. Choose the number of hours for a rental and use the graph to determine the rental fee. Explain each step.
   c. Find the y-intercept and explain what it represents.
   d. Do negative values of x make sense? Why or why not?

4. Another company also provides VCR rentals. Their rental equation is $y = 5x + 15$.
   a. Graph the equation using the x- and y-intercepts.
   b. Compare and contrast this graph with the graph in Question 3. Use the words *slope* and *intercept* in your answer.
   c. From which company would you rent a VCR? Explain your reasoning.

5. The home office of a company has limited the number of sales associates and clerical people in a branch office to 17 or fewer.
   a. If x is the number of sales associates and y is the number of clerical people, write and graph an inequality for this situation.
   b. Does (8, 5) satisfy the inequality? What does (8, 5) represent?
   c. Name an ordered pair that does not satisfy the inequality. What does your ordered pair represent?

Assessment

8 **Chapter 8 Vocabulary Test/Review**   SCORE _____

best-fit line	function	slope	vertical line test
boundary	half plane	slope-intercept form	*x*-intercept
constant of variation	linear equation	substitution	*y*-intercept
direct variation	rate of change	system of equations	

Write whether each sentence is *true* or *false*. If false, replace the underlined word or number to make a true sentence.

1. In a <u>relation</u>, for each element of the domain, there is only one corresponding element in the range.

1. _____

2. A <u>linear equation</u> in two variables is an equation in which the variables appear in separate terms, and neither variable contains an exponent other than 1.

2. _____

3. A(n) <u>x-intercept</u> is the *y*-coordinate of a point where a graph crosses the *y*-axis.

3. _____

4. <u>Slope</u> describes the steepness of a line.

4. _____

5. The <u>constant of variation</u> is a special type of linear equation that describes rate of change.

5. _____

6. In the equation $y = kx$, k is the <u>direct variation</u>.

6. _____

7. The equation $y = mx + b$ is the <u>constant of variation</u>.

7. _____

8. A <u>best-fit line</u> can be used to show a linear relationship approximated by real-life data points.

8. _____

9. The solution to a <u>system of equations</u> is the ordered pair that solves both equations.

9. _____

10. The more accurate way to solve a system of equations is by <u>graphing</u>.

10. _____

In your own words—
Define each term.

11. vertical line test

12. rate of change

8 **Chapter 8 Quiz**

SCORE _____

(Lessons 8–1 through 8–3)

1. The table shows how speed affects the gas mileage of one type of compact car. Is the relation a function? Explain. Describe how gas mileage is related to speed.
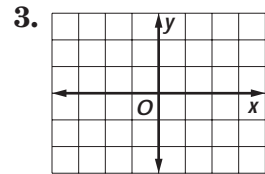
Speed (mph)	Gas Mileage (mpg)
40	36
50	33
60	30
70	26

1. _____

2. Find four solutions of $y = 3x + 2$. Write the solutions as ordered pairs.

2. _____

3. Graph the equation $y = x - 1$ by plotting ordered pairs.

3.

4. Find the x-intercept and y-intercept for the graph of $y = 7x - 14$.

4. _____

5. Graph $6x - 8y = 24$ using the x- and y-intercepts.

5.

---
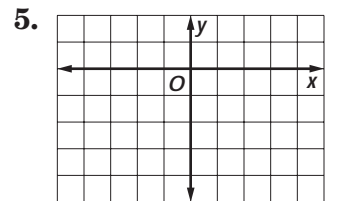
8 **Chapter 8 Quiz**

SCORE _____

(Lessons 8–4 and 8–5)

For Questions 1 and 2, find the slope of the line that passes through each pair of points.

1. $A(4, 5)$ and $B(-3, 5)$
2. $A(3, -6)$ and $B(3, -9)$

1. _____
2. _____

3. **Standardized Test Practice** Two roller coasters are vying for the title of "Steepest Drop." The first ride has a hill that drops 140 feet in a 40-foot run. The second ride's highest hill drops 105 feet in a 30-foot run. Which statement is true?

