

Mini-Lecture 3.1

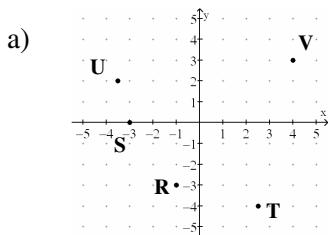
Graphing Equations

Learning Objectives:

1. Plot ordered pairs.
2. Determine whether an ordered pair of numbers is a solution to an equation in two variables.
3. Graph linear equations.
4. Graph nonlinear equations.
5. Key vocabulary: *rectangular coordinate system, Cartesian, axis, origin, quadrant, ordered pair, coordinate, point, solution, intercept, standard form.*

Examples:

1. Determine the ordered pairs, or, plot the points. Name the quadrant in which each point lies.



b) $(4,2)$; $(-3,5)$; $(-2,-4)$; $(3,-4)$; $(0,5)$; $(-2.5,0)$

2. Determine whether each ordered pair is a solution of the given equation.

a) $x + y = 7$; $(1,6)$, $(-3,10)$ b) $y = -3x + 2$; $(0,2)$, $(-2,10)$ c) $4x - 3y = 1$; $\left(\frac{1}{2}, \frac{2}{3}\right)$, $(0,1)$

3. Graph each linear equation by finding any three ordered pairs that are solutions to the equation.

a) $x + y = 2$ b) $2x - 4y = 8$ c) $y = \frac{2}{3}x + 3$ d) $x = 3$ e) $y = -2$

4. Graph each nonlinear equation by finding any 5 ordered pairs that are solutions to the equation.

a) $y = 3x^2$ b) $y = x^2 - 2$ c) $y = x^3$

Teaching Notes:

- In problem 3, some students do not realize that they can choose any x value at all and solve for y , or vice versa.
- Be sure to show students how to plot using x - and y -intercepts too.
- Refer to the end of section exercises for scatter diagram problems and word problems.
- Refer students to the **Linear Equation in Two Variables** and **Finding x - and y -Intercepts** charts in the text.

Answers: (graph answers at end of mini-lectures) 1a) $R(-1, -3)$, $S(-3, 0)$, $T(2.5, -4)$, $U(-3.5, 2)$, $V(4, 3)$; 2a) yes, yes,
b) yes, no, c) no, no

Mini-Lecture 3.2

Introduction to Functions

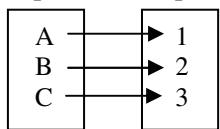
Learning Objectives:

1. Define relation, domain, and range.
2. Identify functions.
3. Use the vertical line test for functions.
4. Find the domain and range of a function.
5. Use function notation.
6. Key vocabulary: *relation, domain, range, function,*

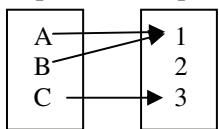
Examples:

1. Find the domain and range of each relation. Also determine whether the relation is a function.

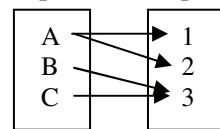
a) Input: Output:



b) Input: Output:



c) Input: Output:



d) $\{(1,4), (1,6)\}$

e) $\{(-2,-6), (0,-6)\}$

f) $\{(-6,-7), (-2,-5), \left(\frac{1}{2}, \frac{2}{3}\right), (0.5, 3)\}$

2. Determine whether each relation is also a function.

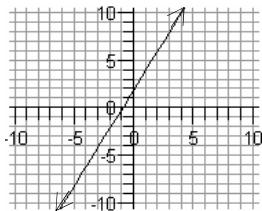
a) $y = x + 3$

b) $y - x = 5$

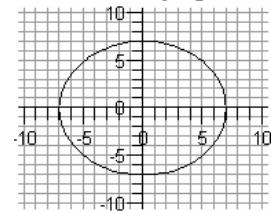
c) $x = 3y^2$

3. Use the vertical line test to determine whether each graph is the graph of a function.

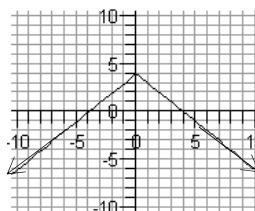
a)



b)



c)



4. Refer to the graphs in problem 3 to answer this question.
Find the domain and range of each relation.

5. For each function, find the indicated values.

a) $f(x) = x - 2$; find $f(3), f(-1)$

b) $g(x) = 3x^2 - 4x + 1$; find $g(0), g(-2)$

Teaching Notes:

- For domain and range, students find it helpful to think of x values as inputs, and y values as outputs.
- Point out to students that equivalent domain or range elements that occur more than once only need to be listed once.
- Some students are very confused by function notation.
- Refer to the end of section exercises for application problems.
- Refer students to the *Vertical Line Test* chart in the text.

Answers: 1a) domain {A,B,C}, range {1,2,3}, function, b) domain {A,B,C}, range {1,3}, function, c) domain {A,B,C}, range {1,2,3}, not a function, d) domain {1}, range {4,6}, not a function, e) domain {-2,0}, range {-6}, function, f) domain {-6,-2,0.5}, range {-7,-5, $\frac{2}{3}, 3$ }, not a function; 2a) function, b) function, c) not a function; 3a) function, b) not a function, c) function, 4a) domain $(-\infty, \infty)$, range $(-\infty, \infty)$, b) domain $(-7, 7)$, range $(-7, 7)$, c) domain $(-\infty, \infty)$, range $(-\infty, 4)$, d) domain $(-\infty, \infty)$, range $(-\infty, \infty)$, e) domain $(-\infty, \infty)$, range {6}, f) domain {-7}, range $(-\infty, \infty)$; 5a) 1,-3, b) 1,21

Mini-Lecture 3.3

Graphing Linear Functions

Learning Objectives:

1. Graph linear functions.
2. Graph linear functions by finding intercepts.
3. Graph vertical and horizontal lines.

Examples:

1. Graph each linear function.

a) $f(x) = x$

b) $f(x) = -2x + 1$

c) $f(x) = 2x - 3$

2. Find the intercepts and graph. Then write each equation using function notation.

a) $4x + 3y = 12$

b) $y = -4x$

c) $x - y = 4$

3. Graph vertical and horizontal lines.

a) $x = -5$

b) $y = -2$

c) $x - 4 = 0$

Teaching Notes:

- Remind students that any function can be written with or without function notation.
- Refer students to the ***x- and y-intercept*** and ***Vertical and Horizontal Lines*** charts in the text.

Answers: (graphing answers at end of mini-lectures) 2a) $f(x) = -4/3x + 4$, b) $f(x) = -4x$, c) $f(x) = x - 4$

Mini-Lecture 3.4

The Slope of a Line

Learning Objectives:

1. Find the slope of a line given two points on the line.
2. Find the slope of a line given the equation of the line.
3. Interpret the slope-intercept form in an application.
4. Find the slopes of horizontal and vertical lines.
5. Compare the slopes of parallel and perpendicular lines.
6. Key vocabulary: *rise, run, slope, slope-intercept form, perpendicular, parallel*.

Examples:

1. Find the slope of the line given two points on the line.
 - a) $(1, 5), (6, 11)$
 - b) $(3, 6), (-2, 9)$
 - c) $(3, -1), (4, -5)$
2. Find the slope and the y -intercept of each line.
 - a) $y = x + 3$
 - b) $y = -4x - 1$
 - c) $-3x + y = 9$
 - d) $x = 3.4$
 - e) $y = -\frac{1}{3}x$
 - f) $2x - 9y = 36$
 - g) $y - 8 = 0$
3. Solve.
 - a) When a road-side service truck is called, the cost of the service is given by the linear function $y = 2x + 60$, where y is in dollars and x is the number of hours the car is worked on. Find and interpret the slope and y -intercept of the linear equation.
 - b) The amount of water in a leaky water jug is given by the linear function $y = 117 - 10x$, where y is in ounces and x is in minutes. Find and interpret the slope and y -intercept of the linear function.
4. Find the slope of each line.
 - a) $x = 3$
 - b) $x - 5 = 0$
 - c) $y = -4$
5. Determine whether each pair of lines is parallel, perpendicular, or neither.
 - a) $y = 3x - 4$
 - b) $-2x + 4y = 1$
 - c) $y = 3x + 4$
 - a) $y = 3x + 2$
 - b) $6x + 3y = 3$
 - c) $y = -3x + 4$

Teaching Notes:

- Some students need to see many numeric examples of $m = \text{rise/run}$ shown on a graph before trying to use the slope formula.
- Many students make sign errors with the slope formula.
- Some students consistently put the change in x instead of the change in y in the numerator.
- Some students are confused by the slopes of horizontal and vertical lines.
- Some students understand objective 5 better if it is introduced using a discovery activity.
- Refer students to the *Slope of a Line, Slope-Intercept Form, Slopes of Vertical and Horizontal Lines, and Parallel/Perpendicular Lines* charts in the text.

Answers: 1a) $m = \frac{6}{5}$, b) $m = -\frac{3}{5}$, c) $m = -4$; 2a) $m = 1, (0, 3)$, b) $m = -4, (0, -1)$, c) $m = 3, (0, 9)$, d) undefined, no

y -intercept, e) $m = -\frac{1}{3}, (0, 0)$, f) $m = \frac{2}{9}, (0, -4)$, g) $m = 0, (0, 8)$; 3a) $m = 2$...cost increases 2 dollars for every hour of

work, $(0, 60)$...there is a minimum basic charge of \$60, b) $m = -10$...the jug loses 10 ounces per minute, $(0, 117)$...the jug started with 117 ounces in it; 4a) undefined, b) undefined, c) zero; 5a) parallel b) perpendicular, c) neither

Mini-Lecture 3.5

Equations of Lines

Learning Objectives:

1. Use the slope-intercept form to write the equation of a line.
2. Graph a line using its slope and y-intercept.
3. Use the point-slope form to write the equation of a line.
4. Write equations of vertical and horizontal lines.
5. Write equations of parallel and perpendicular lines.
6. Key vocabulary: *point-slope form, standard form.*

Examples:

1. Use the slope-intercept form of a linear equation to write the equation of each line with the given slope and y-intercept.
 - a) slope -1; y-intercept (0,4)
 - b) slope $\frac{1}{3}$; y-intercept (0,-7)
 - c) slope $-\frac{5}{2}$; y-intercept (0,0)
2. Graph each linear equation using the slope and y-intercept.
 - a) $y = 2x$
 - b) $y = 2x + 3$
 - c) $y = -2x + 1$
 - d) $y = \frac{1}{2}x - 2$
 - e) $x + 2y = 6$
 - f) $3x - 2y = 12$
3. Write an equation of each line with the given slope and containing the given point. Write the final equation in slope-intercept form.
 - a) slope 3; through (6,2)
 - b) slope $-\frac{2}{3}$; through (1,-5)
 - c) slope $\frac{3}{2}$; through (-2,-7)

Write an equation of the line passing through the given points. Write the final equation in standard form.

- d) (3,0) and (5,4)
- e) (8,-4) and (5,5)
- f) $\left(-\frac{1}{2}, \frac{1}{3}\right)$ and $\left(\frac{5}{2}, -\frac{2}{3}\right)$
4. Write an equation of each line.
 - a) vertical; through (2,4)
 - b) horizontal; through (-1,-3)
 - c) undefined slope; through (0,3)
 - d) slope 0; through (-6,4)
5. Write an equation of each line. Write the equation in the form $x = a$, $y = b$, or $y = mx+b$.
 - a) through (0,3); parallel to $y = 2x - 1$
 - b) through (1,4); parallel to $2x - 3y = 1$
 - c) through (0,-2); perpendicular to $y = -4x + 2$
 - d) through (-6,4); perpendicular to $2x + 5y = 10$

Teaching Notes:

- Some students need a lot of practice using the slope to graph a line.
- Emphasize to students how the sign of the slope is built into the direction you go when using the slope to graph a line.
- Most students understand the point-slope form better if they see that it is just a re-arranging of the slope formula.
- Some students struggle with the fractions that arise when solving the problems in number 5.
- Refer students to the **Point-Slope Form of the Equation of a Line** chart in the text.

Answers: 1a) $y = -x + 4$, b) $y = \frac{1}{3}x - 7$, c) $y = -\frac{5}{2}x$; 2a)-2f) (graph answers at end of mini-lectures); 3a) $y = 3x - 16$,
b) $y = -\frac{2}{3}x - \frac{13}{3}$, c) $y = \frac{3}{2}x - 4$, d) $2x - y = 6$, e) $3x + y = 20$, f) $2x + 6y = 1$; 4a) $x = 2$, b) $y = -3$, c) $x = 0$, d) $y = 4$; 5a) $y = 2x + 3$,
b) $y = \frac{2}{3}x + \frac{10}{3}$, c) $y = \frac{1}{4}x - 2$, d) $y = \frac{5}{2}x + 19$

Mini-Lecture 3.6

Graphing Piecewise-Defined Functions and Shifting and Reflecting Graphs of Functions

Learning Objectives:

1. Graph piecewise-defined functions.
2. Vertical and horizontal shifts.
3. Reflect graphs.

Examples:

1. Graph each piecewise-defined function.

$$a) f(x) = \begin{cases} x & \text{if } x \leq 0 \\ x+2 & \text{if } x > 0 \end{cases}$$

$$b) g(x) = \begin{cases} 4x+3 & \text{if } x \leq 1 \\ \frac{1}{3}x-2 & \text{if } x > 1 \end{cases}$$

Graph each piecewise-defined function. Use the graph to determine the domain and range.

$$c) g(x) = \begin{cases} x+2 & \text{if } x < 0 \\ -x+2 & \text{if } x \geq 0 \end{cases}$$

$$d) h(x) = \begin{cases} -2 & \text{if } x \leq 0 \\ 2 & \text{if } x \geq 1 \end{cases}$$

2. Sketch each pair of functions on one axes.

$$a) f(x) = x$$
$$g(x) = x + 2$$

$$b) f(x) = |x|$$
$$g(x) = |x| - 2$$

$$c) f(x) = |x|$$
$$g(x) = |x - 2|$$

$$d) f(x) = |x|$$
$$g(x) = |x + 2|$$

$$e) f(x) = x^2$$
$$g(x) = (x - 2)^2 + 1$$

$$f) f(x) = \sqrt{x}$$
$$g(x) = \sqrt{x+1} - 2$$

3. Sketch each pair of functions on one axes.

$$a) f(x) = x$$
$$g(x) = -x$$

$$b) f(x) = |x|$$
$$g(x) = -|x|$$

$$c) f(x) = \sqrt{x}$$
$$g(x) = -\sqrt{x-2}$$

$$d) f(x) = x^2$$
$$g(x) = -(x+2)^2 - 1$$

Teaching Notes:

- Most students find vertical shifts easy to understand.
- Some students are confused by the directions of a horizontal shift.
- Objectives 2 and 3 can be covered in a more timely manner if students are broken into groups and each group is given one type of common graph to focus on. Then the class can discuss the results and generalize to arrive at the shifting and reflecting properties.
- Refer students to the **Vertical Shifts**, **Horizontal Shifts**, and **Reflections About the x-axis** charts in the text.

Answers: (graph answers at end of mini-lectures) 1c) domain $(-\infty, \infty)$, range $(-\infty, 2]$, d) domain $(-\infty, 0] \cup [1, \infty)$, range $\{-2, 2\}$

Mini-Lecture 3.7

Graphing Linear Inequalities

Learning Objectives:

1. Graph linear inequalities.
2. Graph the intersection or union of two linear inequalities.
3. Key vocabulary: *boundary line, half planes, solution region, test point.*

Examples:

1. Graph each inequality. Use a test point to check the solution region.

a) $y < x$

b) $y \geq x + 2$

c) $y \leq -x - 3$

d) $x + 2y > -2$

e) $-2x - 5y \geq 10$

f) $2x < -3y$

g) $y > \frac{1}{2}x$

h) $y \leq 2$

i) $x \geq -2\frac{1}{3}$

2. Graph each union or intersection.

a) The intersection of $x \leq 2$ and $y \geq -3$

b) The union of $x \leq 2$ or $y \geq -3$

c) The intersection of $x - y < 2$ and $x + y \geq 3$

d) The union of $2x - 3y < 6$ or $2x + y \geq 3$

Teaching Notes:

- Most students who are good at graphing linear equations find this section easy.
- Remind students to always use a test point from the solution region, and not from the boundary line, to check their graph.
- Remind students to use a dashed line for $<$ or $>$ and a solid line for \leq or \geq .
- Refer students to the ***Graphing a Linear Inequality in Two Variables*** chart in the text.

Answers: (graph answers at end of mini-lectures)

Additional Exercises 3.1

Form I

Given that x is a positive number and y is a positive number, determine the quadrant or axis in which each point lies.

1. (x, y)

2. $(-x, y)$

3. $(x, 0)$

Determine whether each ordered pair is a solution of the given equation.

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

5. $y = -5; (-5, 0), (0, -5)$

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

Graph each equation.

7. $y = 3x$

Name _____

Date _____

1. _____

2. _____

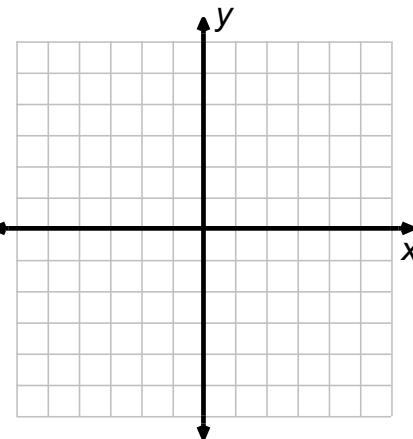
3. _____

4. _____

5. _____

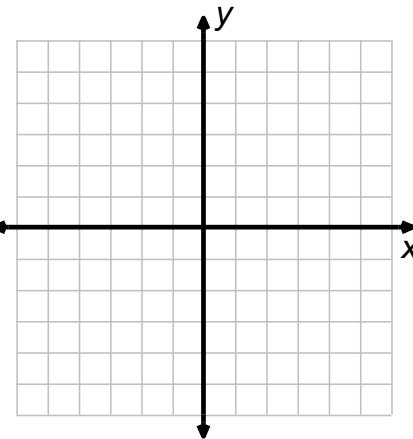
6. _____

7.



8. $x = -2$

8.



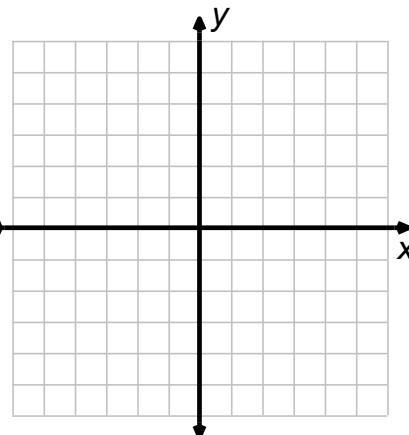
Additional Exercises 3.1 (*cont.*)

Name _____

Graph each equation.

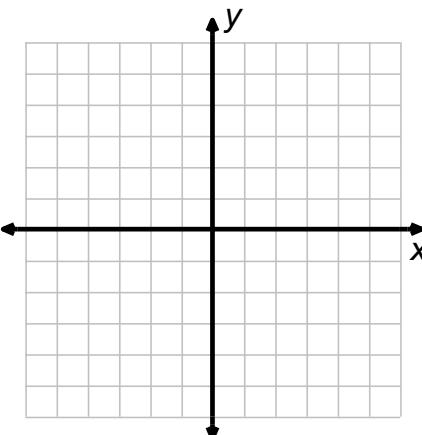
9. $y = 4x + 1$

9.



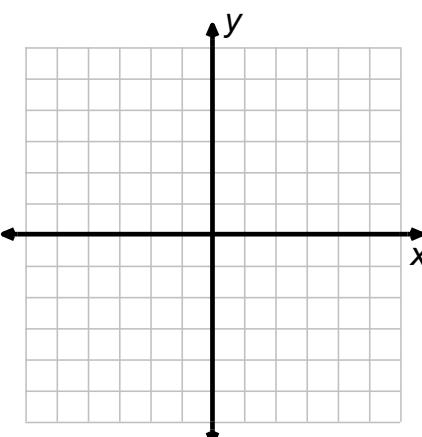
10. $2x + y = 4$

10.



11. Graph $y = x^2 - 2$. Let $x = -2, -1, 0, 1, 2$ to generate ordered pair solutions.

11.



Additional Exercises 3.1

Form II

Given that x is a positive number and y is a positive number, determine the quadrant or axis in which each point lies.

1. $(x, -y)$

2. $(-x, y)$

3. $(-x, 0)$

Determine whether each ordered pair is a solution of the given equation.

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

5. $y = 3x + 5; (-2, -1), (0, 3)$

6. $3x - 2y = 6; (0, -3), (-4, -9)$

Graph each equation.

7. $y = -5x + 2$

Name _____

Date _____

1. _____

2. _____

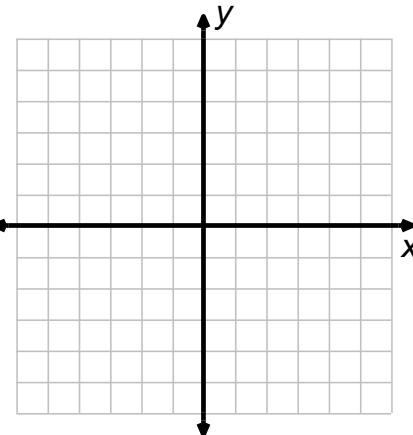
3. _____

4. _____

5. _____

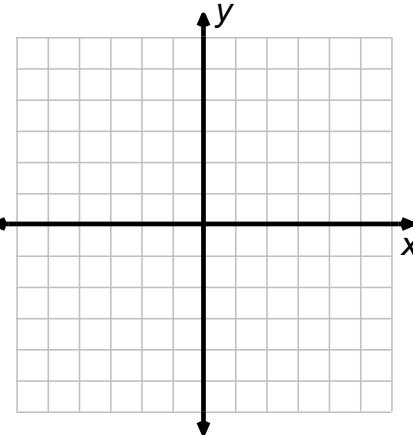
6. _____

7.



8. $x = 2y$

8.



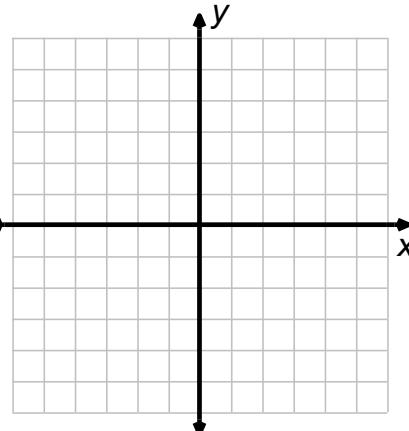
Additional Exercises 3.1 (cont.)

Name _____

Graph each equation.

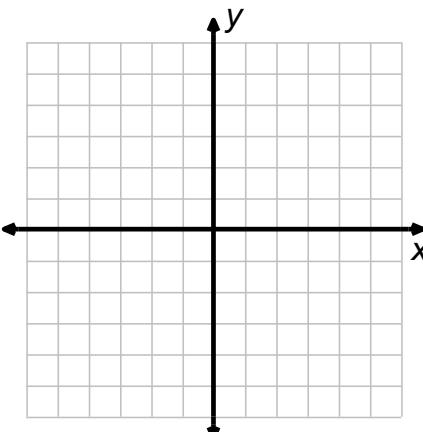
9. $2x - y = 4$

9.



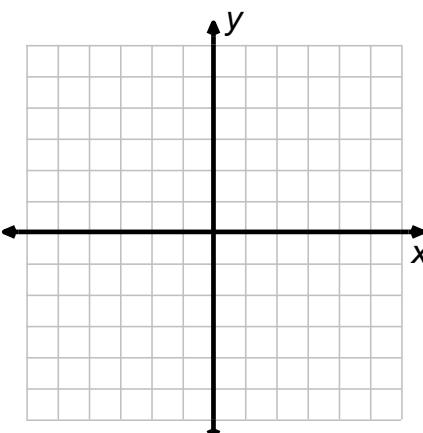
10. $y = \frac{3}{2}x - 1$

10.



11. Graph $y = x^2 + 3x$. Let $x = -4, -3, -2, -1, 0, 1$ to generate ordered pair solutions.

11.



Additional Exercises 3.1

Form III

Given that x is a positive number and y is a positive number, determine the quadrant or axis in which each point lies.

1. $(-x, -y)$

2. $(x, 0)$

3. $(0, -y)$

Determine whether each ordered pair is a solution of the given equation.

4. $7x - 3y = 7$; $(4, 7), (1, -2)$

5. $2y = 3x^2 + 8$; $(0, 8), (-4, 28)$

6. $y = 3\sqrt[3]{x} - 7$; $(8, 1), (-8, -13)$

Graph each equation.

7. $2y = x - 1$

8. $y = -\frac{5}{2}x + 4$

Name _____

Date _____

1. _____

2. _____

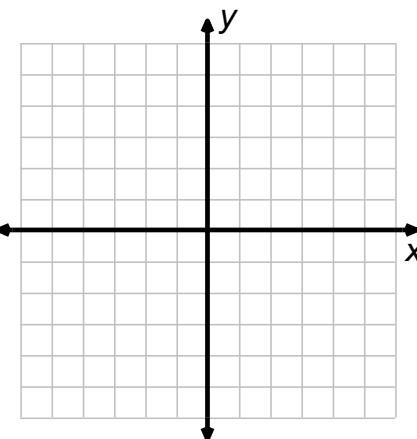
3. _____

4. _____

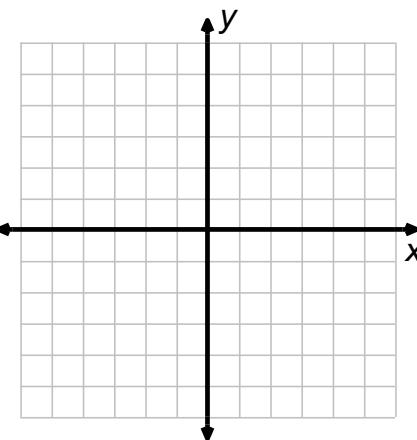
5. _____

6. _____

7.



8.



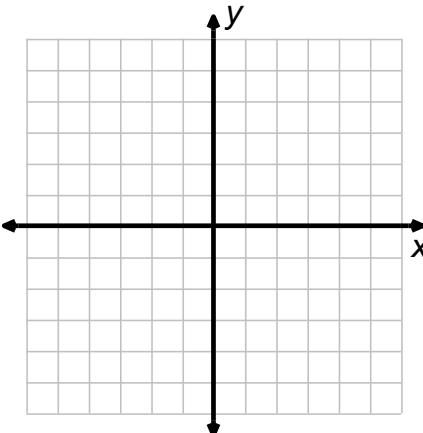
Additional Exercises 3.1 (cont.)

Name _____

Graph each equation.

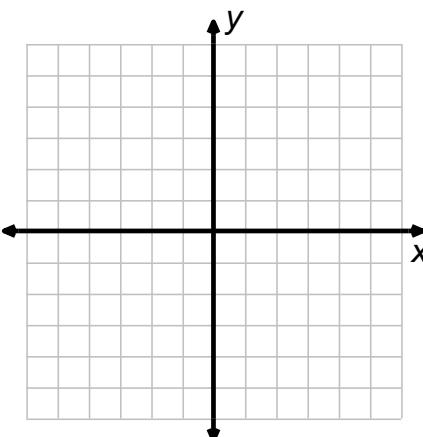
9. $3x + 4y = 12$

9.



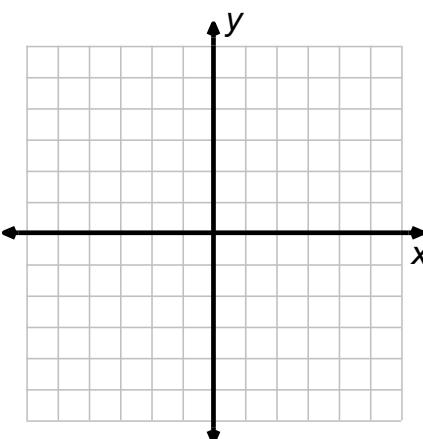
10. $y = 2x^2 - 1$

10.



11. Graph $y = x^2 - 2x - 1$. Let $x = -1, 0, 1, 2, 3$ to generate ordered pair solutions.

11.



Additional Exercises 3.2

Form I

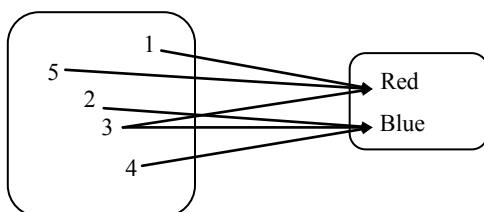
Name _____

Date

Find the domain and the range of each relation. Also determine whether the relation is a function.

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

2. $\{(1, 8), (2, 4), (4, 2), (8, 1)\}$



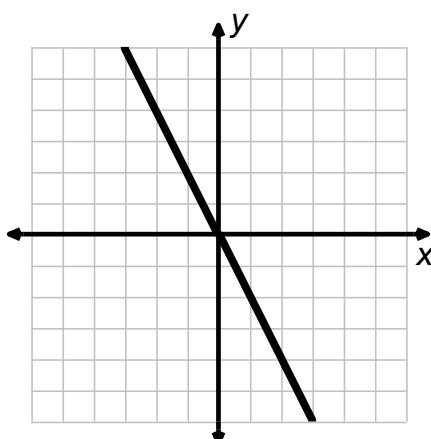
1. _____

2.

3.

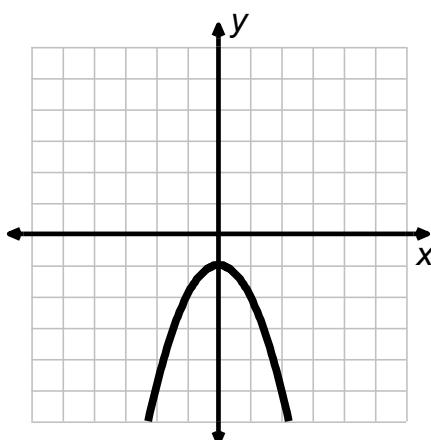
Find the domain and range of each relation. Use the vertical line test to determine whether each graph is the graph of a function.

4.



4.

5.



5. _____

Additional Exercises 3.2 (*cont.*)

Name _____

Determine whether each relation is a function.

6. $y = 11 - 3x$

7. $y^2 = x + 1$

Given the following functions, find the indicated values.

8. $f(x) = 8 - 2x; f(-1)$

9. $g(x) = 5; g(-2)$

10. $h(x) = x^2 - x + 1; h(3)$

6. _____

7. _____

8. _____

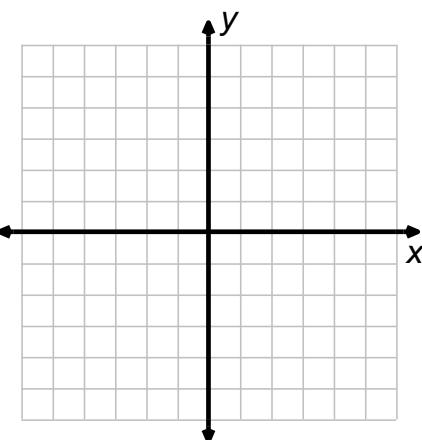
9. _____

10. _____

Graph the linear functions.

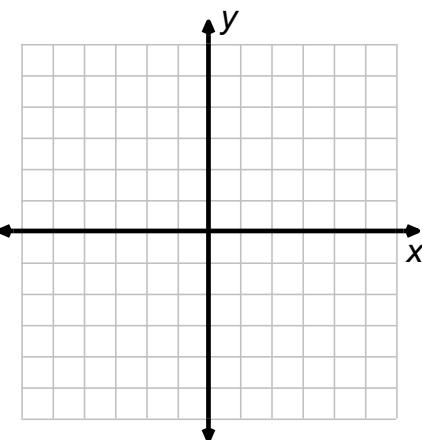
11. $f(x) = x + 2$

11.



12. $f(x) = 2x - 5$

12.



Additional Exercises 3.2

Form II

Name _____

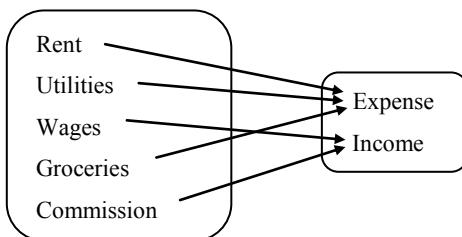
Date _____

Find the domain and the range of each relation. Also determine whether the relation is a function.

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

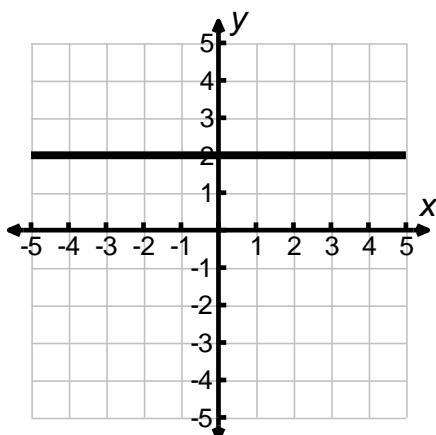
2. $\{(3, 5), (3, 7), (4, 2), (5, 10)\}$

3. Input Output



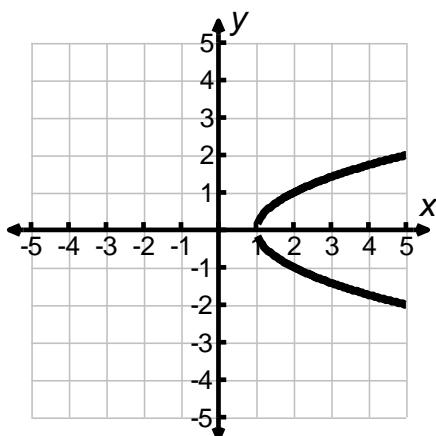
Find the domain and range of each relation. Use the vertical line test to determine whether each graph is the graph of a function.

4.



4. _____

5.



5. _____

Additional Exercises 3.2 (*cont.*)

Name _____

Determine whether each relation is a function.

6. $3x + 2y = 7$

7. $x^2 = y - 2$

Given the following functions, find the indicated values.

8. $f(x) = 4x - 6$; $f(-3)$

9. $g(x) = 0.5(x + 7)$; $g(9)$

10. $h(x) = 5x^2 + 12x - 3$; $h(3)$

Graph the linear functions.

11. $f(x) = -4x + 7$

6. _____

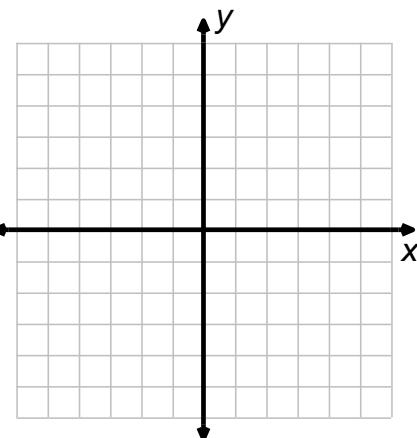
7. _____

8. _____

9. _____

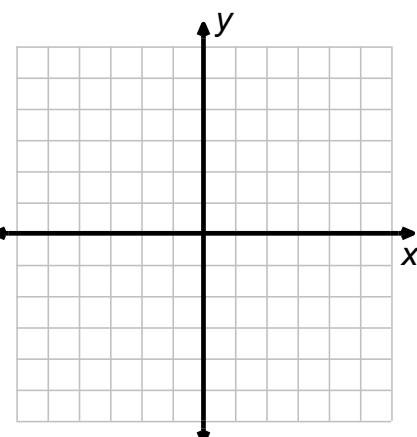
10. _____

11.



12. $f(x) = \frac{1}{3}x - 3$

12.



Additional Exercises 3.2

Form III

Name _____

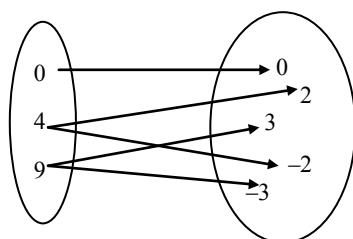
Date _____

Find the domain and the range of each relation. Also determine whether the relation is a function.

1. $\{(0, 3), (2, 5), (4, 7), (6, 5), (8, 3)\}$

2. $\{(a, b), (b, c), (c, d), (d, e)\}$

3. Input Output



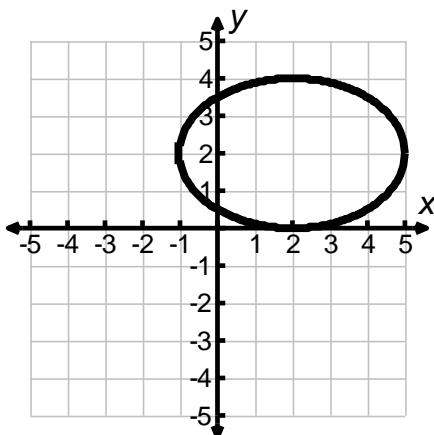
1. _____

2. _____

3. _____

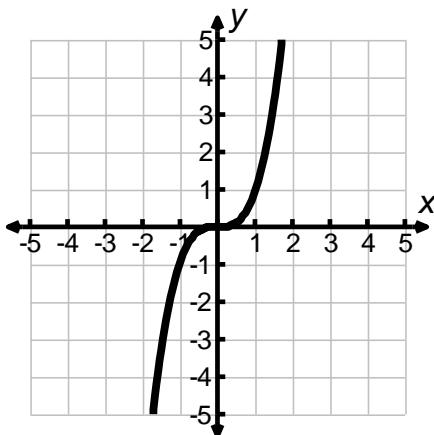
Find the domain and range of each relation. Use the vertical line test to determine whether each graph is the graph of a function.

4.



4. _____

5.



5. _____

Additional Exercises 3.2 (*cont.*)

Name _____

Determine whether each relation is a function.

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

7. $y = 2|x| + 3$

Given the following functions, find the indicated values.

8. $f(x) = 3x^2 + 6x - 7; f(4)$

9. $g(x) = 2x^3; g(-4)$

10. $h(x) = \frac{9}{x-3}; h(-12)$

6. _____

7. _____

8. _____

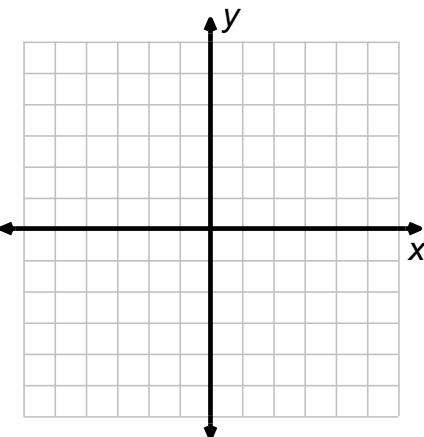
9. _____

10. _____

Graph the linear functions.

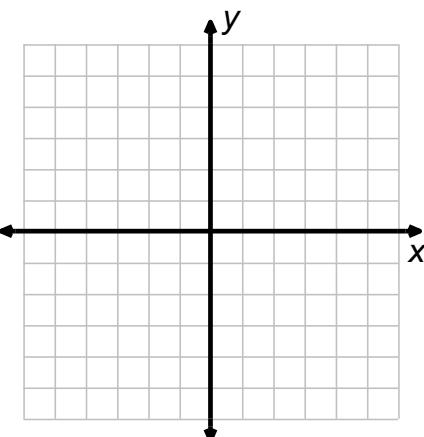
11. $f(x) = 2.5x - 7.5$

11.



12. $f(x) = \frac{6x-4}{2}$

12.



Additional Exercises 3.3

Form I

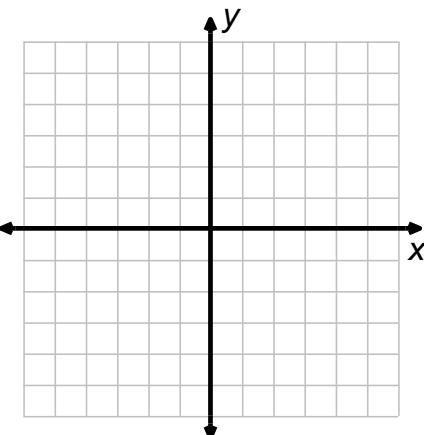
Graph each linear equation.

1. $y = 3x - 1$

Name _____

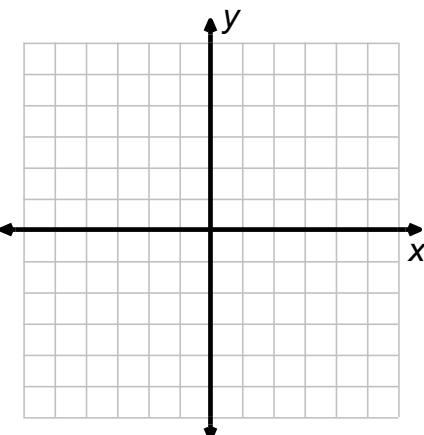
Date _____

1.



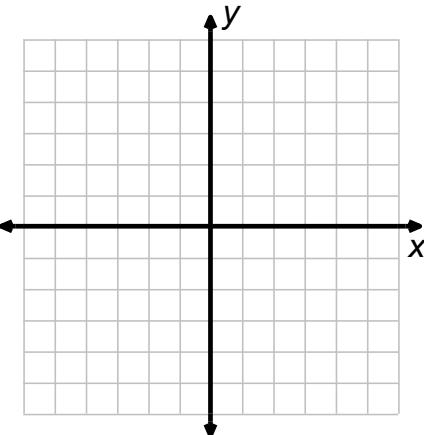
2. $y = \frac{1}{2}x$

2.



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

3.

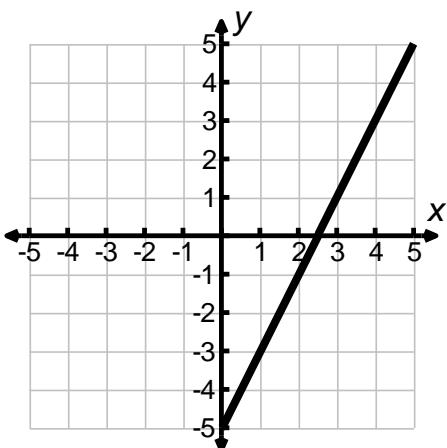


Additional Exercises 3.3 (cont.)

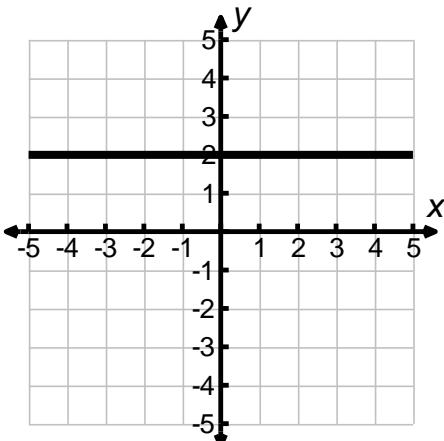
Name _____

Match each equation below with its graph.

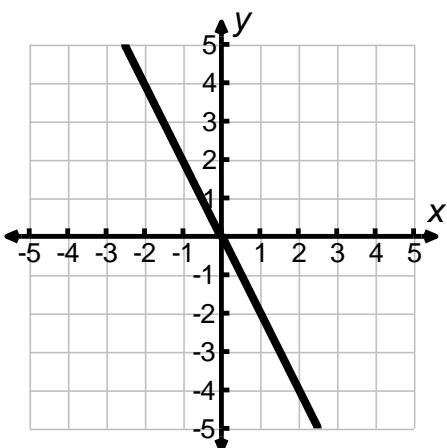
A.



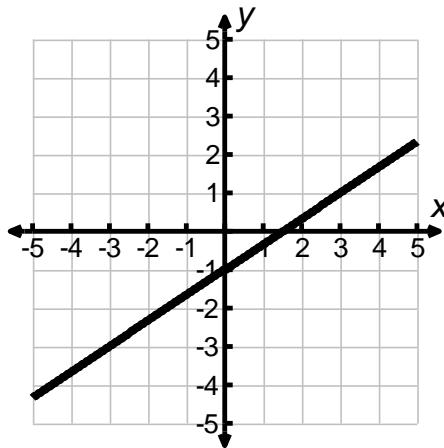
B.



C.



D.



4. $2x - 3y = 3$

5. $6x + 3y = 0$

6. $2x - y = 5$

7. $y = 2$

4. _____

5. _____

6. _____

7. _____

In the answer space write the word or phrase that correctly completes the following statements.

8. The graph of $y = -6$ is the graph of a _____ line.

8. _____

9. The graph of $y = x + 4$ has a y -intercept of _____.

9. _____

10. The y -intercept of a linear function can be found by replacing _____ in the equation with 0.

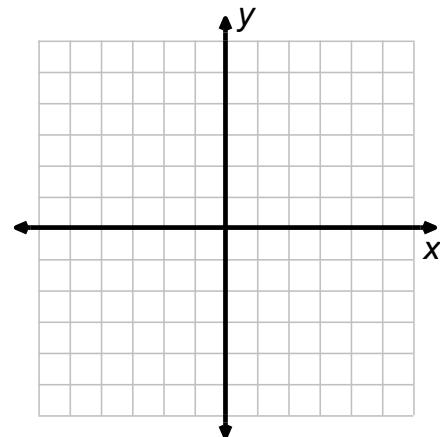
10. _____

Additional Exercises 3.3 (*cont.*)

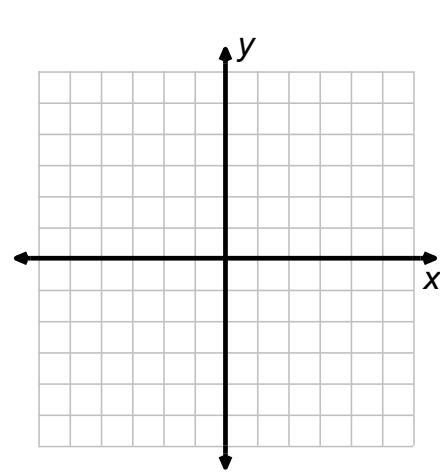
Name _____

Graph each linear function by finding x -intercepts and y -intercepts.

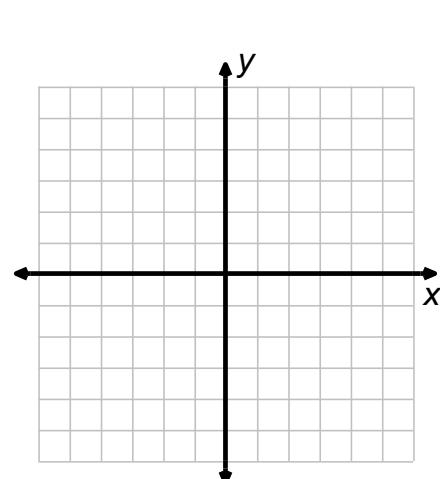
11. $y = x + 3$



12. $y = 2x - 2$



13. $2y = -3x + 1$



Additional Exercises 3.3

Form II

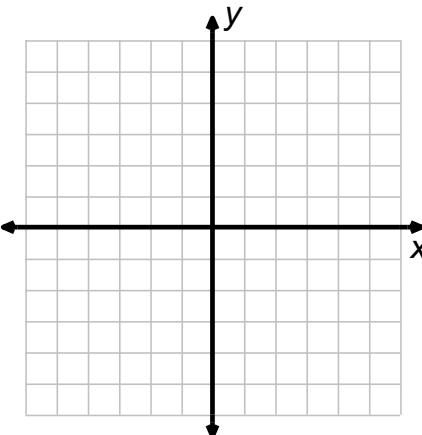
Name _____

Date _____

Graph each linear equation.

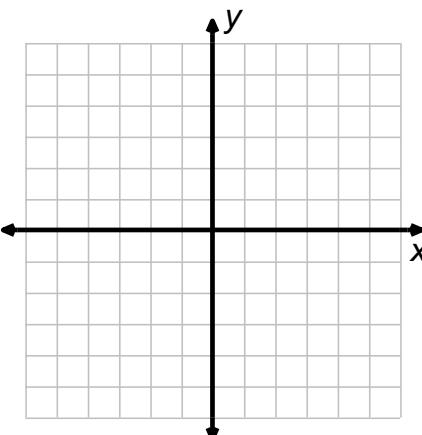
1. $y = -\frac{5}{2}x + 4$

1.