A. The first ride is the "Steepest Drop".
B. The second ride is the "Steepest Drop".
C. Both rides have the same slope
D. There is not enough information to tell.

3. _____

4. The table shows the results of a science experiment. Find the rate of change.

x (minutes)	0	2	4	5
y (°F)	−20	−6	8	15

4. _____

Assessment

8 # Chapter 8 Quiz

SCORE _____

(Lessons 8–6 through 8–8)

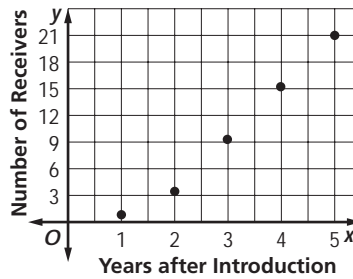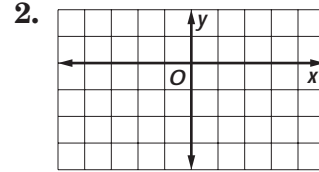**For Questions 1 and 2, use the equation $3x + 6y = -6$.**

1. State the slope and the *y*-intercept for the graph of the equation.

1. _____

2. Graph the equation using the slope and *y*-intercept.

2.

3. Write an equation in slope-intercept form to represent the table values.

x	−3	−1	0	5
y	−8	6	13	48

3. _____

4.

The relation between the number of receivers (millions) and the time after the technology was introduced is shown in the scatter plot.

Number of Receivers
Years after Introduction

Number of Receivers
Years after Introduction
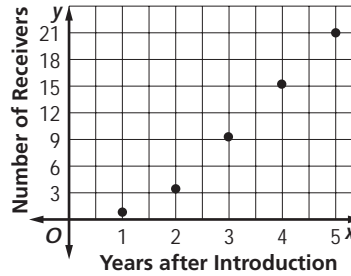
4. Draw the best fit line and estimate the rate of change.

5. Predict the number of receivers 6 years after the technology was introduced.

5. _____

---

8 # Chapter 8 Quiz

SCORE _____

(Lessons 8–9 and 8–10)

For Questions 1 and 2, solve each system of equations by substitution.

1. _____

1. $y = 3x$
$y = -15$

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

2. _____

3. _____

3. Use the graphs of $y = 2x + 3$ and $y = 2x - 5$ to explain why the related system of equations has no solution.

4. Graph $y > -\dfrac{1}{2}x - 2$.

4.
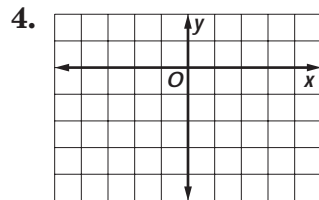
5. Terika is buying drinks for a summer camp and she has $75 to spend. Orange juice costs $2.50 per gallon and milk costs $3.00 per gallon. Write an inequality to represent this situation. Identify the variables and describe what they represent.

5. _____

8 **Chapter 8 Mid-Chapter Test**   SCORE _____

(Lessons 8–1 through 8–5)

Part I *Write the letter for the correct answer in the blank at the right of each question.*

1. The relation $\{(2, 17), (-7, -4), (-4, 3), (0, 3)\}$ is *not* a function when which ordered pair is added to the set?