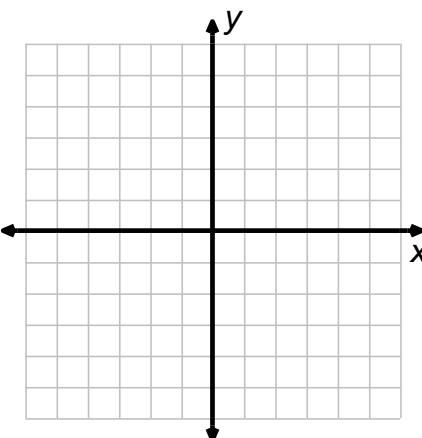
2. $y = 4$

2.



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

3.

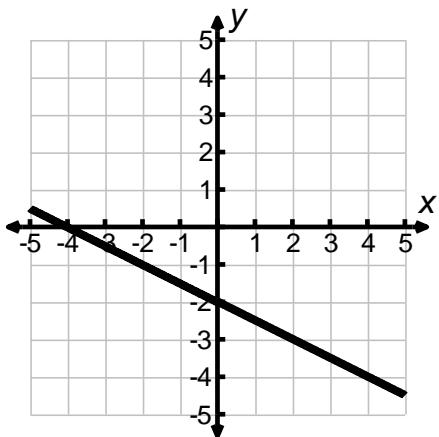


Additional Exercises 3.3 (cont.)

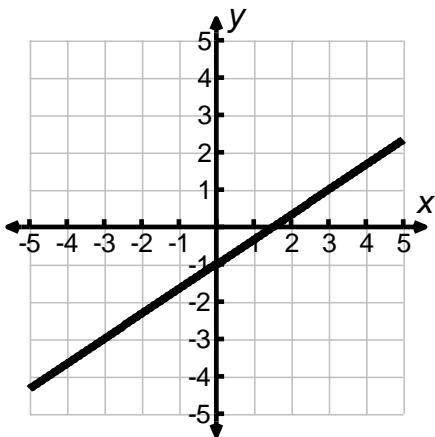
Name _____

Match each equation below with its graph.

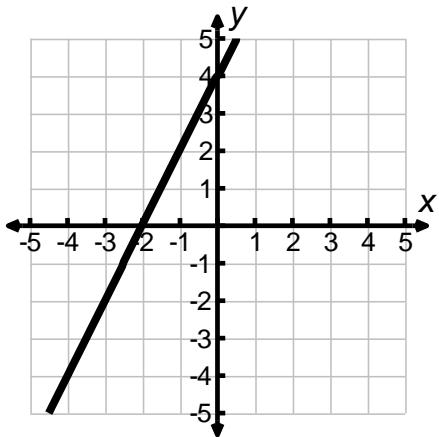
A.



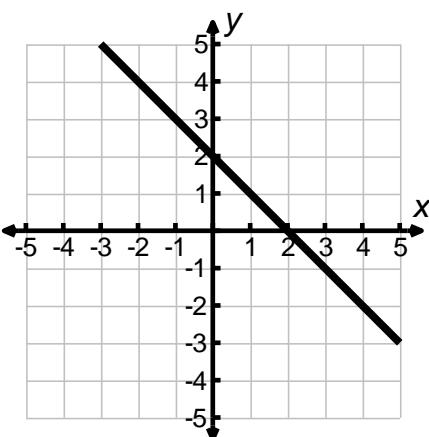
B.



C.



D.



4. $2x - 3y = 3$

4. _____

5. $x + y = 2$

5. _____

6. $x + 2y + 4 = 0$

6. _____

7. $y = 4 + 2x$

7. _____

In the answer space write the word or phrase that correctly completes the following statements.

8. The graph of $x = 4$ is the graph of a _____ line.

8. _____

9. The graph of $y = 2x - 5$ has a y -intercept of _____.

9. _____

10. The graph of $12 = 2x - 3y$ has a y -intercept of _____.

10. _____

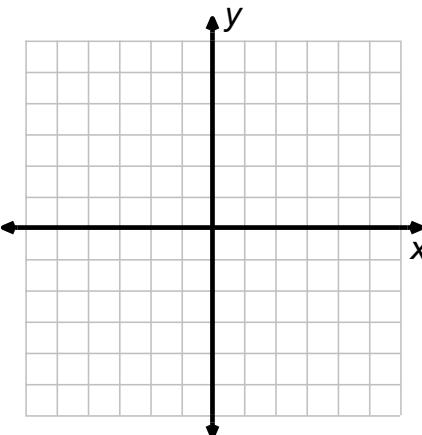
Additional Exercises 3.3 (*cont.*)

Name _____

Graph each linear function by finding x -intercepts and y -intercepts.

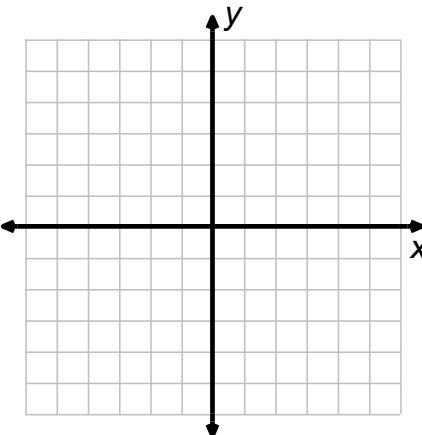
11. $x = 2y - 4$

11.



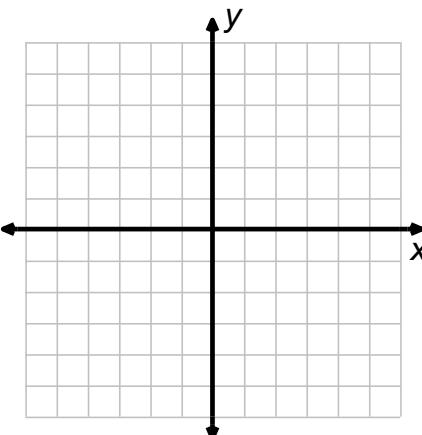
12. $-2x + 3y = 6$

12.



13. $7x + 3y - 5 = 0$

13.



Additional Exercises 3.3

Form III

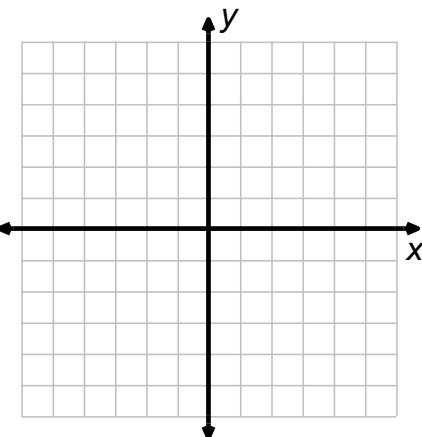
Graph each linear equation.

1. $2x + y + 3 = 0$

Name _____

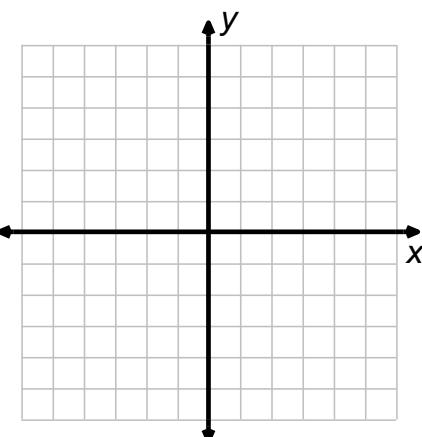
Date _____

1.



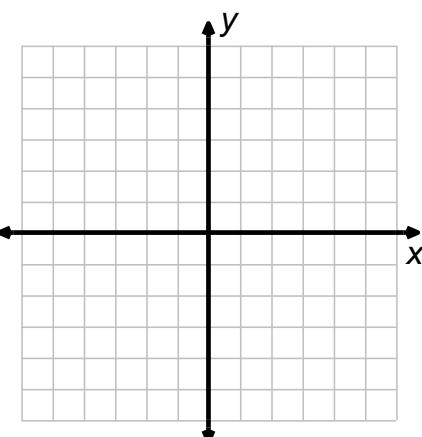
2. $3x - y = 4$

2.



3. $\frac{2}{9}y = -\frac{4}{3}x - \frac{5}{9}$

3.

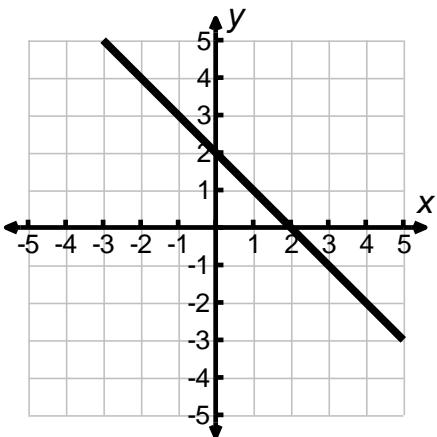


Additional Exercises 3.3 (cont.)

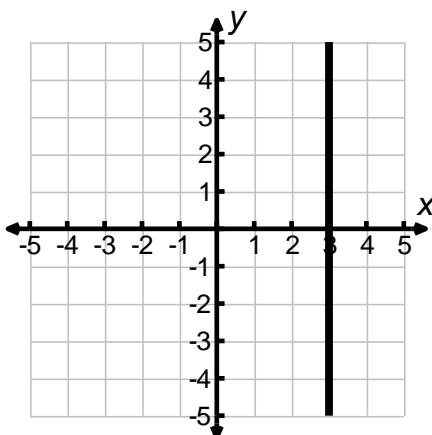
Name _____

Match each equation below with its graph.

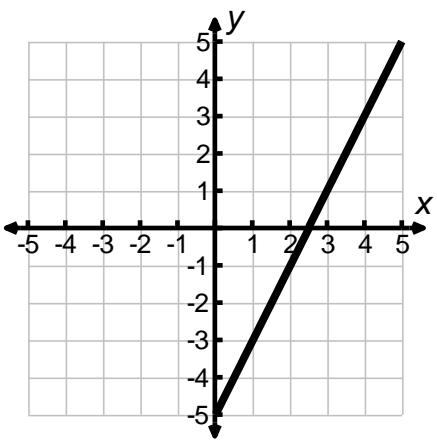
A.



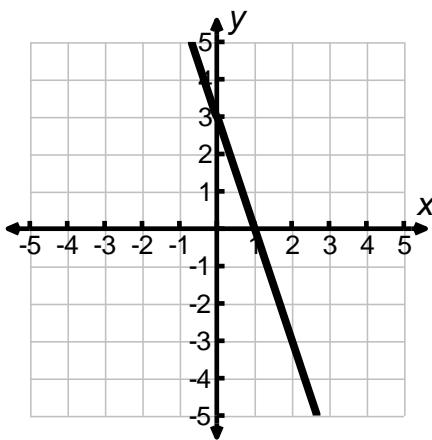
B.



B.



D.



4. $x = 3$

5. $3x + y = 3$

6. $x + y = 2$

7. $2x - y = 5$

4. _____

5. _____

6. _____

7. _____

In the answer space write the word or phrase that correctly completes the following statements.

8. The x -intercept of a linear function can be found by replacing _____ in the equation with 0.

8. _____

9. By changing y to _____, a linear equation can be written as a function of x .

9. _____

10. The y -intercept for $\frac{2}{9}y = -\frac{4}{3}x - \frac{5}{9}$ is _____.

10. _____

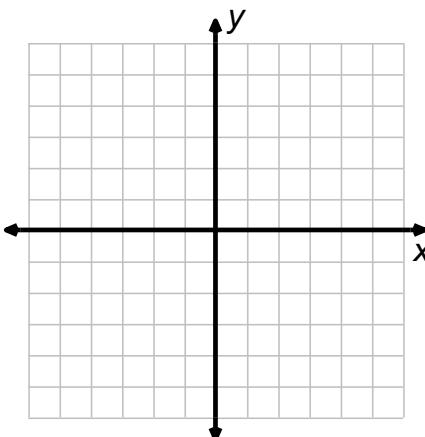
Additional Exercises 3.3 (*cont.*)

Name _____

Graph each linear function by finding x -intercepts and y -intercepts.

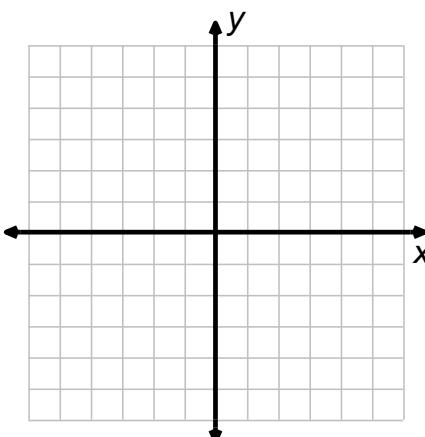
11. $3x - 4y = 12$

11.



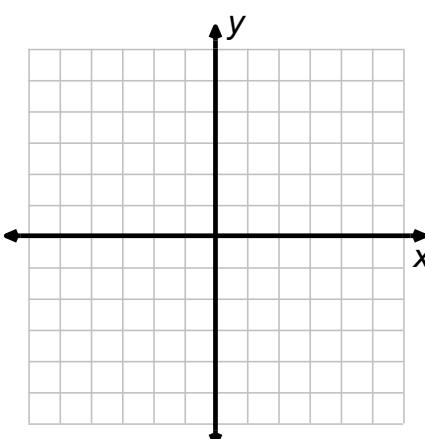
12. $-5x + 2y = 8$

12.



13. $1.5x - 0.5y = 2.5$

13.



Additional Exercises 3.4

Form I

Find the slope of the line containing each pair of points.

1. $(3, 4), (5, 6)$

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

Name _____

Date _____

Find the slope and the y -intercept of each line.

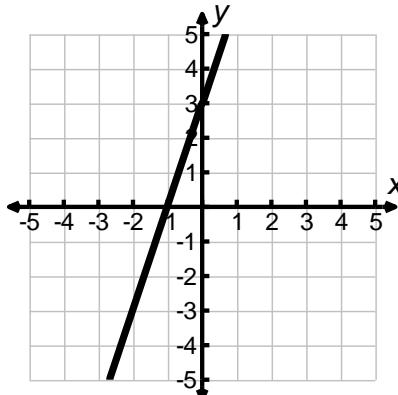
3. $x = 4y$

4. $y = -x - 2$

5. $y = 2x + 3$

6. $3y = x + 2$

7. Match the graph with its equation.



a. $y = 3x + 3$

b. $y = 3x - 3$

c. $y = -3x + 3$

d. $y = -3x - 3$

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

Find the slope of each line.

8. $y = -5$

9. $x - 6 = 0$

8. _____

9. _____

Determine whether the lines are parallel, perpendicular, or neither.

10. $x + y = 4$
 $x - y = 4$

10. _____

11. $2x - y = 4$
 $y = 2x + 7$

11. _____

Find the slope in the following problem.

12. What is the slope of a 5-foot high platform that begins at ground level 10 feet from the base of the platform?

12. _____

Additional Exercises 3.4

Form II

Find the slope of the line containing each pair of points.

1. $(5, 4), (7, 4)$

2. $(8, 0), (4, -2)$

Find the slope and the y -intercept of each line.

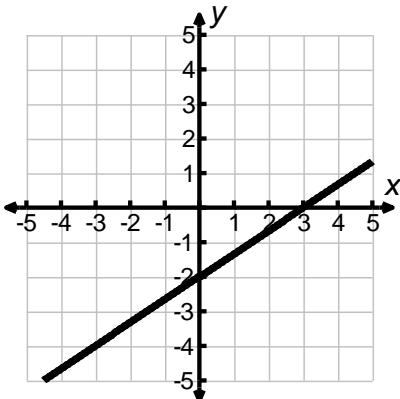
3. $x = -2y$

4. $x + 3 = 0$

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

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

7. Match the graph with its equation.



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

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

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

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

Find the slope of each line.

8. $y - 4.5 = 0$

9. $x + 3 = 0$

Determine whether the lines are parallel, perpendicular, or neither.

10. $3x - 2y = 6$

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

12. $2x - y = 4$
 $2y = 4x + 3$

Find the slope in the following problem.

12. What is the slope of a road that rises 25 feet vertically for every 200 feet of horizontal distance?

Name _____

Date _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

Additional Exercises 3.4

Form III

Find the slope of the line containing each pair of points.

1. $(-1, 5), (6, 3)$

2. $(-2, -5), (-3, -4)$

Find the slope and the y -intercept of each line.

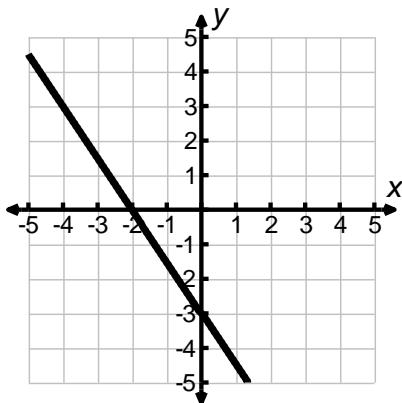
3. $-5x + y = 10$

4. $y = \frac{1}{3}x + \frac{2}{5}$

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

6. $11y - 4x + 3 = 0$

7. Match the graph with its equation.



a. $y = 1.5x + 3$

b. $y = 1.5x - 3$

c. $y = -1.5x + 3$

d. $y = -1.5x - 3$

Find the slope of each line.

8. $y = b$

9. $x - a = 0$

Determine whether the lines are parallel, perpendicular, or neither.

10. $3x + y = -8$
 $3x - 9y = 11$

11. $2x - y = 7$
 $y = -2x + 6$

Find the slope in the following problem.

12. A graph shows a linear growth of sales at 3444 per year. What is the slope of the graph in terms of sales per month?

Name _____

Date _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

Additional Exercises 3.5

Form I

Use the slope-intercept form of a linear equation to write the equation of each line with the given slope and y -intercept.

1. Slope 3; y -intercept $(0, 0)$
2. Slope 1; y -intercept $(0, 9)$
3. Slope $\frac{1}{2}$; y -intercept $(0, -2)$

Write an equation of each line with the given slope and containing the given point. Write the equation in the form $y = mx + b$.

4. Slope 7; through $(-6, 5)$
5. Slope -9 ; through $(-3, 1)$

Write an equation of each line passing through the given points. Write the equation in the form $y = mx + b$.

6. $(0, 2), (1, 4)$
7. $(-2, -3), (3, 2)$
8. $(-2, 1), (1, -2)$

Write an equation of each line.

9. Horizontal; through $(5, 9)$
10. Vertical; through $(3, 7)$

Find the equation of each line. Write the equation in the form $y = mx + b$.

11. Through $(-2, 3)$; parallel to $f(x) = x + 2$
12. Through $(4, 2)$; perpendicular to $f(x) = -2x$

The monthly profit (in dollars) of a cookie factory can be estimated by the linear equation $y = 0.1x - 500$, where x is the number of packages of cookies sold.

13. What is the monthly profit if 10,000 packages of cookies are sold?

Name _____

Date _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

Additional Exercises 3.5

Form II

Use the slope-intercept form of a linear equation to write the equation of each line with the given slope and y -intercept.

1. Slope 2; y -intercept $(0, -3)$
2. Slope 0; y -intercept $(0, -\frac{7}{8})$
3. Slope $-\frac{2}{5}$; y -intercept $(0, 1)$

Write an equation of each line with the given slope and containing the given point. Write the equation in the form $y = mx + b$.

4. Slope 3; through $(-2, 1)$
5. Slope $-\frac{1}{5}$; through $(0, -5)$

Write an equation of each line passing through the given points. Write the equation in the form $y = mx + b$.

6. $(8, 0), (4, 2)$
7. $(3, -4), (5, -2)$
8. $(6, -4), (2, 1)$

Write an equation of each line.

9. Vertical; through $(2, 5)$
10. Horizontal; through $(7, 4)$

Find the equation of each line. Write the equation in the form $y = mx + b$.

11. Through $(2, 7)$; parallel to $f(x) = 3x - 4$
12. Through $(-1, -5)$; perpendicular to $f(x) = \frac{1}{2}x + 9$

The monthly profit (in dollars) of a cookie factory can be estimated by the linear equation $y = 0.1x - 500$, where x is the number of packages of cookies sold.

13. How many packages of cookies must be sold each month in order to have a profit of \$2000 per month.

Name _____

Date _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

Additional Exercises 3.5

Form III

Use the slope-intercept form of a linear equation to write the equation of each line with the given slope and y -intercept.

1. Slope 4; y -intercept $(0, -7)$

2. Slope $\frac{4}{5}$; y -intercept $(0, -\frac{1}{3})$

3. Slope $-\frac{1}{2}$; y -intercept $(0, \frac{5}{4})$

Write an equation of each line with the given slope and containing the given point. Write the equation in the form $y = mx + b$.

4. Slope $\frac{1}{3}$; through $(-1, 0)$

5. Slope $-\frac{3}{4}$; through $(-4, 2)$

Write an equation of each line passing through the given points. Write the equation in the form $y = mx + b$.

6. $(0, 2), (1, 4)$

7. $(-2, -7), (0, -1)$

8. $(-1, 5), (6, 3)$

Write an equation of each line.

9. Horizontal; through $(1, -3)$

10. Undefined slope; through $(6, -7)$

Find the equation of each line. Write the equation in the form $y = mx + b$.

11. Through $(5, 3)$; parallel to $f(x) = -5x + 7$

12. Through $(2, -3)$; perpendicular to $f(x) = -\frac{2}{3}x - 9$

The monthly profit (in dollars) of a cookie factory can be estimated by the linear equation $y = 0.1x - 500$, where x is the number of packages of cookies sold.

13. Find and interpret the y -intercept of the equation.

Name _____

Date _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

Additional Exercises 3.6

Form I

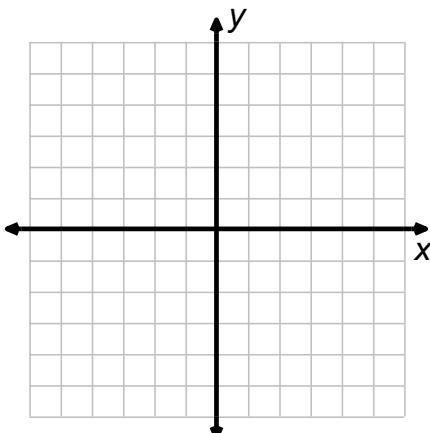
Graph each piecewise-defined function.

1. $f(x) = \begin{cases} -3 & \text{if } x < 0 \\ 4 & \text{if } x \geq 0 \end{cases}$

Name _____

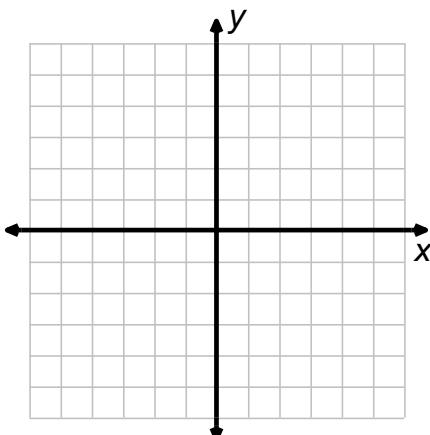
Date _____

1.



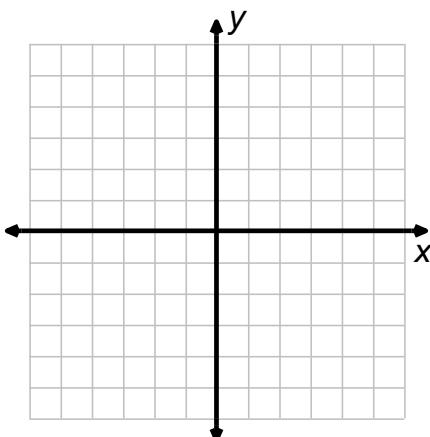
2. $f(x) = \begin{cases} -2 & \text{if } x < 0 \\ 2x & \text{if } x \geq 0 \end{cases}$

2.



3. $f(x) = \begin{cases} x & \text{if } x < 0 \\ x - 1 & \text{if } x \geq 0 \end{cases}$

3.

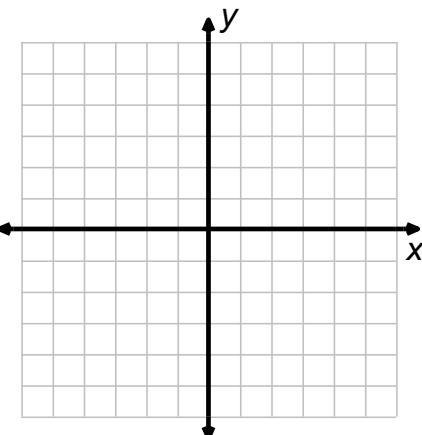


Additional Exercises 3.6 (*cont.*)

Name _____

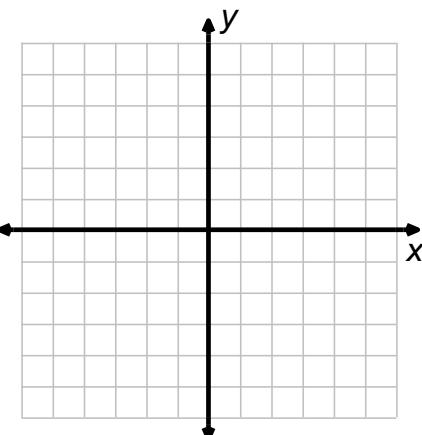
4. $f(x) = \begin{cases} 4x & \text{if } x \leq 0 \\ 2x - 3 & \text{if } x > 0 \end{cases}$

4.



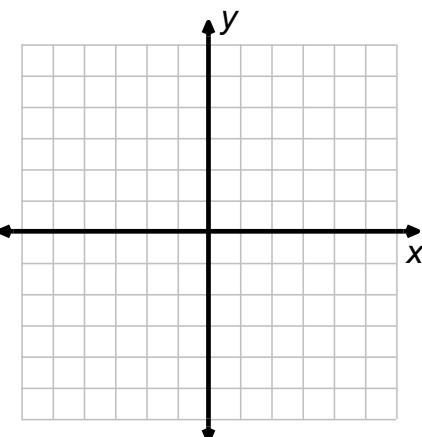
5. $f(x) = \begin{cases} -x + 2 & \text{if } x \leq 2 \\ -x + 4 & \text{if } x > 2 \end{cases}$

5.



6. $f(x) = \begin{cases} -2x - 4 & \text{if } x \leq -3 \\ 2x + 5 & \text{if } x > -3 \end{cases}$

6.

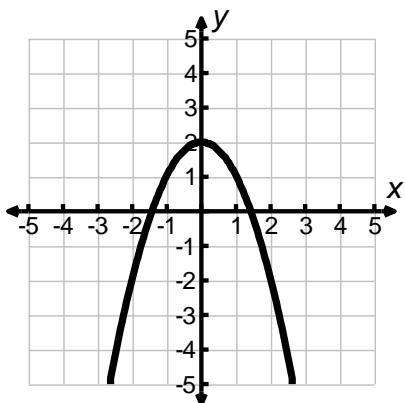


Additional Exercises 3.6 (cont.)

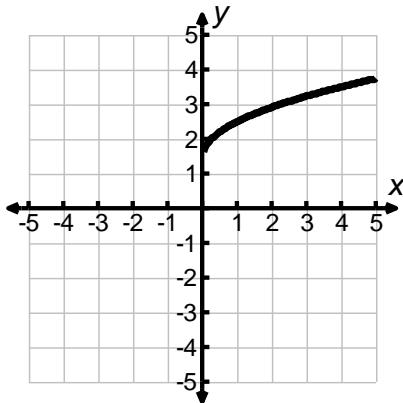
Name _____

Match each function below with its graph.

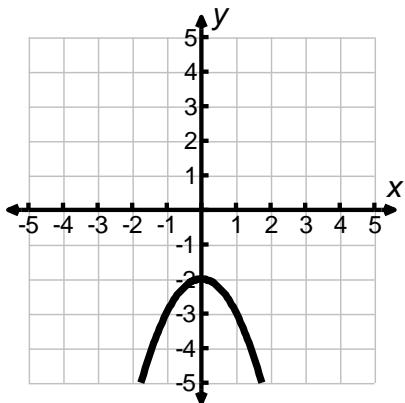
A.



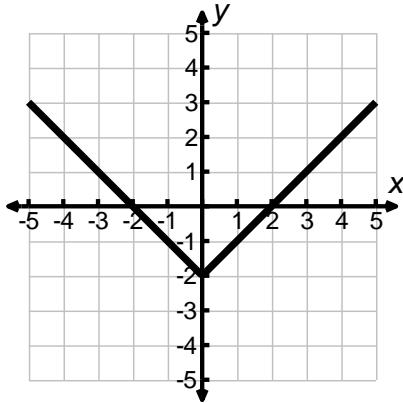
B.



C.



D.



7. $f(x) = \sqrt{x} + \frac{3}{2}$

7. _____

8. $f(x) = |x| - 2$

8. _____

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

9. _____

10. $f(x) = -x^2 + 2$

10. _____

Additional Exercises 3.6

Form II

Name _____

Date _____

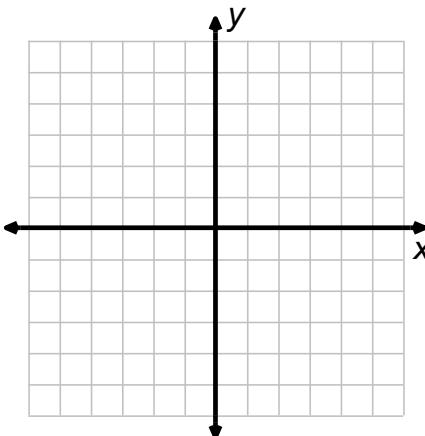
Graph each piecewise-defined function.

1. $f(x) = \begin{cases} 3x & \text{if } x < 0 \\ x+2 & \text{if } x \geq 0 \end{cases}$

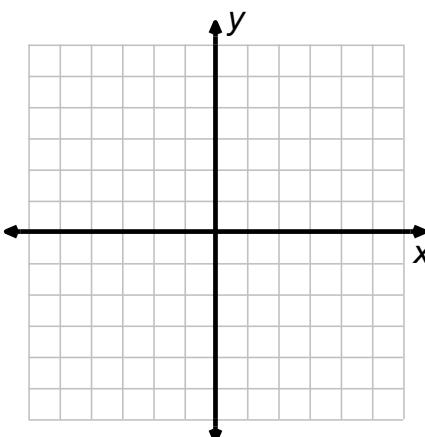
2. $f(x) = \begin{cases} 3x-2 & \text{if } x < 2 \\ 4 & \text{if } x \geq 2 \end{cases}$

3. $f(x) = \begin{cases} -3x+1 & \text{if } x \leq 0 \\ 4x-4 & \text{if } x > 0 \end{cases}$

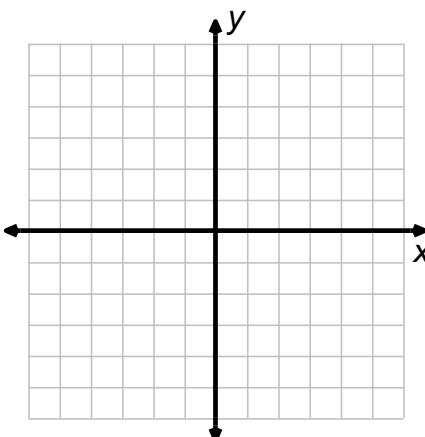
1.



2.



3.

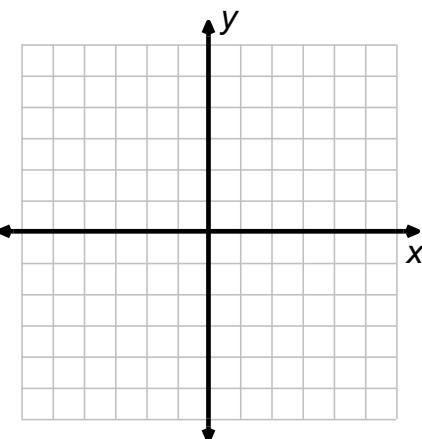


Additional Exercises 3.6 (*cont.*)

Name _____

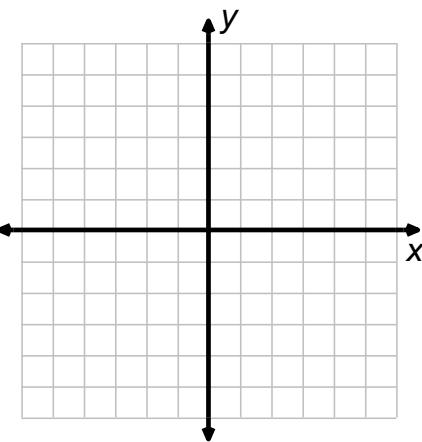
4. $f(x) = \begin{cases} -\frac{1}{2}x & \text{if } x < -1 \\ 2x+5 & \text{if } x \geq -1 \end{cases}$

4.



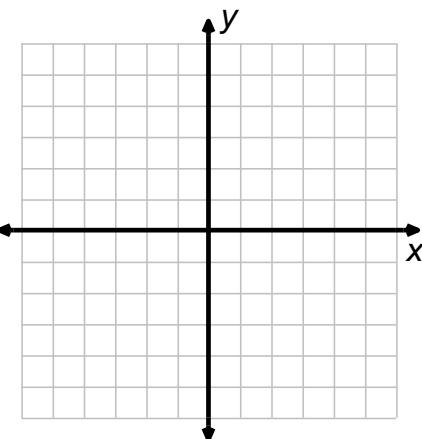
5. $f(x) = \begin{cases} 5x+10 & \text{if } x \leq -2 \\ -5x-2 & \text{if } x > -2 \end{cases}$

5.



6. $f(x) = \begin{cases} \frac{1}{3}x-2 & \text{if } x < 3 \\ \frac{1}{5}x+2 & \text{if } x \geq 3 \end{cases}$

6.

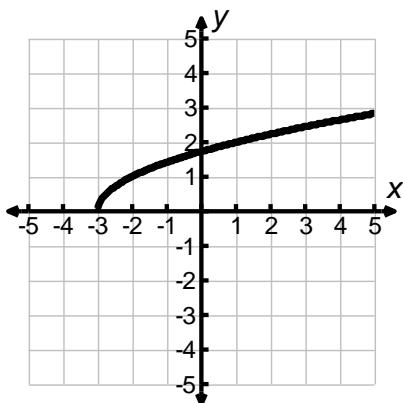


Additional Exercises 3.6 (cont.)

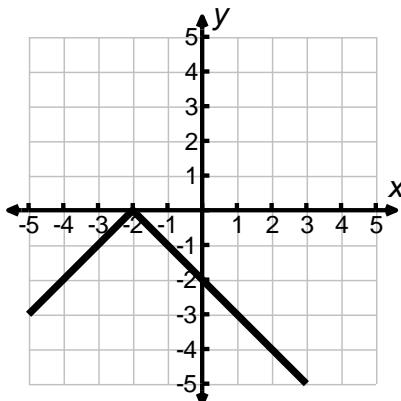
Name _____

Match each function below with its graph.

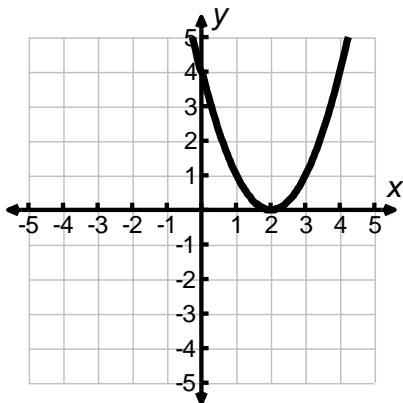
A.



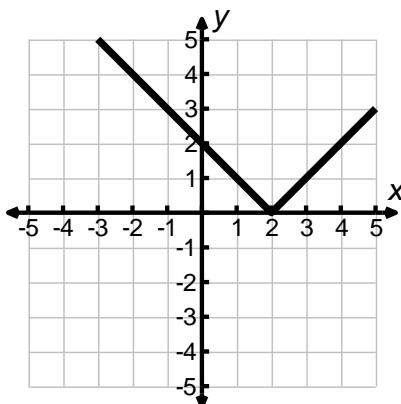
B.



C.



D.



7. $f(x) = -|x + 2|$

8. $f(x) = |x - 2|$

9. $f(x) = \sqrt{x+3}$

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

7. _____

8. _____

9. _____

10. _____

Additional Exercises 3.6

Form III

Graph each piecewise-defined function.

1. $f(x) = \begin{cases} -2x & \text{if } x < 0 \\ 3x - 1 & \text{if } x \geq 0 \end{cases}$

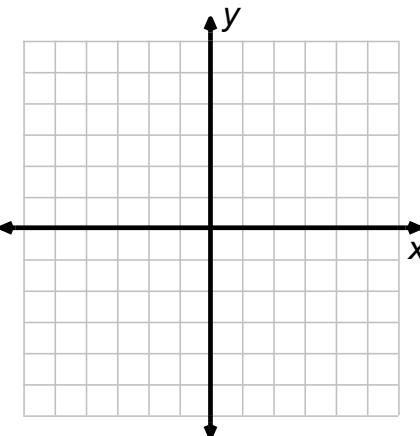
Name _____

Date _____

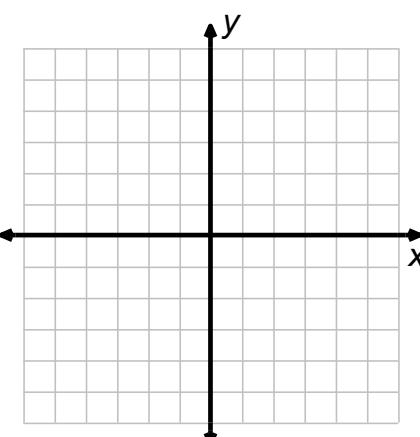
2. $f(x) = \begin{cases} 4x + 4 & \text{if } x \leq 0 \\ \frac{1}{2}x + 2 & \text{if } x > 0 \end{cases}$

3. $f(x) = \begin{cases} \frac{1}{3}x + 4 & \text{if } x < 3 \\ 2x - 4 & \text{if } x \geq 3 \end{cases}$

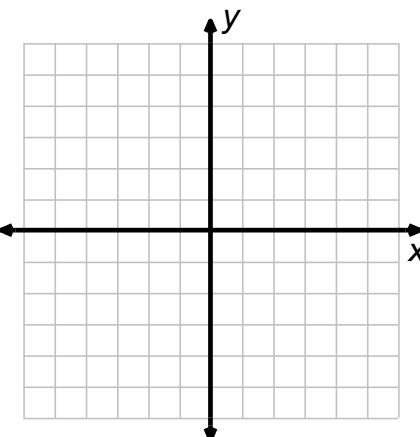
1.



2.



3.

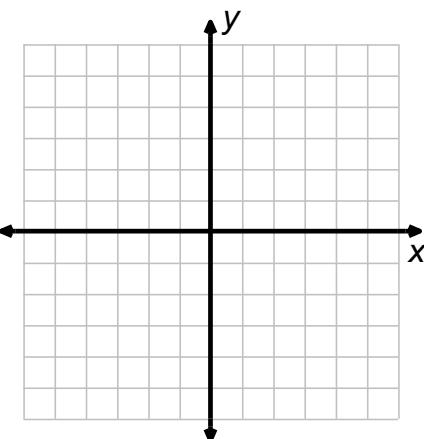


Additional Exercises 3.6 (*cont.*)

Name _____

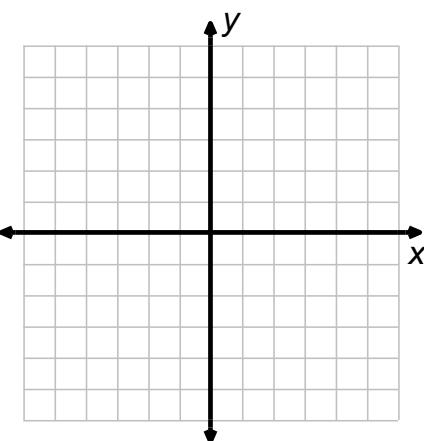
4. $f(x) = \begin{cases} -\frac{1}{5}x - \frac{2}{5} & \text{if } x < 3 \\ \frac{1}{2}x - \frac{3}{2} & \text{if } x \geq 3 \end{cases}$

4.



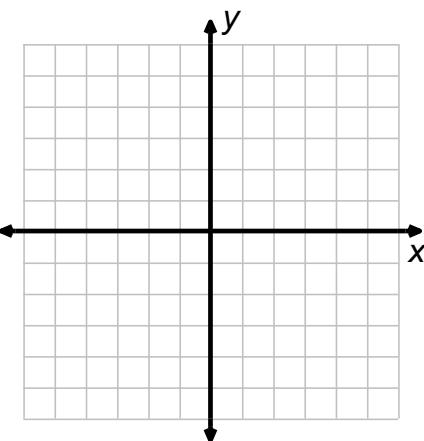
5. $f(x) = \begin{cases} -1.5x + 1.5 & \text{if } x \leq 3 \\ 2.5x - 6.5 & \text{if } x > 3 \end{cases}$

5.



6. $f(x) = \begin{cases} -\frac{2}{5}x - 2 & \text{if } x < 2 \\ \frac{2}{5}x + 2 & \text{if } x \geq 2 \end{cases}$

6.

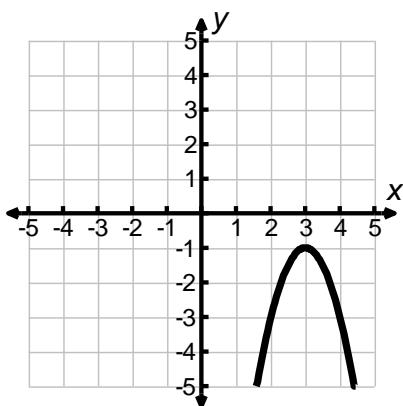


Additional Exercises 3.6 (cont.)

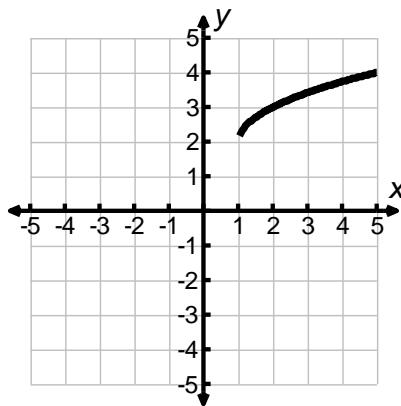
Name _____

Match each function below with its graph.

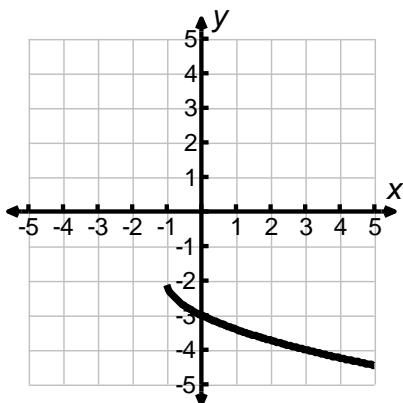
A.



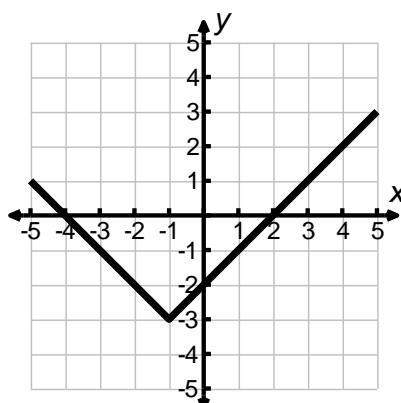
B.



C.



D.



7. $f(x) = -\sqrt{x+1} - 2$

7. _____

8. $f(x) = \sqrt{x+1} + 2$

8. _____

9. $f(x) = |x + 1| - 3$

9. _____

10. $f(x) = -(2(x - 3)^2) - 1$

10. _____

Additional Exercises 3.7

Form I

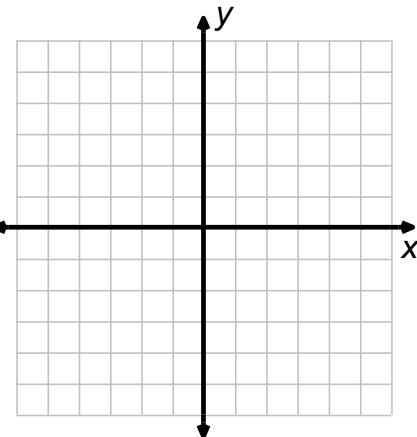
Graph each inequality.

1. $y > 2$

Name _____

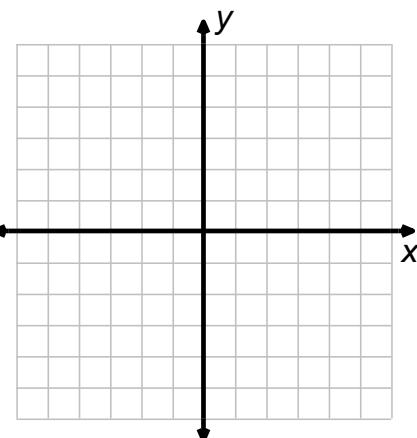
Date _____

1.



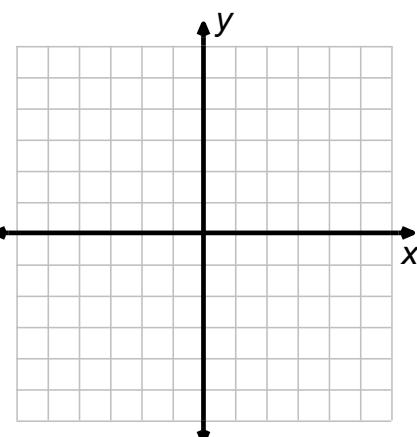
2. $x \leq 3$

2.



3. $y \leq -x$

3.

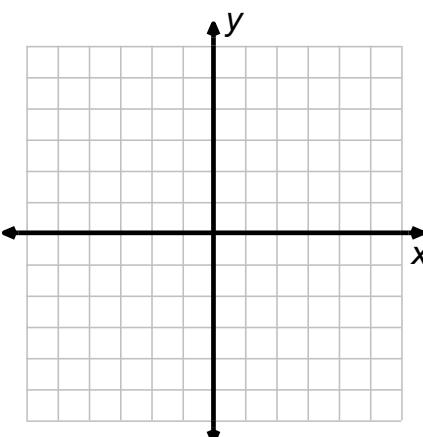


Additional Exercises 3.7 (*cont.*)

Name _____

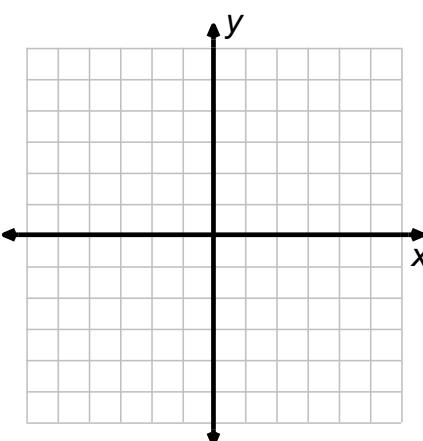
4. $x - y < 0$

4.



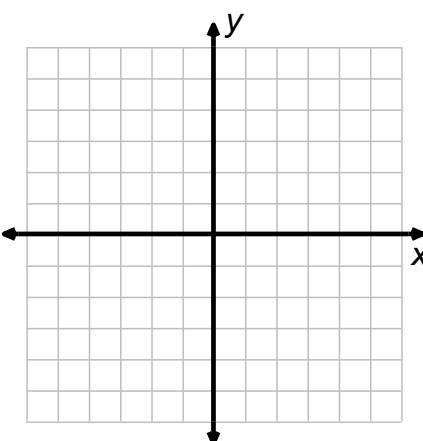
5. $y > \frac{1}{2}x$

5.