   A. $(-25, 20)$ **B.** $(10, 25)$ **C.** $(2, 6)$ **D.** $(9, 5)$ **1.** _____

2. Use the table shown to complete the sentence in the best way. "Generally, as x increases, y ____?____ ."

x	9	7	5	3	1
y	2	6	10	9	15

   **A.** increases   **B.** decreases

   C. remains constant   **D.** increases, decreases, then decreases   **2.** _____

3. Find the slope of the line that passes through the points $A(-5, 3)$ and $B(4, 0)$.

   A. $-\dfrac{3}{5}$ **B.** $\dfrac{1}{3}$ **C.** 3 **D.** $-\dfrac{1}{3}$ **3.** _____

4. The sun rises at 7:12 A.M. on December 1, 2001 in Dallas and at 7:28 A.M. on December 27. What is the rate of change?

   A. $\dfrac{8}{13}$ minutes later each day   **C.** $1\dfrac{5}{8}$ minutes later per day

   B. 16 minutes   **D.** 26 days   **4.** _____

5. Which of the following is a solution of $4x + 3y = -12$?

   A. $(0, -3)$ **B.** $(3, -8)$ **C.** $(-4, 0)$ **D.** $(0, 4)$ **5.** _____

Part II

6. Graph $y = -x + 3$ by plotting ordered pairs.   **6.**
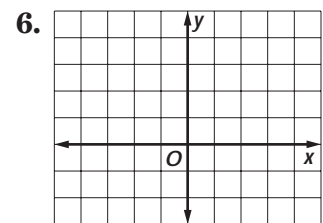
7. Graph $y = \dfrac{1}{2}x - 2$ using the x- and y-intercepts.   **7.**
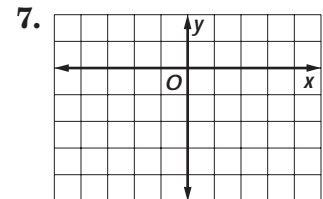
Use the graph shown at the right.

8. What is the slope of the line?   **8.** _____

9. Find the x- and y-intercepts of the line.   **9.** _____

10. Write a direct variation equation relating x and y.   **10.** _____

Assessment
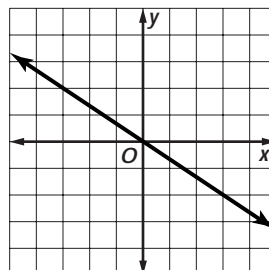
8 Chapter 8 Cumulative Review
(Chapters 1–8)

1. Simplify $7(3x + 5y) + 5(2x + 7y)$. (Lesson 1–4)

1. _____

2. What is $6\frac{2}{3}$ divided by $3\frac{3}{4}$? (Lesson 5–4)

2. _____

3. Find the LCM of $8x^2y$ and $18x^2y^2z$. (Lesson 5–6)

3. _____

4. Express *356 miles in 8 hours* as a unit rate. (Lesson 6–1)

4. _____

5. If Marta bought 4 ounces of perfume for $116, how much would 6 ounces cost? (Lesson 6–2)

5. _____

6. In a scale model of a boat, the tallest mast has a height of 7 inches. If the actual height of the mast is 35 feet, what is the scale of the model? (Lesson 6–3)

6. _____

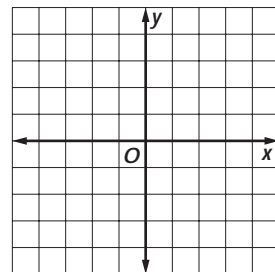**Solve each equation.** (Lessons 7–1 and 7–2)

7. $-4(x + 9) = -12x - 4$ 8. $5n + 6 = 7(n + 3) - 3n$

7. _____

8. _____

Solve each inequality. (Lessons 7–5 and 7–6)

9. $\frac{x - 1}{4} > 3$ 10. $-4t > -32$

9. _____

10. _____

11. Find two solutions to the equation $3x + 5y = 10$. Write the solutions as ordered pairs. (Lesson 8–2)

11. _____

12. Graph $y = 2x - 2$ by plotting ordered pairs. (Lesson 8–2)

12.

13. Find the slope of the line that passes through the points $A(-4, 3)$ and $B(2, 1)$. (Lesson 8–4)

13. _____

14. State the slope and the y-intercept for the graph of $3y - 6x = 9$. (Lesson 8–6)

14. _____

15. Find the rate of change for the linear function. (Lesson 8–5)

x	y
-6	5
-2	13
2	21

15. _____

16. Solve the system of linear equations $y = 4x + 7$ and $y = -3x$ by substitution. (Lesson 8–9)

16. _____

8 Standardized Test Practice

(Chapters 1–8)

Part 1: Multiple Choice

Instructions: Fill in the appropriate oval for the best answer.