6. $x + y < -2$

6.



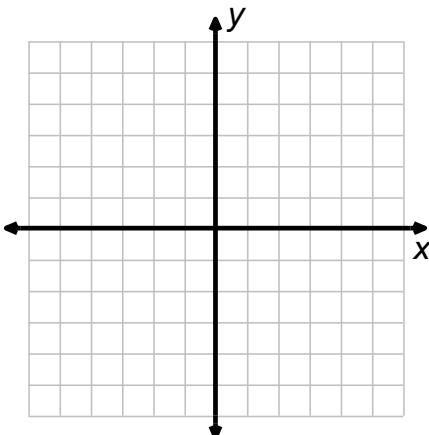
Additional Exercises 3.7 (*cont.*)

Name _____

Graph each union or intersection.

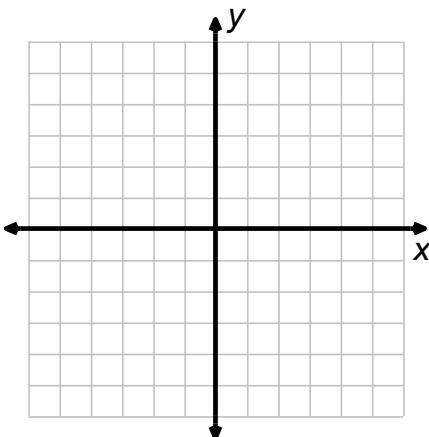
7. The union of $x \leq -1$ or $y \geq 2$

7.



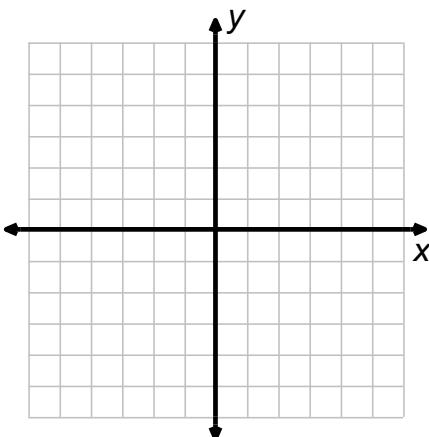
8. The intersection of $x \leq 1$ and $x \geq 1$

8.



9. The union of $y \leq x$ or $y \geq -2x$

9.

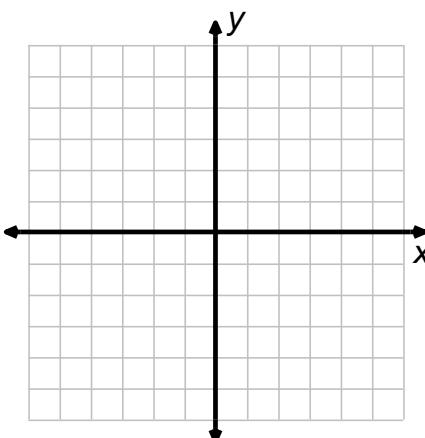


Additional Exercises 3.7 (cont.)

Name _____

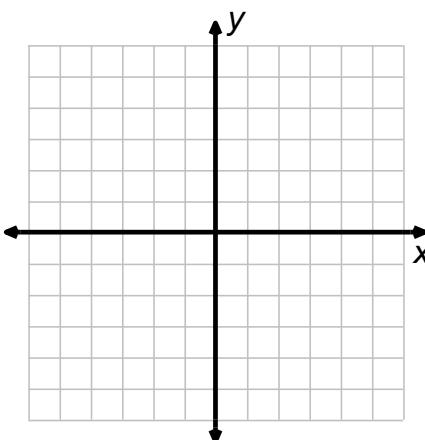
10. The intersection of $y < x - 2$ and $y < -3$

10.



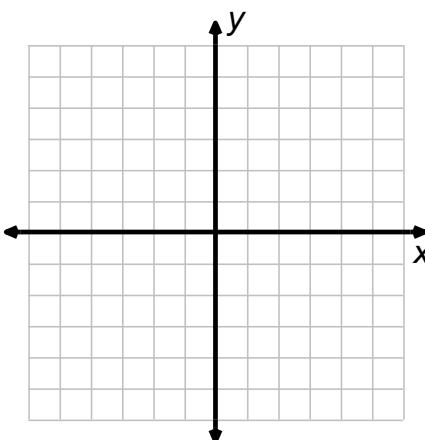
11. The union of $x \geq 1$ or $4x - y \geq 4$

11.



12. The intersection of $x - 2y < 3$ and $x > -1$

12.



Additional Exercises 3.7

Form II

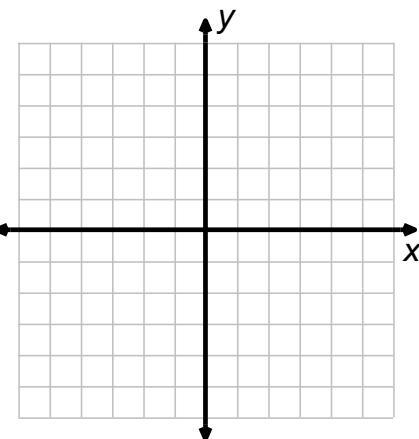
Graph each inequality.

1. $y \leq -3x$

Name _____

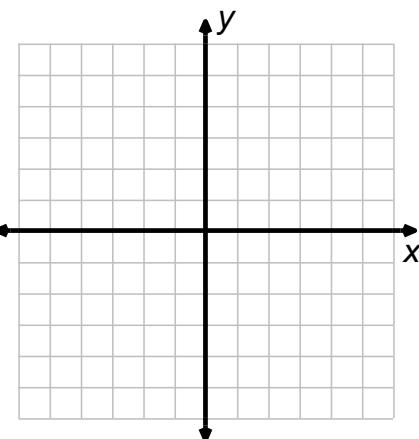
Date _____

1.



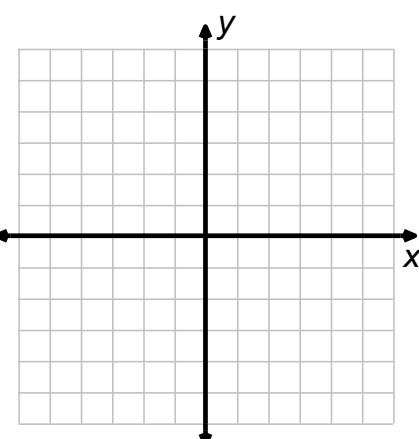
2. $x - y \geq 1$

2.



3. $x + 4y < 4$

3.

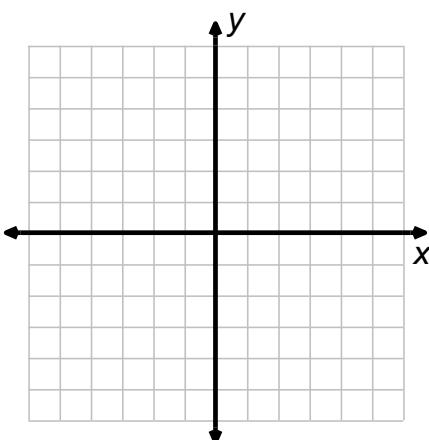


Additional Exercises 3.7 (*cont.*)

Name _____

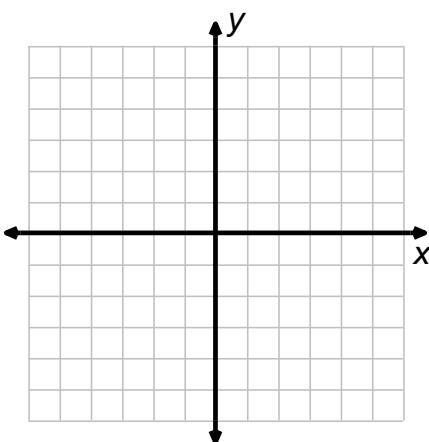
4. $2x - y > 2$

4.



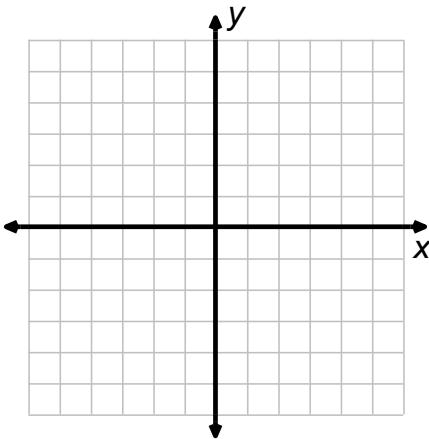
5. $4x + 4y \geq 2$

5.



6. $y \leq \frac{2}{3}x + \frac{2}{3}$

6.



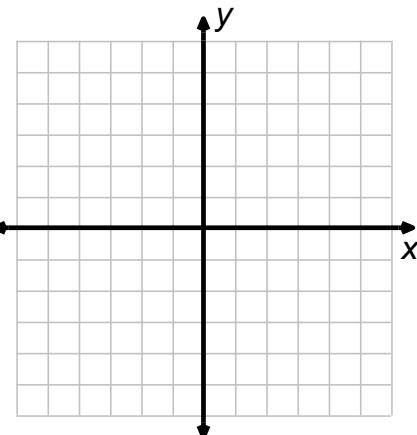
Additional Exercises 3.7 (*cont.*)

Name _____

Graph each union or intersection.

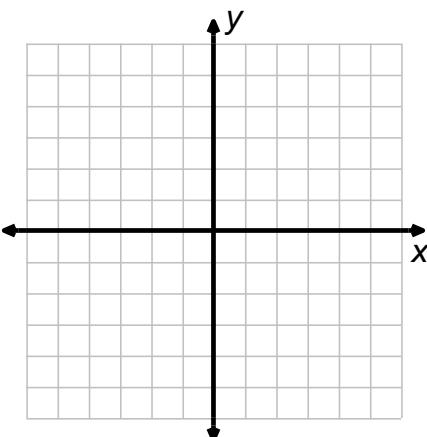
7. The union of $x \leq 3$ or $y \geq 2$

7.



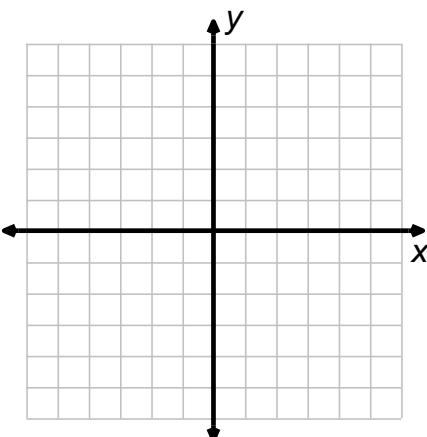
8. The intersection of $x \geq 1$ and $y \leq 2$

8.



9. The union of $x - 2y \geq 2$ or $x \geq 2$

9.

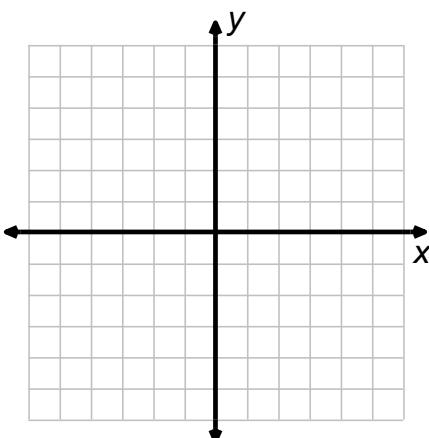


Additional Exercises 3.7 (cont.)

Name _____

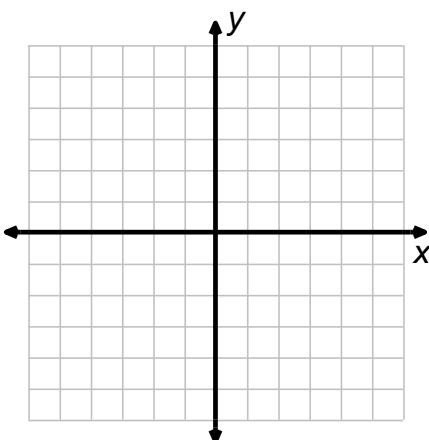
10. The intersection of $x + y < 2$ and $x > 2$

10.



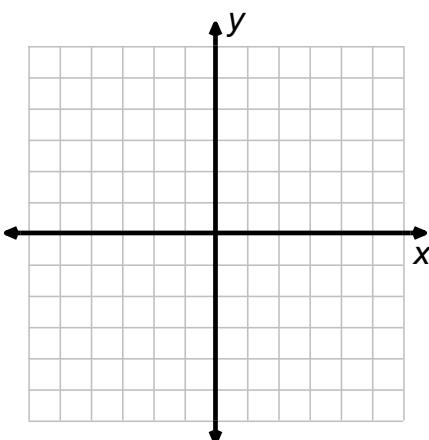
11. The union of $6x + y \geq 2$ or $4x - y \geq 4$

11.



12. The intersection of $2x - y \geq 3$ and $2x - 3y \leq 6$

12.



Additional Exercises 3.7

Form III

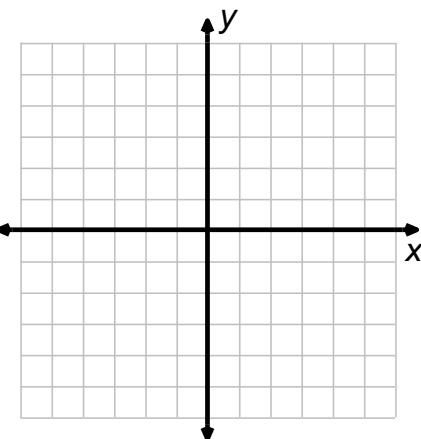
Graph each inequality.

1. $3x - 2y \leq 6$

Name _____

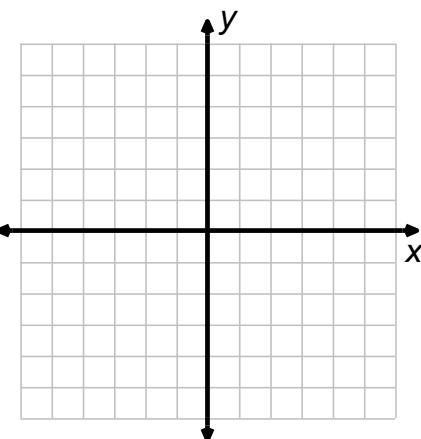
Date _____

1.



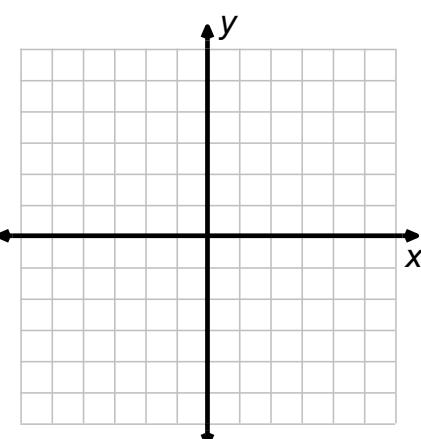
2. $4x + 3y \geq -6$

2.



3. $5x + 2y < 10$

3.

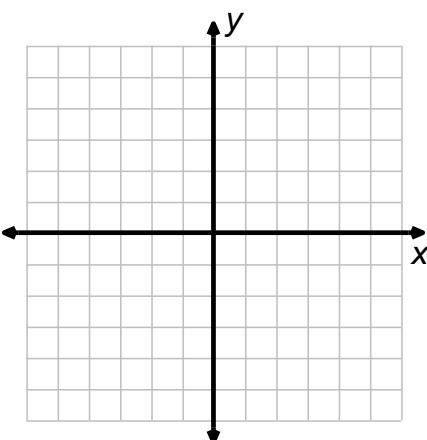


Additional Exercises 3.7 (*cont.*)

Name _____

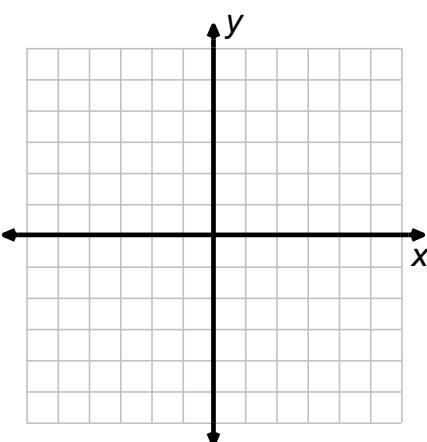
4. $3x + 4y \geq 12$

4.



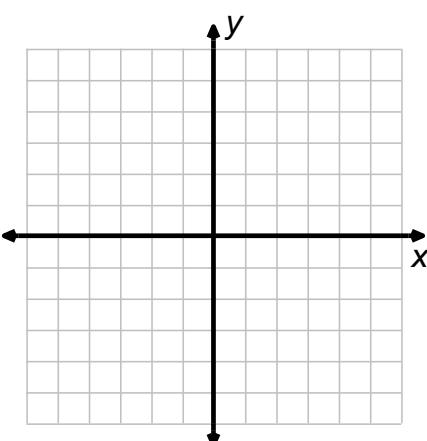
5. $y \geq \frac{1}{4}x - \frac{1}{2}$

5.



6. $y < -\frac{4}{3}x - \frac{5}{3}$

6.



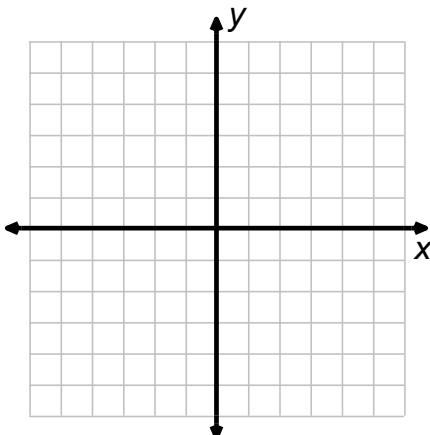
Additional Exercises 3.7 (*cont.*)

Name _____

Graph each union or intersection.

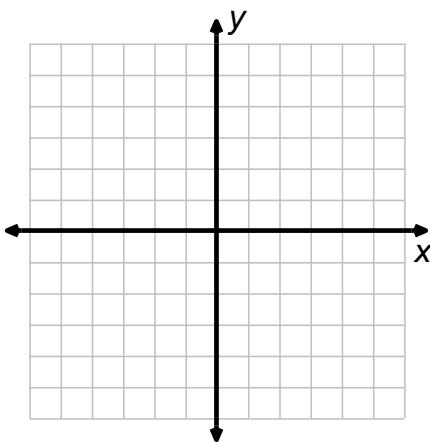
7. The union of $y \leq -2$ or $y \geq 2$

7.



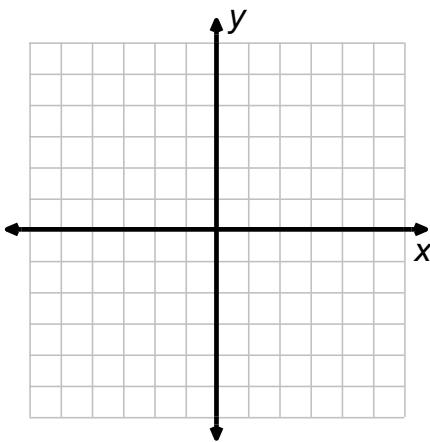
8. The intersection of $4x - 2y < 4$ and $y \geq -1$

8.



9. The union of $6x + 3y \geq 3$ or $4x - 2y \geq 4$

9.

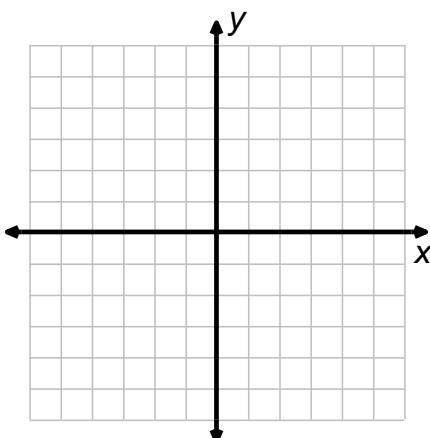


Additional Exercises 3.7 (cont.)

Name _____

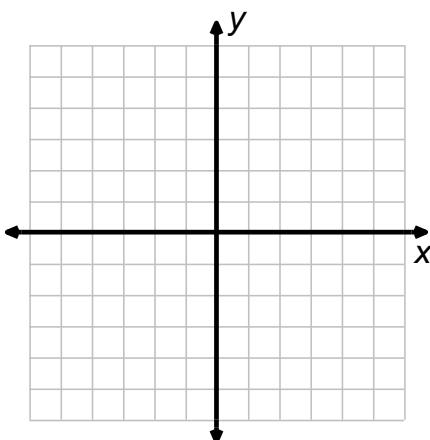
10. The intersection of $3x + 2y > 6$ and $3x - 2y > -6$

10.



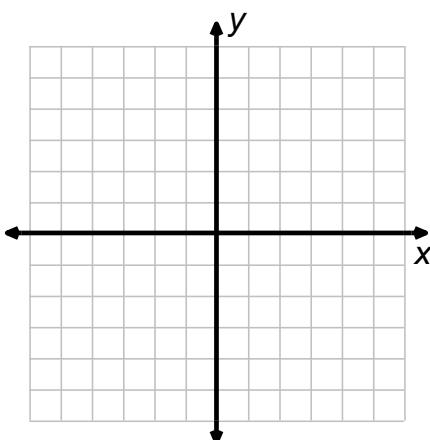
11. The union of $3.5x + 2.5y \leq 6$ or $3.5x - 2.5y \leq 6$

11.



12. The intersection of $4.5x - 2.5y < 3$ and $1.5x > -1$

12.



Name:
Instructor:

Date:
Section:

Section 3.4 The Slope of a Line

Objective: Find the slope of a line for a practical application.

Suggested Format: Think and Pair

Time: 10 minutes

In 1995, a study was done to see if cigarette advertisers increased the number of ads placed in twelve particular magazines during the months of January and February to counter smokers' resolutions to quit smoking for the new year. (The data that follows was taken from a paper presented to the American Public Health Association in San Diego, CA, by authors Michael Basil and Carline Schooler. For results of the study, visit www.du.edu/~mbasil/cigads.html.)

Month	x	Number of Cigarette Ads, y
January	1	84
February	2	99
March	3	61
April	4	107

1. Using a separate sheet of graph paper, plot the above data as order pairs. Be sure to label the x -axis "Month" and the y -axis "Number of Ads".
2. Connect the points using three line segments.
3. Calculate the slope of each of the line segments.

Jan to Feb _____

Feb to Mar _____

Mar to Apr _____

4. During which period did the greatest change occur? Explain your answer.

Name:
Instructor:

Date:
Section:

Section 3.5 Equations of Lines

Objective: Provide a practical application of equations of lines.

Suggested Format: Small Group

Time: 20 minutes

1. A small junior college had an enrollment of 7,843 in 1990 and 8,793 in 2000. Let $x = 0$ represent the year 1990. Write the data as two ordered pairs. (The year 2000 would be $x = ?$)
 2. Use the two ordered pairs to find the rate of change in enrollment. Interpret.
 3. Find the equation that represents the enrollment.
 4. Use the equation to predict the enrollment in 2010.

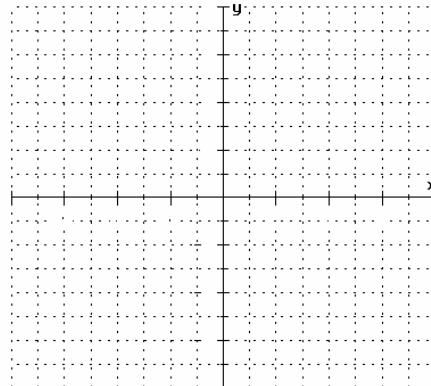
Name:
Instructor:

Date:
Section:

Chapter 3 Test Form A

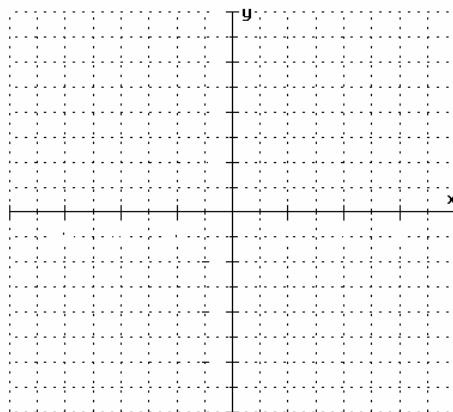
1. Graph the point and identify the quadrant that the point lies in. $(-1, 3)$

1. _____

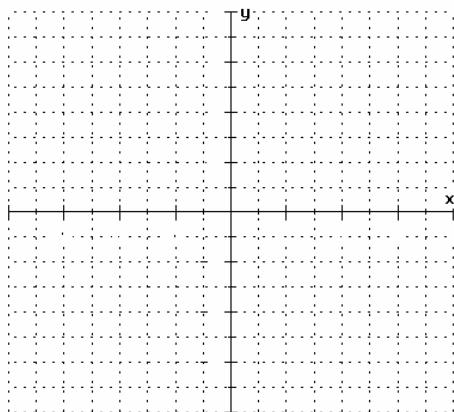


Graph each line.

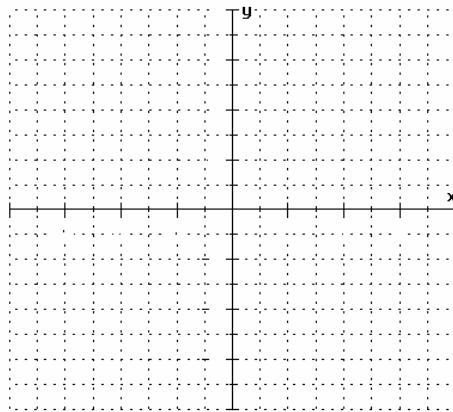
2. $y = 2x - 4$



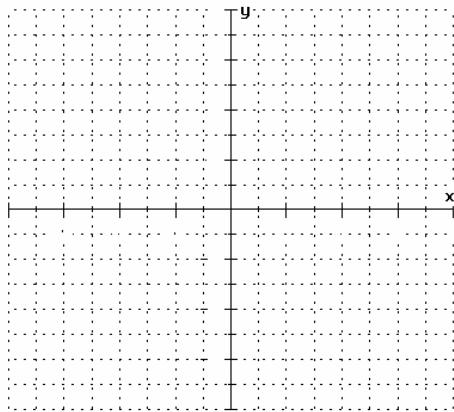
3. $x + 3y = 6$



4. $y = -2$



5. $y = -2x$



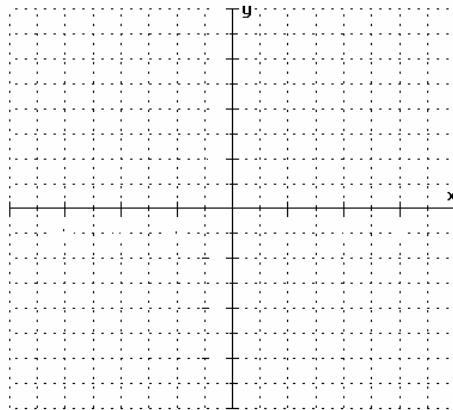
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Section:

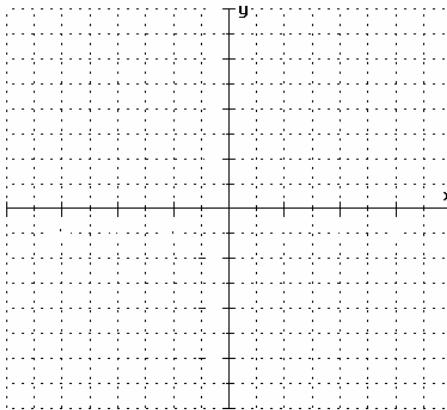
Chapter 3 Test Form A cont'd

Graph each function.

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



7. $g(x) = |x - 2|$



Find the equation of each line in standard form satisfying the given conditions.

8. through $(-2, 4)$ and $(5, 0)$

8. _____

9. vertical, through $(-3, 5)$

9. _____

10. through $(1, 3)$, slope -7

10. _____

11. horizontal, through $(8, -2)$

11. _____

12. Find the slope of the line that passes through $(-3, 1)$ and $(2, -6)$.

12. _____

13. Find the slope and the y -intercept of the line
 $6x - 2y = 7$

13. _____

Find the equation of the line in function notation that satisfies the conditions given.

14. through $(2, -1)$ and $(5, 4)$

14. _____

15. parallel to $x + 4y = 2$, through $(-1, 3)$

15. _____

16. perpendicular to $3x - 2y = -1$, through $(2, -7)$

16. _____

Name:
Instructor:

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Section:

Chapter 3 Test Form A *cont'd*

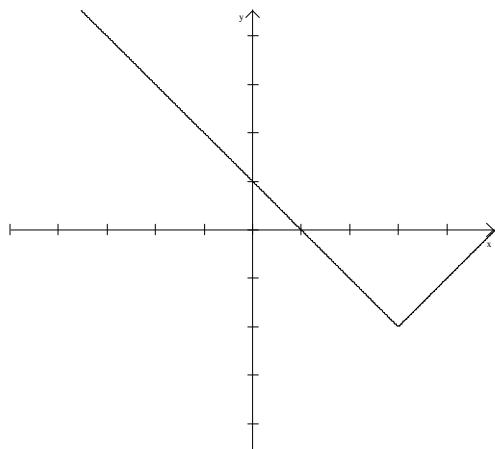
17. Determine if these lines are parallel lines, perpendicular lines, or neither.

$$L_1 : 5x - 2y = 6$$

L_2 : passes through $(4, -1)$ and $(3, 2)$

Find the domain and range of each function.

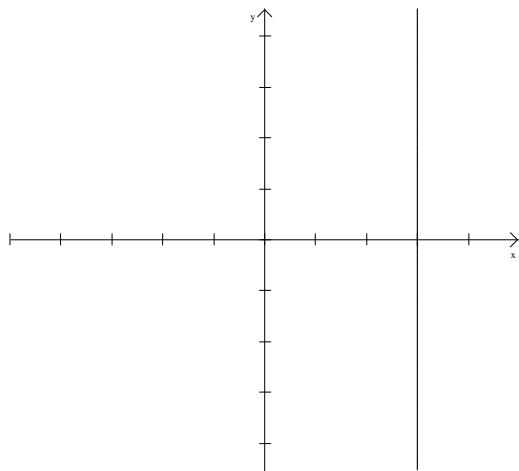
18.



17. _____

18. _____

19.



19. _____

If $f(x) = |x - 3| - 2$, find the following.

20. $f(-2)$

20. _____

21. $f(3)$

21. _____

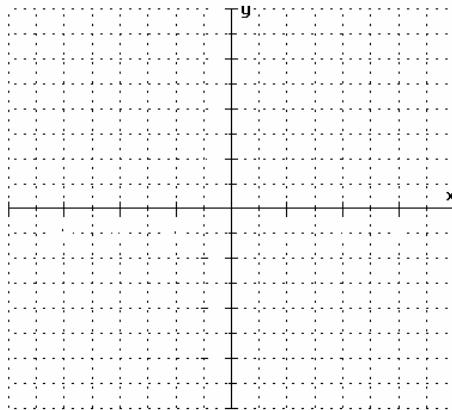
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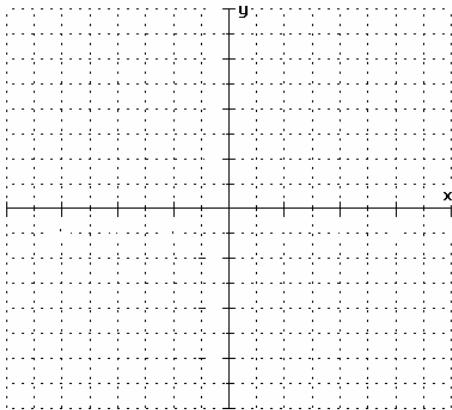
Chapter 3 Test Form A *cont'd*

Graph each inequality.

22. $x - y > 5$

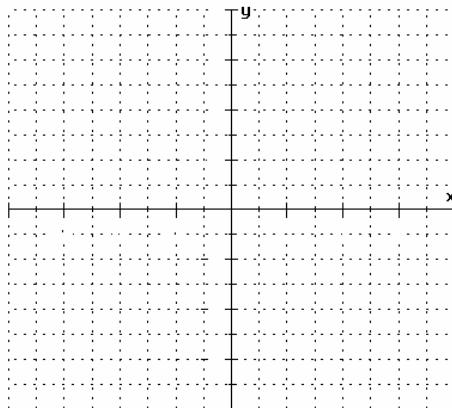


23. $x \leq 2$



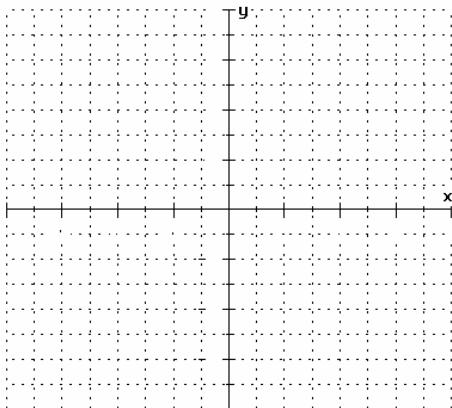
24. The intersection of

$$x - 3y \leq 6 \text{ and } x + y \leq 3$$



25. Graph.

$$f(x) \begin{cases} 2x; & x \leq 1 \\ x+1; & x > 1 \end{cases}$$



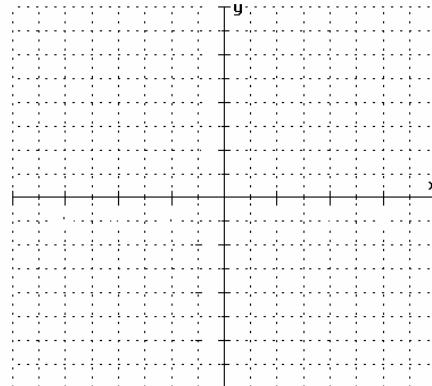
Name:
Instructor:

Date:
Section:

Chapter 3 Test Form B

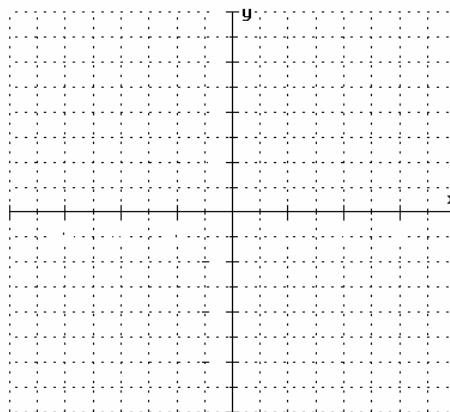
1. Graph the point and identify the quadrant that the point lies in. $(-2, -3)$

1. _____

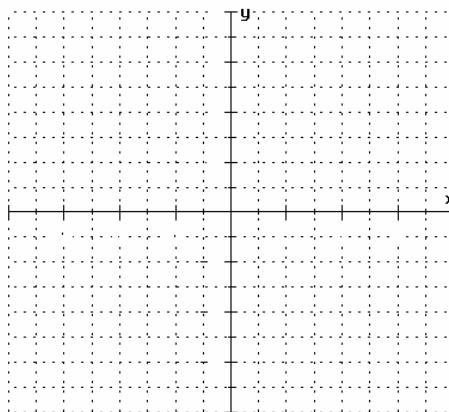


Graph each line.

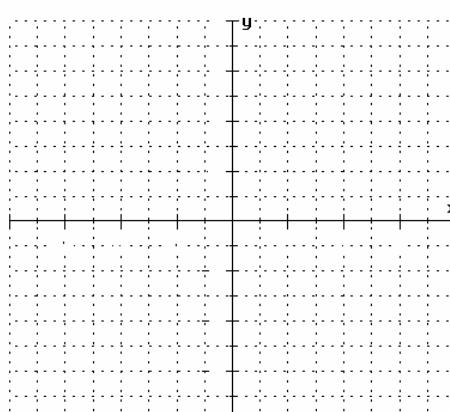
2. $y = -x + 4$



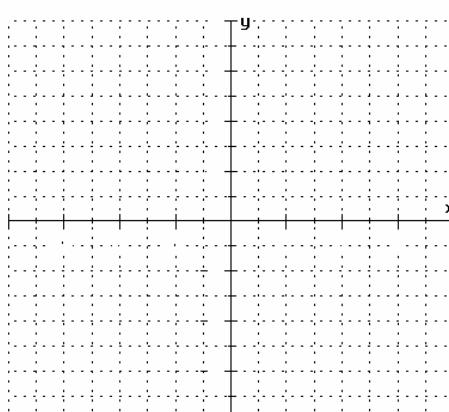
3. $2x - y = 4$



4. $y = 4$



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



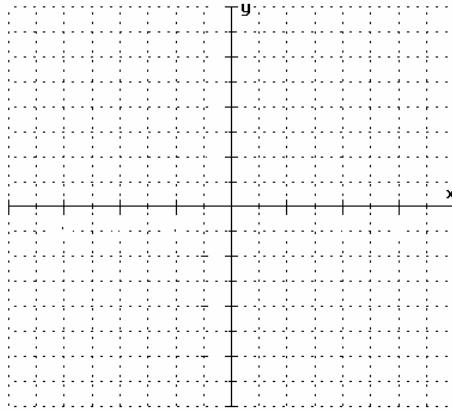
Name:
Instructor:

Date:
Section:

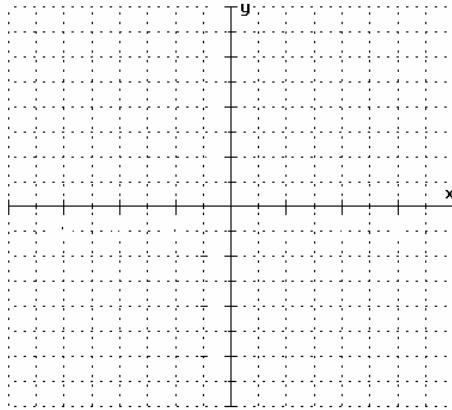
Chapter 3 Test Form B cont'd

Graph each function.

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



7. $g(x) = |x - 1| + 2$



Find the equation of each line in standard form satisfying the given conditions.

8. through $(-9, -2)$ and $(3, 4)$

8. _____

9. vertical, through $(11, -4)$

9. _____

10. through $(5, -1)$, slope $-\frac{2}{3}$

10. _____

11. horizontal, through $(7, 0)$

11. _____

12. Find the slope of the line that passes through $(13, -2)$ and $(-11, 6)$.

12. _____

13. Find the slope and the y -intercept of the line
 $12x - 5y = 6$

13. _____

Find the equation of the line in function notation that satisfies the conditions given.

14. through $(7, -3)$ and $(-2, 5)$

14. _____

15. parallel to $x + 4y = 2$, through $(-1, 3)$

15. _____

16. perpendicular to $8y = 3x - 1$, through $(4, 2)$

16. _____

Name:
Instructor:

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Chapter 3 Test Form B cont'd

17. Determine if these lines are parallel lines, perpendicular lines, or neither.

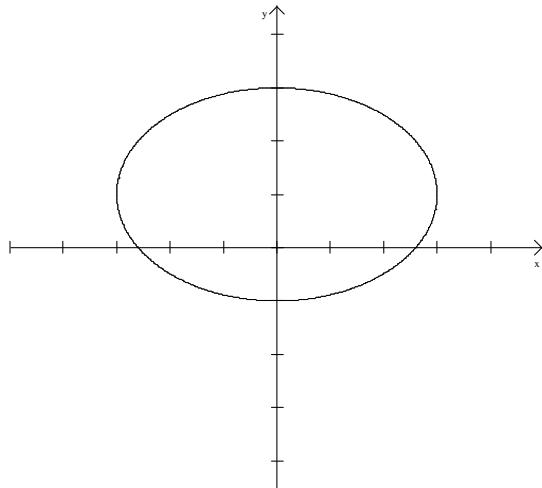
$$L_1 : 5x - 4y = 3$$

L_2 : passes through (4, 1) and (-8, 16)

17. _____

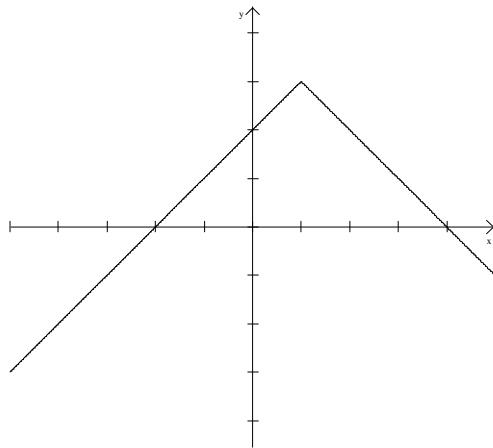
Find the domain and range of each function.

18.



18. _____

19.



19. _____

If $f(x) = -x^2 + 3x - 7$, find the following.

20. $f(-1)$

20. _____

21. $f(4)$

21. _____

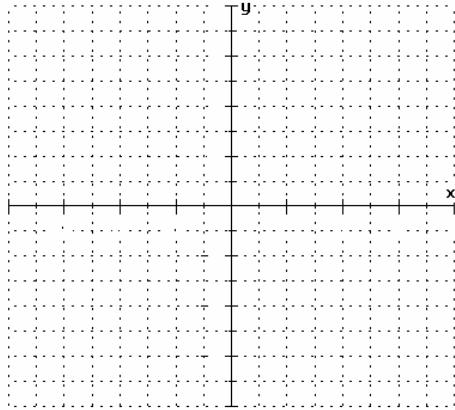
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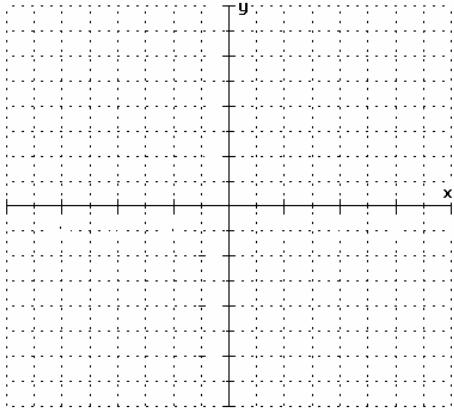
Chapter 3 Test Form B cont'd

Graph each inequality.

22. $x - 2y < -4$

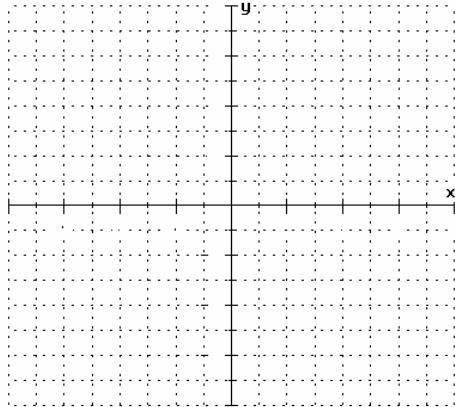


23. $y < x + 2$



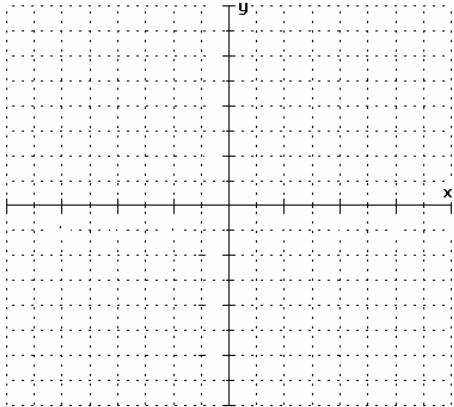
24. The intersection of

$$y < x - 3 \text{ and } x + y < 4$$



25. Graph.

$$f(x) \begin{cases} x - 2; & x \leq 2 \\ 3x - 6; & x > 2 \end{cases}$$



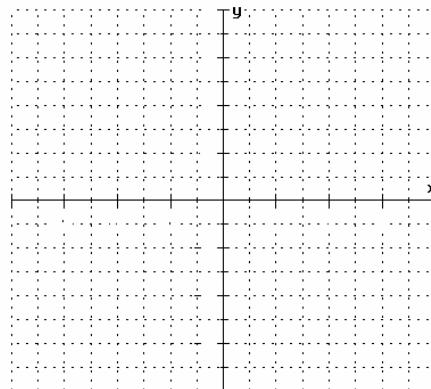
Name:
Instructor:

Date:
Section:

Chapter 3 Test Form C

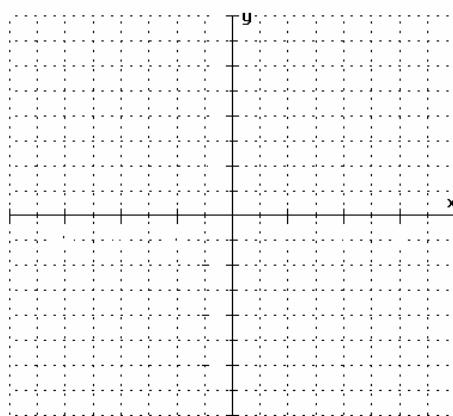
1. Graph the point and identify the quadrant that the point lies in. $(5, -3)$

1. _____

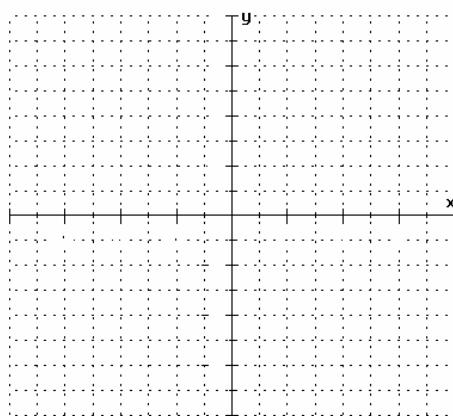


Graph each line.

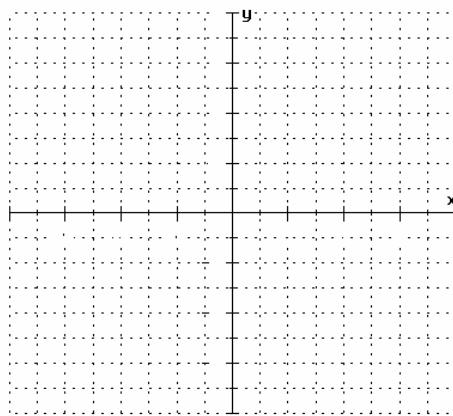
2. $3x - 2y = 6$



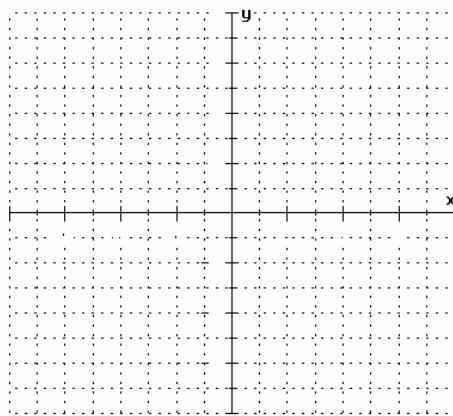
3. $y = \frac{2}{3}x$



4. $y = 4$



5. $y = -x + 2$



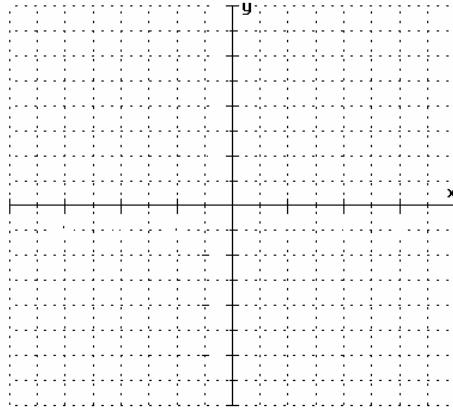
Name:
Instructor:

Date:
Section:

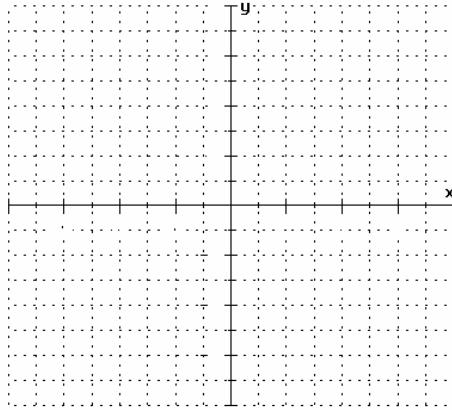
Chapter 3 Test Form C cont'd

Graph each function.