1. Solve $\dfrac{2x}{y} = z$ for x. (Lesson 3–4)

A. $x = \dfrac{2}{yz}$ **B.** $x = yz - 2$ **C.** $x = \dfrac{yz}{2}$ **D.** $x = \dfrac{z - y}{2}$ **1.** Ⓐ Ⓑ Ⓒ Ⓓ

2. Ron put all his math test scores in numerical order from least to greatest and found the middle number. Which measure of central tendency does this number represent? (Lesson 5–8)

E. mean   **F.** median   **G.** mode   **H.** outlier   **2.** Ⓔ Ⓕ Ⓖ Ⓗ

3. Find the fifth term in the sequence $\dfrac{1}{5}, \dfrac{1}{25}, \dfrac{1}{125}, \dots$.
(Lesson 5–10)

A. $\dfrac{1}{3125}$ **B.** $\dfrac{1}{625}$ **C.** $\dfrac{1}{225}$ **D.** $\dfrac{1}{255}$ **3.** Ⓐ Ⓑ Ⓒ Ⓓ

4. What value of y makes $\dfrac{7.6}{1.9} = \dfrac{2}{y}$ a proportion? (Lesson 6–2)

E. 5   **F.** 1.5   **G.** 0.5   **H.** 0.15   **4.** Ⓔ Ⓕ Ⓖ Ⓗ

5. In December, Morristown received 4.5 inches of rain. In January, Morristown received 6.93 inches of rain. What was the percent of change from December to January? (Lesson 6–8)

A. 38%   **B.** 54%   **C.** .38%   **D.** 5.4%   **5.** Ⓐ Ⓑ Ⓒ Ⓓ

6. Three times a number is 180 less than seven times the number. What is the number? (Lesson 7–1)

E. 10   **F.** 180   **G.** 18   **H.** 45   **6.** Ⓔ Ⓕ Ⓖ Ⓗ

7. Solve $8a - 3 = 5(a + 7) + 3a$. (Lesson 7–2)

A. 0   **B.** 38   **C.** all numbers   **D.** ∅   **7.** Ⓐ Ⓑ Ⓒ Ⓓ

8. Which inequality represents *a number increased by 7 is at most 19*? (Lesson 7–3)

E. $n + 7$ **F.** $n + 7 \geq 19$ **G.** $n + 7 \leq 19$ **H.** $n + 7 < 19$ **8.** Ⓔ Ⓕ Ⓖ Ⓗ

9. Solve $x + 6 > 10$. (Lesson 7–4)

A. $x < 4$ **B.** $x > 4$ **C.** $x \geq 4$ **D.** $x \leq 4$ **9.** Ⓐ Ⓑ Ⓒ Ⓓ

10. Solve $-6x \leq -24$. (Lesson 7–5)

E. $x \geq 4$ **F.** $x \leq 4$ **G.** $x < -4$ **H.** $x < -4$ **10.** Ⓔ Ⓕ Ⓖ Ⓗ

11. Find the rate of change for the linear function. (Lesson 8–5)

x	0	2	3	5
y	−51	−17	0	34

A. 17   **B.** −51   **C.** 3   **D.** $-\dfrac{1}{17}$ **11.** Ⓐ Ⓑ Ⓒ Ⓓ

Assessment

8 **Standardized Test Practice** *(continued)*

12. Suppose y varies directly with x. If $y = 24$ when x is 3, what
is the direct variation equation? (Lesson 8–5)

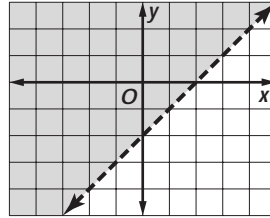**E.** $y = 3x$ **F.** $y = 3x + 15$ **G.** $x = 8y$ **H.** $y = 8x$