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



7. $g(x) = -|x - 3| + 2$



Find the equation of each line in standard form satisfying the given conditions.

8. through $(4, -10)$ and $(11, 2)$

8. _____

9. vertical, through $(-2, 1)$

9. _____

10. through $(-3, 5)$, slope $\frac{1}{5}$

10. _____

11. horizontal, through $(-1, -3)$

11. _____

12. Find the slope of the line that passes through $(7, -2)$ and $(-5, 1)$.

12. _____

13. Find the slope and the y -intercept of the line $-17x + 2y = 13$.

13. _____

Find the equation of the line in function notation that satisfies the conditions given.

14. through $(7, 8)$ and $(-9, -2)$

14. _____

15. parallel to $4y - 7x = -5$, through $(5, -8)$

15. _____

16. perpendicular to $-8x + 3y = -5$, through $(2, -2)$

16. _____

Name:
Instructor:

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Chapter 3 Test Form C cont'd

17. Determine if these lines are parallel lines, perpendicular lines, or neither.

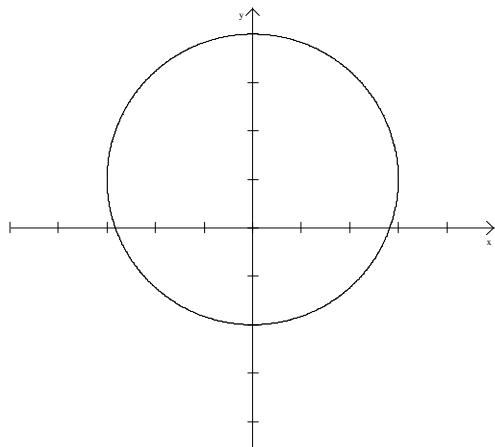
$$L_1 : 9x - y = 14$$

L_2 : passes through $(7, 9)$ and $(-2, 10)$

17. _____

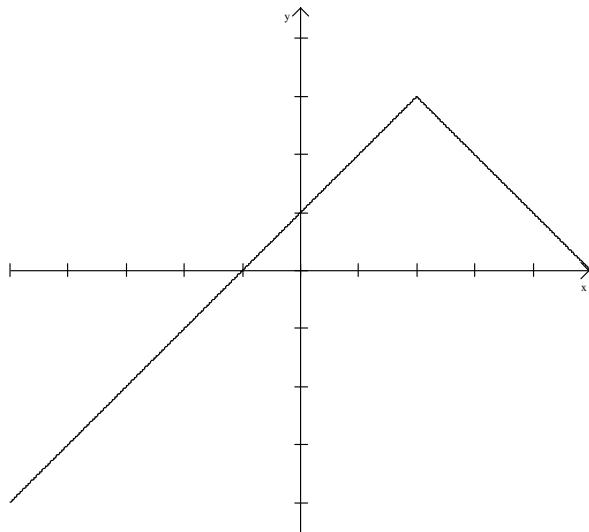
Find the domain and range of each function.

18.



18. _____

19.



19. _____

If $f(x) = 5x^2 - 2x$, find the following.

20. $f(-3)$

20. _____

21. $f(2)$

21. _____

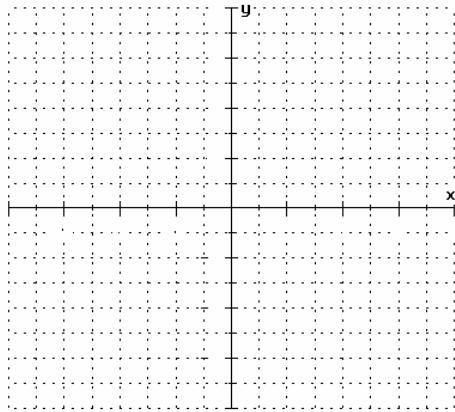
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Instructor:

Date:
Section:

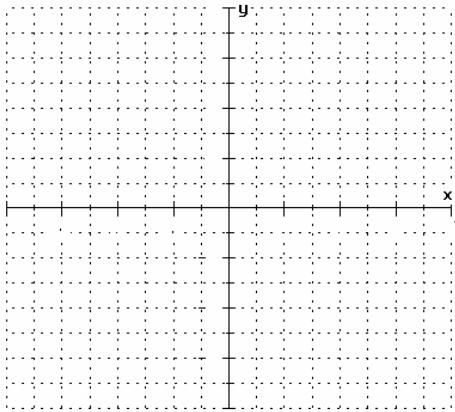
Chapter 3 Test Form C cont'd

Graph each inequality.

22. $3x - 4y > 12$

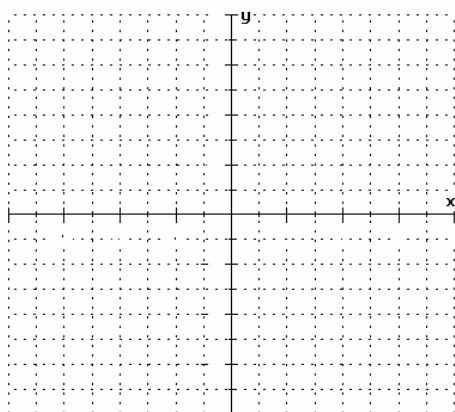


23. $x \geq -2$



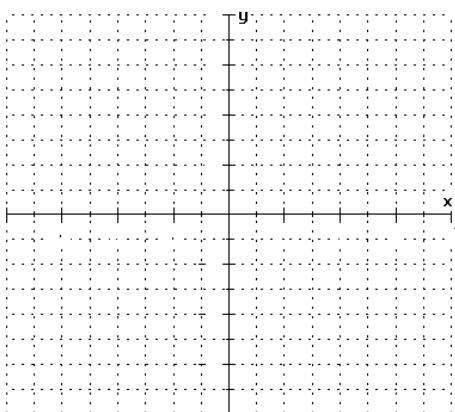
24. The intersection of

$$y > 2x - 1 \text{ and } y < 3$$



25. Graph.

$$f(x) = \begin{cases} 2x; & x \leq 0 \\ x+1; & x > 0 \end{cases}$$



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Instructor:

Date:
Section:

Chapter 3 Test Form D

Circle the correct answer.

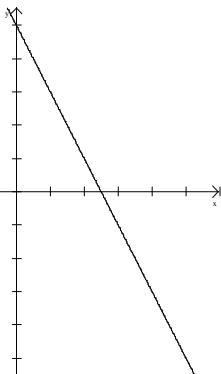
1. Determine the quadrant for $(-1, 4)$

- a. QI b. QII c. QIII d. QIV

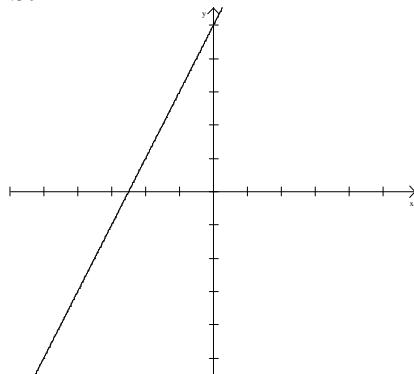
Match the equation to the correct graph.

2. $2x - y = 5$

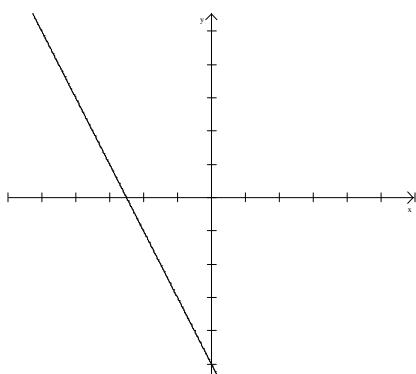
a.



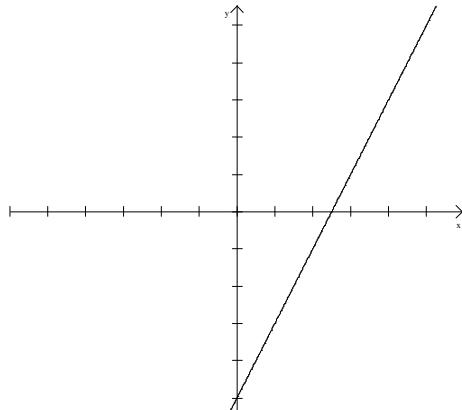
b.



c.



d.



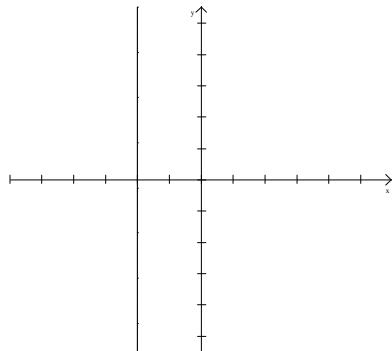
Name:
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Section:

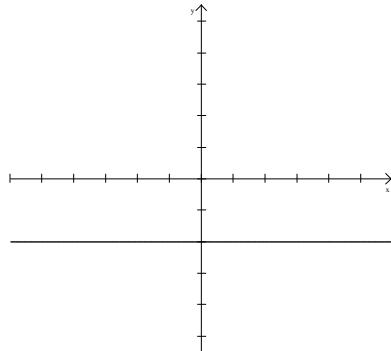
Chapter 3 Test Form D cont'd

3. $x = -2$

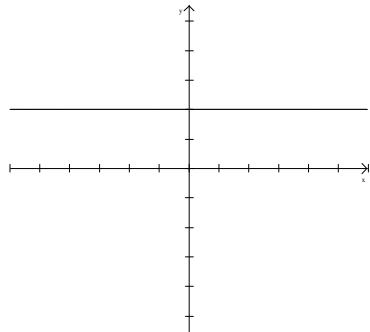
a.



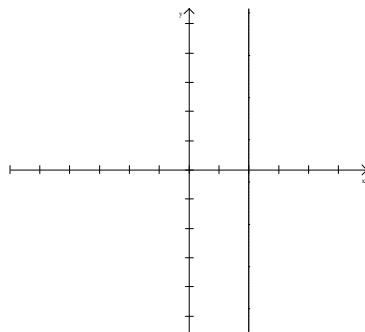
b.



c.

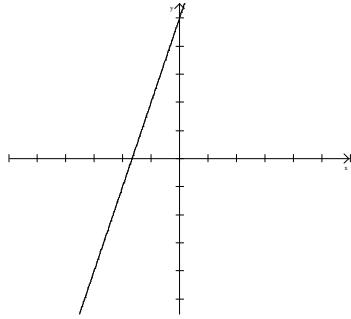


d.

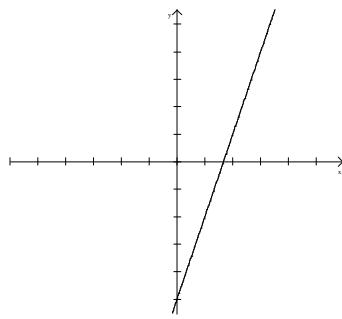


4. $y = 3x - 5$

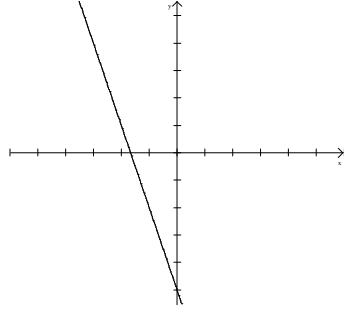
a.



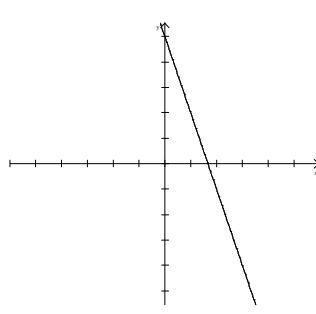
b.



c.



d.



Name:
Instructor:

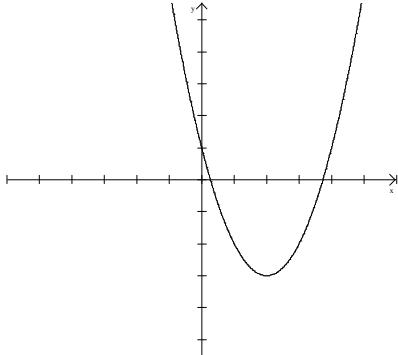
Date:
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Chapter 3 Test Form D cont'd

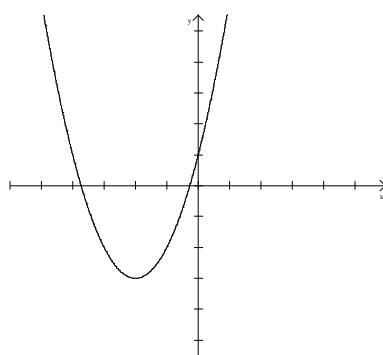
Match the function to the correct graph.

5. $y = (x - 2)^2 + 3$

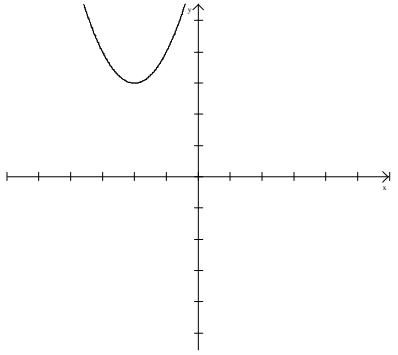
a.



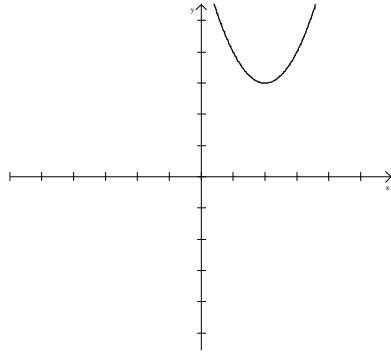
b.



c.



d.



6. Find the slope and the y -intercept of the line $-2x + 4y = 5$.

a. $m = -\frac{1}{2}$; $b = \frac{5}{4}$

b. $m = -2$, $b = \frac{4}{5}$

c. $m = \frac{1}{2}$, $b = \frac{5}{4}$

d. $m = -\frac{1}{2}$, $b = \frac{4}{5}$

7. Find the slope of the line that passes through $(-7, 6)$ and $(-1, 3)$

a. $-\frac{1}{2}$

b. -2

c. 2

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

Name:
Instructor:

Date:
Section:

Chapter 3 Test Form D cont'd

8. Find the slope and the y -intercept of the line $-3x + 6y = 9$.

a. $m = -2; b = -\frac{3}{2}$

b. $m = \frac{1}{2}, b = \frac{3}{2}$

c. $m = -\frac{1}{2}, b = -\frac{3}{2}$

d. $m = 2, b = \frac{3}{2}$

Find the equation of each line in standard form satisfying the conditions given.

9. through $(1, -5)$; slope -2

a. $2x + y = 3$

b. $2x - y = -3$

c. $2x - y = 3$

d. $2x + y = -3$

10. horizontal; through $(3, -1)$

a. $x = 3$

b. $y = -1$

c. $x = -3$

d. $y = 1$

11. Vertical; through $(-5, -4)$

a. $y = -4$

b. $x = -5$

c. $y = 4$

d. $x = 5$

12. If $f(x) = -4x^2 + 2x - 1$, find $f(-1)$.

a. 7

b. 1

c. -7

d. -1

13. If $f(x) = -3x^3 + 2x - 1$, find $f(-1)$.

a. 0

b. -2

c. -6

d. 4

Find an equation of each line in function notation satisfying the conditions given.

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

a. $f(x) = \frac{3}{7}x + \frac{4}{7}$

b. $f(x) = -3x - 10$

c. $f(x) = 3x - 10$

d. $f(x) = -\frac{3}{7}x + \frac{24}{7}$

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Chapter 3 Test Form D cont'd

15. perpendicular to $6x - 2y = 3$; through $(5, -1)$

a. $f(x) = -\frac{1}{3}x - \frac{8}{3}$

b. $f(x) = -3x - 10$

c. $f(x) = 3x - 10$

d. $f(x) = -\frac{1}{3}x + \frac{2}{3}$

16. parallel to $4y - x = 6$; through $(-1, 1)$

a. $f(x) = 4x - 3$

b. $f(x) = 4x - 5$

c. $f(x) = \frac{1}{4}x + \frac{5}{4}$

d. $f(x) = \frac{1}{4}x - \frac{5}{4}$

17. through $(9, -6)$ with slope -3

a. $f(x) = -3x - 15$

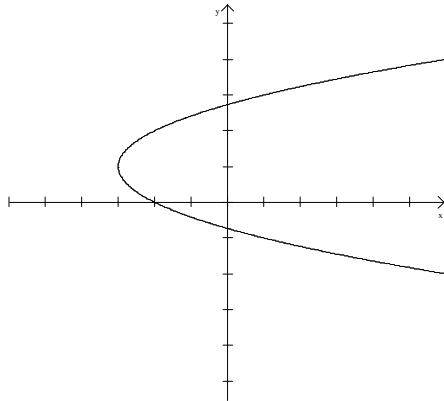
b. $f(x) = -3x - 21$

c. $f(x) = -3x + 21$

d. $f(x) = -3x - 3$

Find the domain and range of each relation.

18.



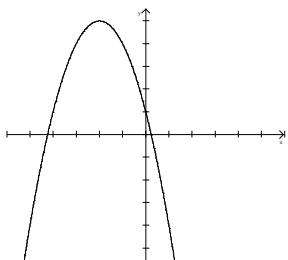
- a. Domain $(-\infty, \infty)$; Range $[-3, \infty)$ b. Domain $[-3, \infty)$; Range $(-\infty, \infty)$
c. Domain $[-3, \infty)$, Range $[0, \infty)$ d. Domain $[3, \infty)$; Range $(-\infty, \infty)$

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Chapter 3 Test Form D cont'd

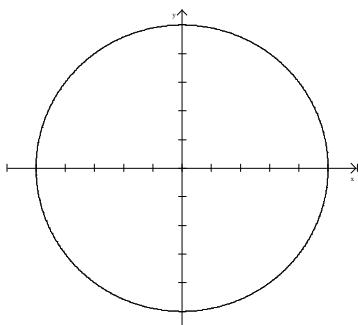
19.



- a. Domain $(-\infty, \infty)$; Range $(-\infty, -2]$
c. Domain $(-\infty, 5]$; Range $(-\infty, \infty)$

- b. Domain $(-\infty, \infty)$; Range $(-\infty, 5]$
d. Domain $[5, \infty)$; Range $(-\infty, \infty)$

20.



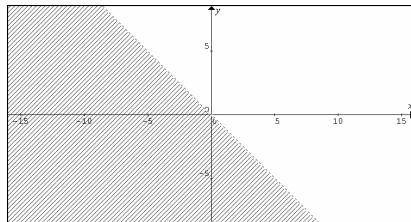
- a. Domain $(-\infty, \infty)$; Range $[-5, 5]$
c. Domain $[-5, 5]$; Range $[-5, 5]$

- b. Domain $(-5, 5)$; Range $(-5, 5)$
d. Domain $(-\infty, \infty)$; Range $(-\infty, \infty)$

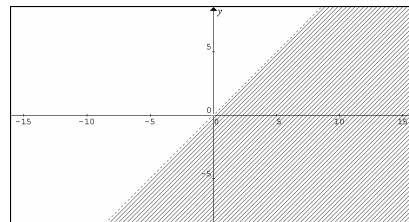
Match the graph to the inequalities.

21. $y < -x$

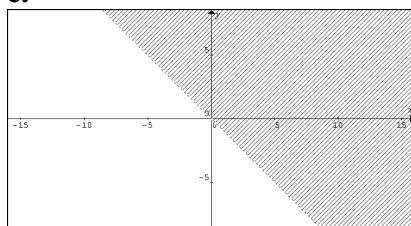
a.



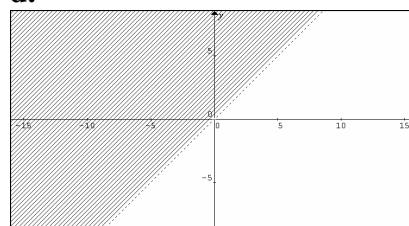
b.



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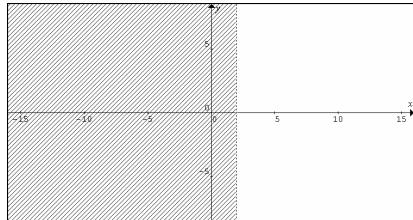
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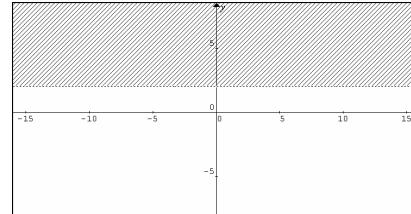
Chapter 3 Test Form D cont'd

22. $x < 2$

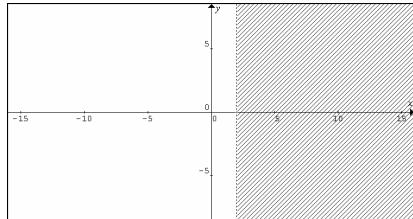
a.



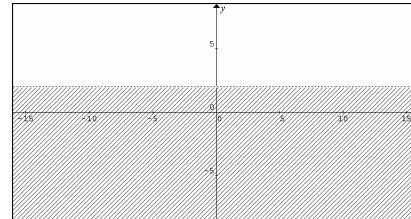
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c.

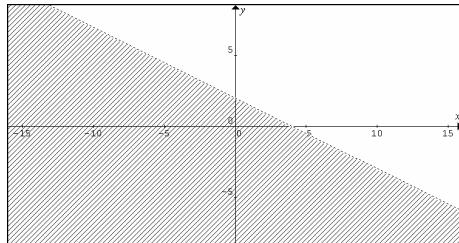


d.

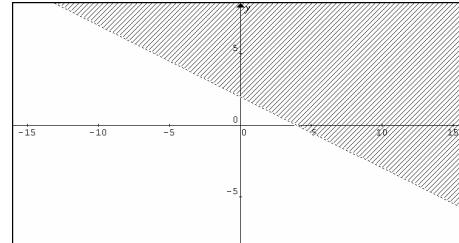


23. $x - 2y < 4$

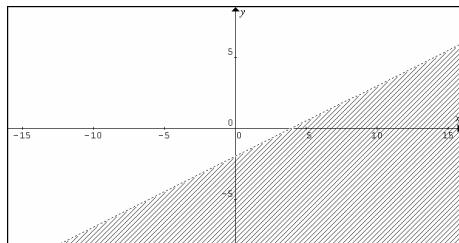
a.



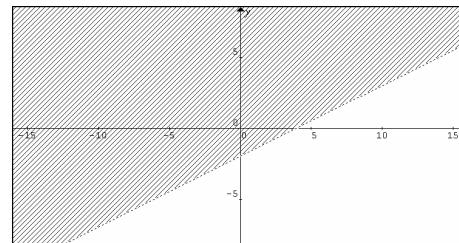
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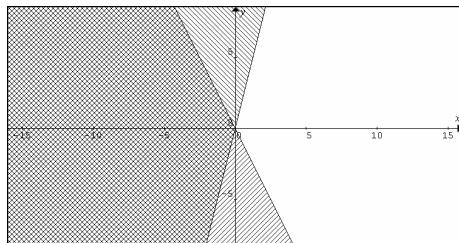
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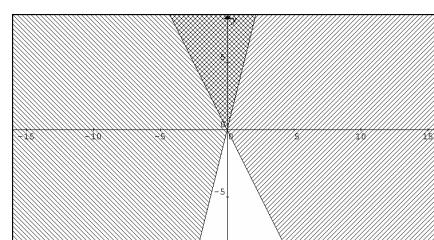
Chapter 3 Test Form D *cont'd*

24. The intersection of $y \geq -2x$ and $y \leq 4x$

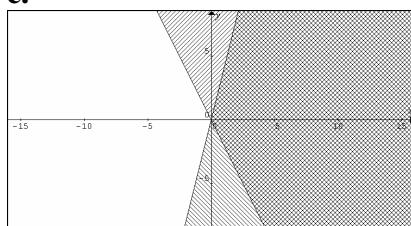
a.