12. Ⓔ Ⓕ Ⓖ Ⓗ

13. A linear function has slope $\dfrac{1}{4}$ and goes through the point
$(2, -3)$. What is the y-coordinate of the point on the line
whose x-coordinate is -6? (Lesson 8–7)

A. -1 **B.** -5 **C.** -4 **D.** -2

13. Ⓐ Ⓑ Ⓒ Ⓓ

14. Choose the inequality that describes
the graph shown. (Lesson 8–10)

E. $y < x - 2$ **F.** $y > x - 2$ **G.** $y \leq x - 2$ **H.** $y \geq x - 2$

14. Ⓔ Ⓕ Ⓖ Ⓗ

15. Determine which ordered pair is a solution of $y - 4x < 0$. (Lesson 8–7)

A. $(-1, 1)$ **B.** $(1, 4)$ **C.** $(1, -1)$ **D.** $(2, 9)$

15. Ⓐ Ⓑ Ⓒ Ⓓ

Part 2: Grid In

Instructions: Enter your answer by writing each digit of the answer in a column box
and then shading in the appropriate oval that corresponds to that entry.

16. Evaluate $a^2 + b + 5c$ if $a = 3$, $b = 2$,
and $c = 1$. (Lesson 4–2)

17. Find the x-intercept for the graph of
$y = 6x - 3$. (Lesson 8–3)

16.

17.

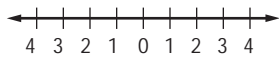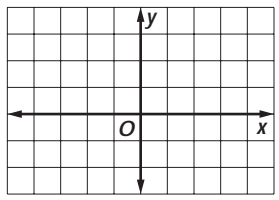

Part 3: Short Response

Instructions: Write your answer in the blank at the right of each question.

18. Jan uses 1 gallon of paint to cover 200 square feet of ceiling.
Write a proportion that could be used to find how many gallons **18.** _____
she will need to cover 700 square feet. Then solve. (Lesson 6–2)

19. Solve the system of linear equations $3x - y = 2$ and $y = 8x + 3$ **19.** _____
by substitution. (Lesson 8–9)

Unit 3 Test
(Chapters 7–8)

SCORE _____

1. Solve $3y - 15 = 8y - 5$.

1. _____

2. Solve $3(8a + 4) = 6(4a + 2)$.

2. _____

3. The perimeter of a rectangle is 42 inches. The length is 3 inches less than twice the width. Find the dimensions of the rectangle.

3. _____

4. Write an inequality that represents *the quotient when dividing a number by −9 is less than 93*.

4. _____

5. Write an inequality for the graph.

```
  <——+———+———●———+———+——>
     33   32   31   30   29
```

5. _____

6. An F-6 tornado has winds that are at least 319 miles per hour. Suppose a tornado has winds that are 275 miles per hour. Write and solve an inequality to find out how much the winds must increase before the tornado becomes an F-6 tornado.

6. _____

7. Solve $q - 2\frac{1}{6} > \frac{5}{9}$.

7. _____

8. Solve $\dfrac{b}{-5} > -3.7$.

8. _____

9. Three more than the quotient of a number and 7 is at most 92. Find the number.

9. _____

10. Four times the sum of a number and 6 is at least six times the same number less 14. For what numbers is this true?

10. _____

11. Solve $\frac{1}{3}(4 - x) \le \frac{1}{2}$. Graph your solution on a number line.

11. _____

```
  <—+—+—+—+—+—+—+—+—+—>
    4 3 2 1 0 1 2 3 4
```

12. The table represents the temperature y at x kilometers above sea level for a certain location. Describe the relationship between the temperature and the altitude. Is this relation a function?

12. _____

Altitude (km)	0	1	2	3
Temperature (°C)	24.0	17.4	10.8	4.2

13. Find two solutions of $6x - 12y = 0$. Write the solutions as ordered pairs.

13. _____

14. Find the x-intercept and y-intercept of $x - y = 2$. Then graph the equation.

14. _____

Assessment

Unit 3 Test *(continued)*
(Chapters 7–8)

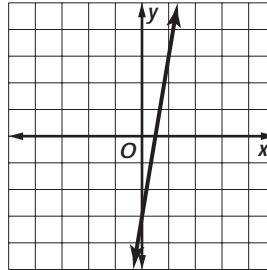**15.** Find the slope of the line that passes through $A(-7, 2)$ and $B(3, -3)$.

15. _____

16. The table shows the wind chill temperature for different wind speeds when the actual temperature is 25°F. State the rate of change.

Wind (mph)	Temperature (°F)
x	*y*
10	15
15	13
20	11

16. _____

17. Write an equation in slope-intercept form for the line graphed.
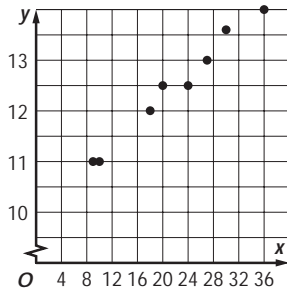
17. _____

18. If $(2, b)$ is on the graph of the line with slope $-\dfrac{3}{2}$ and y-intercept 3, find the value of b.

18. _____

19. The scatter plot at the right shows a correlation between x and y. Draw a best-fit line for the data. Use the best-fit line to predict the value of y when x is 4.
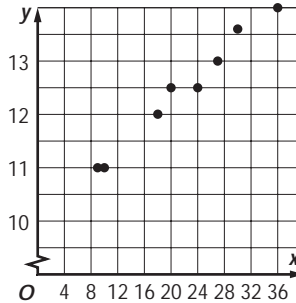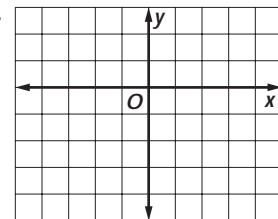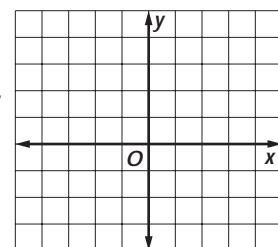
19. _____

_____

20. Solve the system of equations by graphing. $y = 2x - 3$
$y = 3x - 4$

20.

_____

21. Solve the system of equations by substitution. $2x + 5y = 0$
$x = -7y + 9$

21. _____

22. Graph $y < 2x + 1$.

22.

8 Standardized Test Practice

Student Record Sheet *(Use with pages 430–431 of the Student Edition.)*

Part 1 Multiple Choice

Select the best answer from the choices given and fill in the corresponding oval.

1 Ⓐ Ⓑ Ⓒ Ⓓ   4 Ⓐ Ⓑ Ⓒ Ⓓ   7 Ⓐ Ⓑ Ⓒ Ⓓ   9 Ⓐ Ⓑ Ⓒ Ⓓ

2 Ⓐ Ⓑ Ⓒ Ⓓ   5 Ⓐ Ⓑ Ⓒ Ⓓ   8 Ⓐ Ⓑ Ⓒ Ⓓ   10 Ⓐ Ⓑ Ⓒ Ⓓ

3 Ⓐ Ⓑ Ⓒ Ⓓ   6 Ⓐ Ⓑ Ⓒ Ⓓ

Part 2 Short Response/Grid In

Solve the problem and write your answer in the blank.

For Questions 12, 15, and 19, also enter your answer by writing each number or symbol in a box. Then fill in the corresponding oval for that number or symbol.

11 _____

12 _____ (grid in)

13 _____

14 _____

15 _____ (grid in)

16 _____

17 _____

18 _____

19 _____ (grid in)

20 _____

12

15

19

Part 3 Open Ended

Record your answers for Question 21 on the back of this paper.