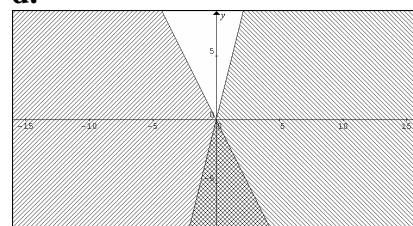
b.



c.

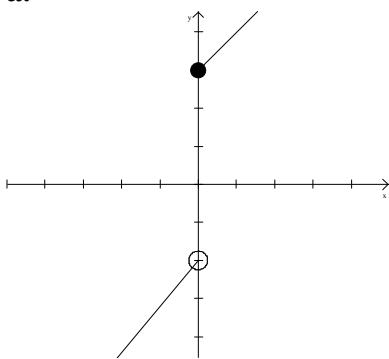


d.

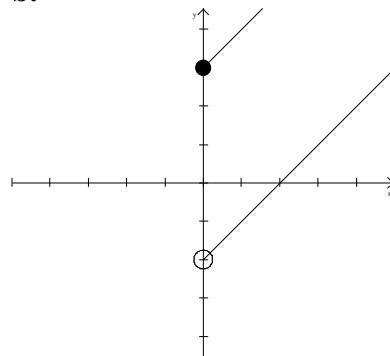


25. $f(x) = \begin{cases} x-2; & x > 0 \\ x+3; & x \leq 0 \end{cases}$

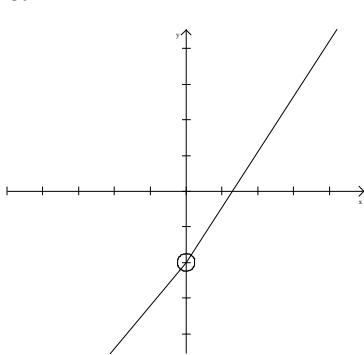
a.



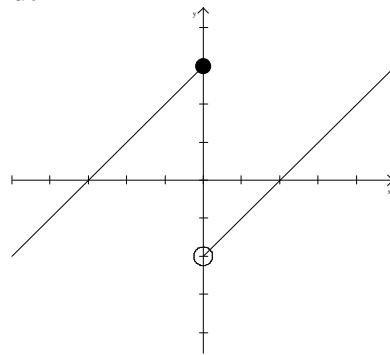
b.



c.



d.



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Chapter 3 Test Form E

Circle the correct answer.

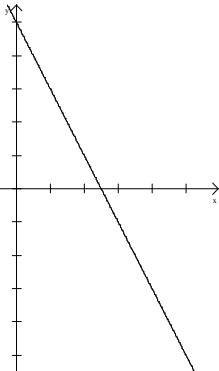
1. Determine the quadrant for $(-1, -2)$

a. QI b. QII c. QIII d. QIV

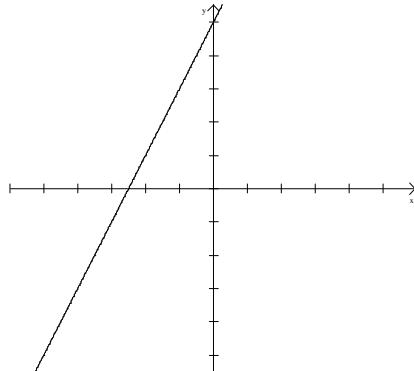
Match the equation to the correct graph.

2. $2x + y = 5$

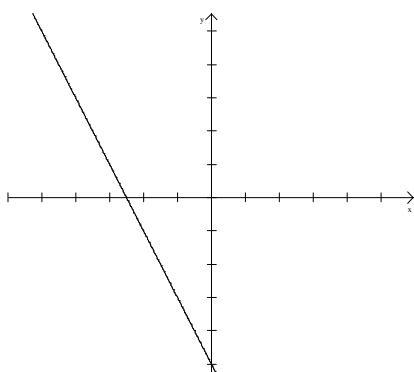
a.



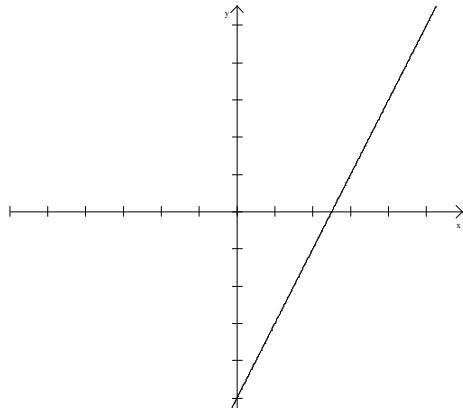
b.



c.



d.



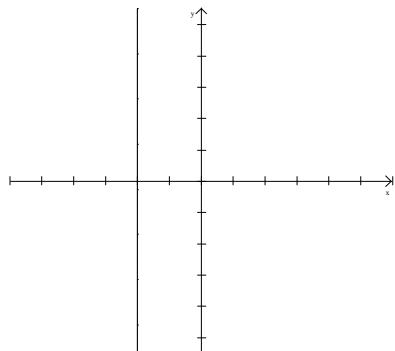
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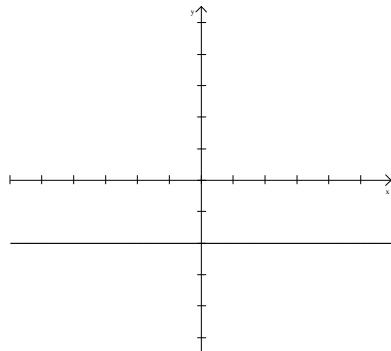
Chapter 3 Test Form E cont'd

3. $y = -2$

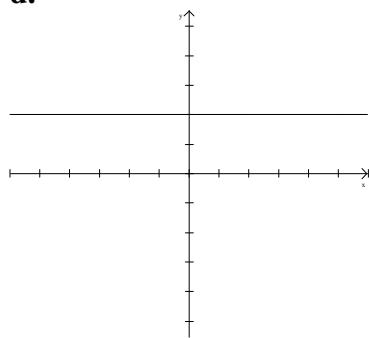
a.



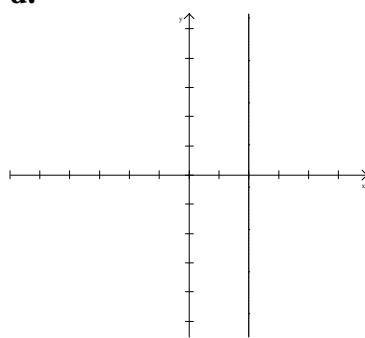
b.



d.

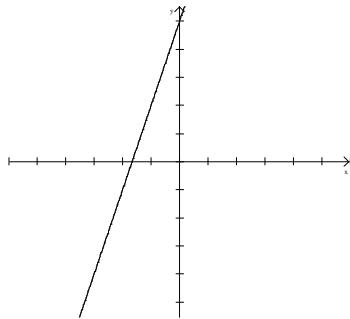


d.

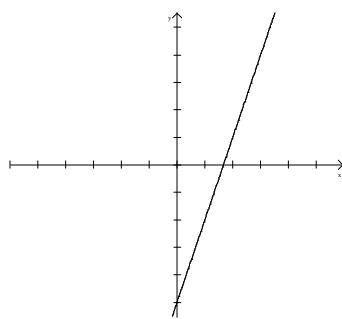


4. $y = -3x - 5$

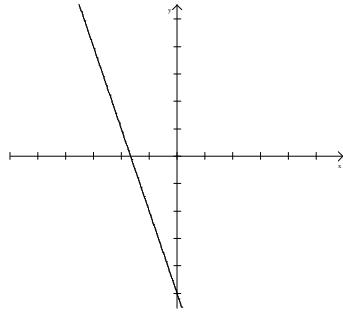
a.



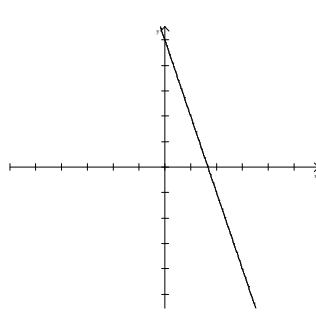
b.



c.



d.



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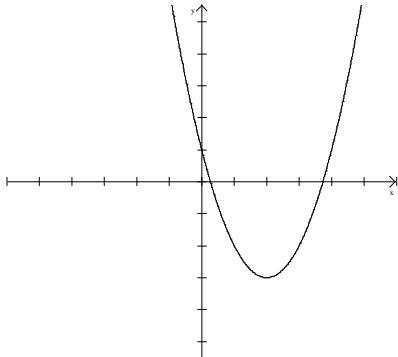
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Chapter 3 Test Form E cont'd

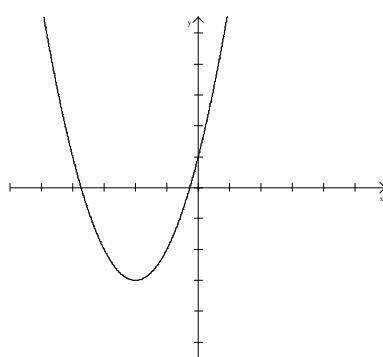
Match the function to the correct graph.

5. $y = (x+2)^2 + 3$

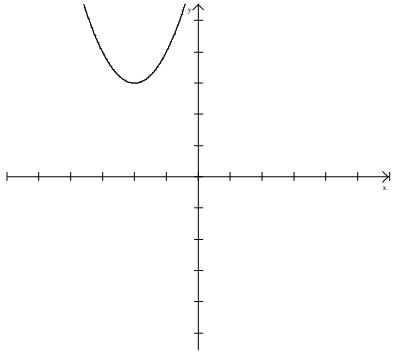
a.



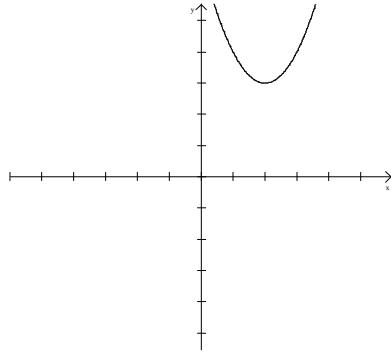
b.



c.



d.



6. Find the slope and the y -intercept of the line $4x - 3y = 24$.

a. $m = -\frac{3}{4}; b = -8$

b. $m = \frac{3}{4}, b = -6$

c. $m = \frac{4}{3}, b = 8$

d. $m = \frac{4}{3}, b = -8$

7. Find the slope of the line that passes through $(-1, -5)$ and $(2, 1)$

a. 2

b. -2

c. $\frac{1}{2}$

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

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8. Find the slope and the y -intercept of the line $3x - 8y = 1$.

a. $m = \frac{8}{3}$; $b = \frac{1}{3}$

b. $m = \frac{3}{8}$, $b = \frac{1}{8}$

c. $m = \frac{3}{8}$, $b = -\frac{1}{8}$

d. $m = \frac{8}{3}$, $b = -\frac{1}{3}$

Find the equation of each line in standard form satisfying the conditions given.

9. through $(-3, -1)$; slope 1

a. $x - y = 2$ b. $x - y = -2$ c. $x + y = -2$ d. $x + y = 2$

10. horizontal; through $(7, -2)$

a. $x = 7$ b. $x = -7$ c. $y = 2$ d. $y = -2$

11. Vertical; through $(-1, 0)$

a. $y = 0$ b. $x = -1$ c. $y = -1$ d. $x = 0$

12. If $f(x) = 2x^2 - 3x - 1$, find $f(-1)$.

a. -2 b. 4 c. 0 d. -3

13. If $f(x) = -x^3 + 2x^2$, find $f(-2)$.

a. -16 b. 16 c. 0 d. -8

Find an equation of each line in function notation satisfying the conditions given.

14. through $(-1, 6)$ and $(1, -2)$

a. $f(x) = -\frac{1}{4}x - \frac{7}{4}$

b. $f(x) = -4x - 3$

c. $f(x) = -4x + 2$

d. $f(x) = -\frac{1}{4}x - 3$

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15. perpendicular to $-3x - 5y = 2$; through (2, -6)

a. $f(x) = \frac{5}{3}x - \frac{28}{3}$

b. $f(x) = \frac{5}{3}x - 8$

c. $f(x) = -\frac{3}{5}x - \frac{8}{3}$

d. $f(x) = -\frac{3}{5}x - 8$

16. parallel to $2x - 5y = 10$; through (-4, -3)

a. $f(x) = -\frac{5}{2}x - 7$

b. $f(x) = -\frac{5}{2}x + 7$

c. $f(x) = \frac{2}{5}x - 7$

d. $f(x) = \frac{2}{5}x - \frac{7}{5}$

17. through (6, -3) with slope 3

a. $f(x) = -3x - 15$

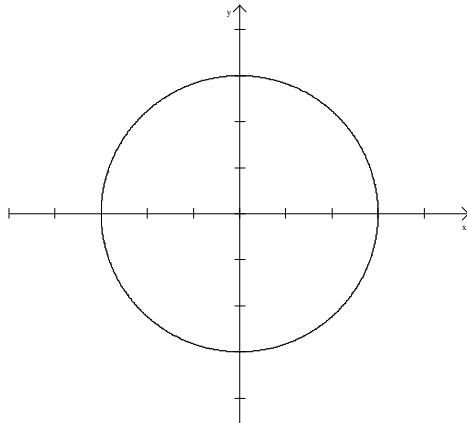
b. $f(x) = -3x - 21$

c. $f(x) = 3x - 21$

d. $f(x) = -3x - 3$

Find the domain and range of each relation.

18.



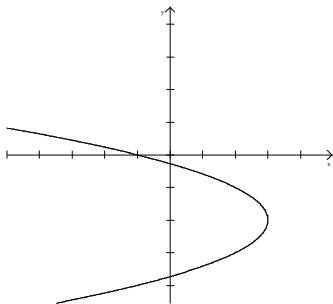
- a. Domain $(-\infty, \infty)$; Range $[-3, \infty)$ b. Domain $[-3, 3]$; Range $(-\infty, \infty)$
c. Domain $[-3, 3]$, Range $[-3, 3]$ d. Domain $(-\infty, \infty)$; Range $[-3, 3]$

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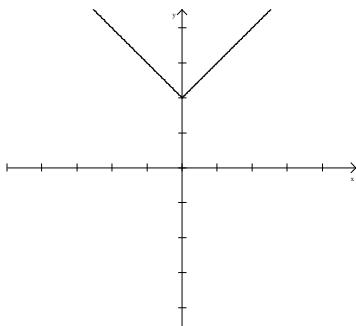
Chapter 3 Test Form E cont'd

19.



- a. Domain $(-\infty, \infty)$; Range $(-\infty, -2]$
b. Domain $(-\infty, \infty)$; Range $(-\infty, -3]$
c. Domain $(-\infty, 3]$; Range $(-\infty, \infty)$
d. Domain $[3, \infty)$; Range $(-\infty, \infty)$

20.

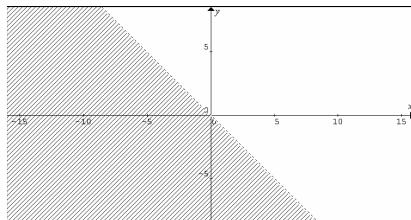


- a. Domain $(-\infty, 3)$; Range $(2, \infty)$
b. Domain $[2, \infty)$; Range $(-\infty, \infty)$
c. Domain $(-\infty, 2]$; Range $[2, \infty)$
d. Domain $(-\infty, \infty)$; Range $[2, \infty)$

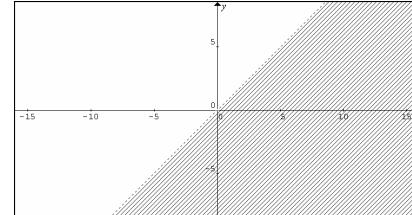
Match the graph to the inequalities.

21. $y > -x$

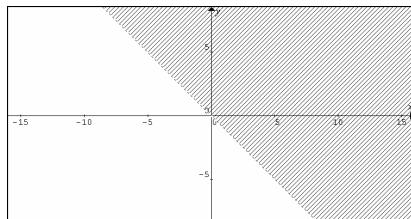
a.



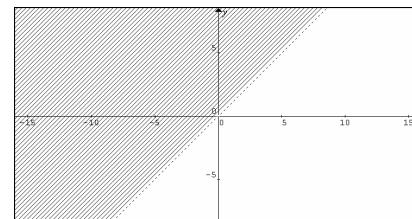
b.



c.



d.



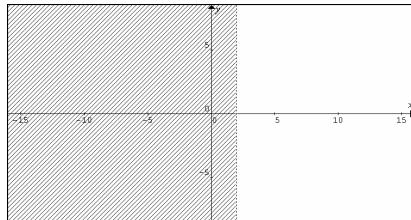
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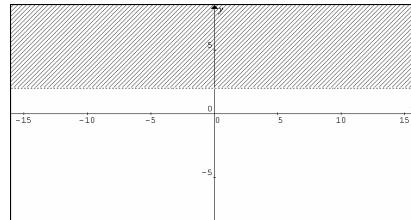
Chapter 3 Test Form E cont'd

22. $y > 2$

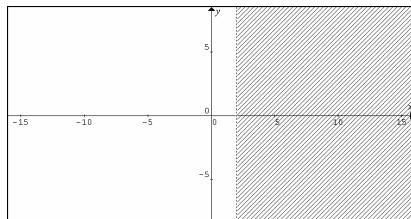
a.



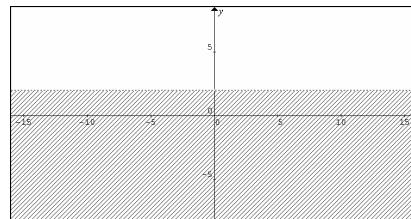
b.



c.

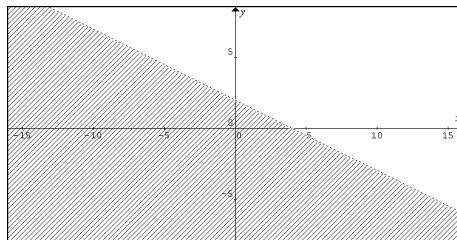


d.

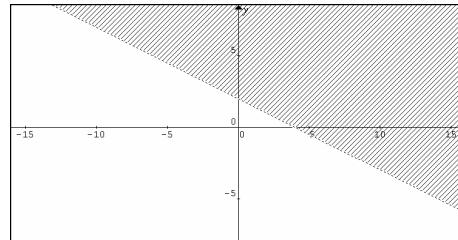


23. $x + 2y < 4$

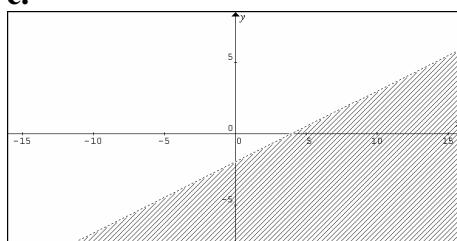
a.



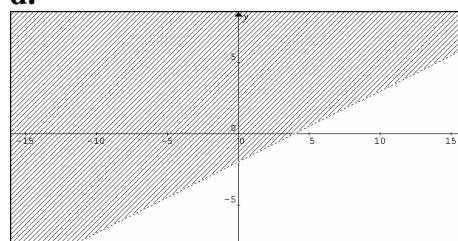
b.



c.



d.



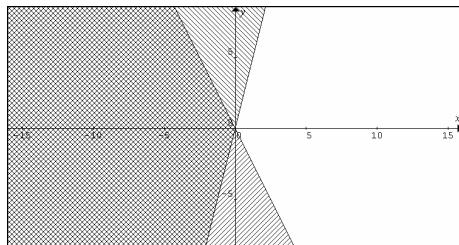
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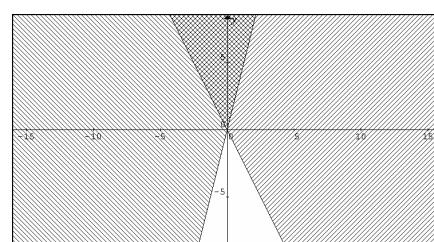
Chapter 3 Test Form E cont'd

24. The intersection of $y \leq -2x$ and $y \geq 4x$

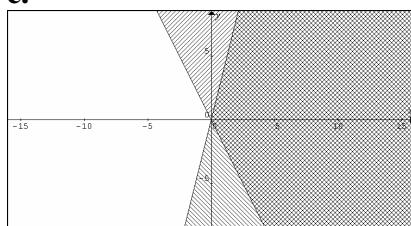
a.



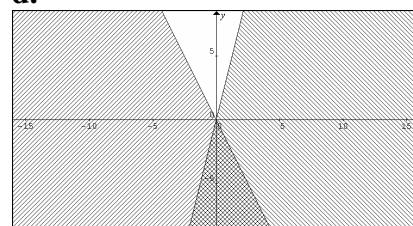
b.



c.

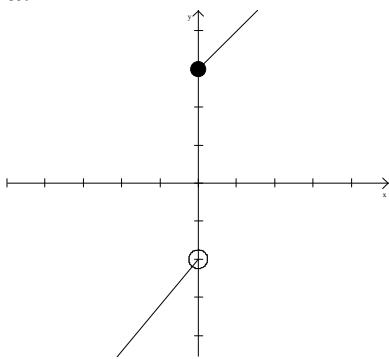


d.

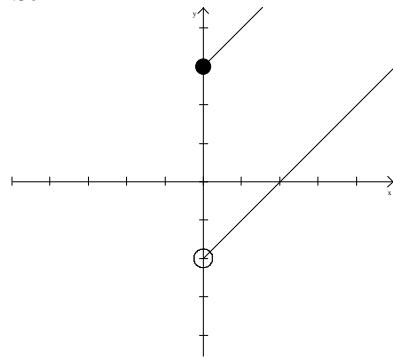


25. $f(x) = \begin{cases} x-2; & x < 0 \\ x+3; & x \geq 0 \end{cases}$

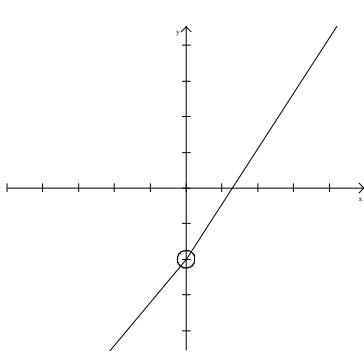
a.



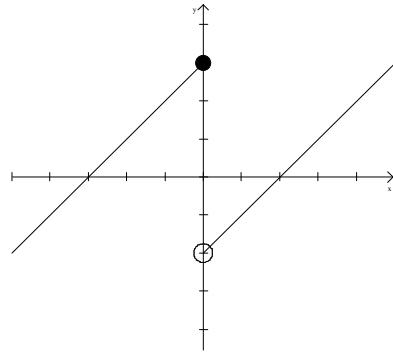
b.



c.



d.



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Chapter 3 Test Form F

Circle the correct answer.

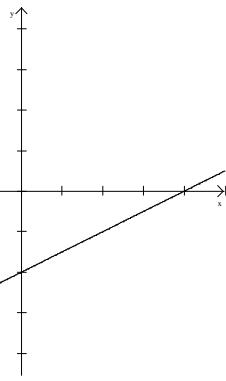
1. Determine the quadrant for $(4, -3)$

- a. QI b. QII c. QIII d. QIV

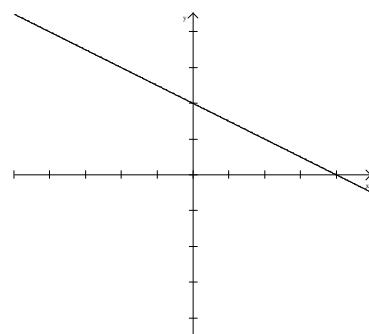
Match the equation to the correct graph.

3. $2x + 4y = 8$

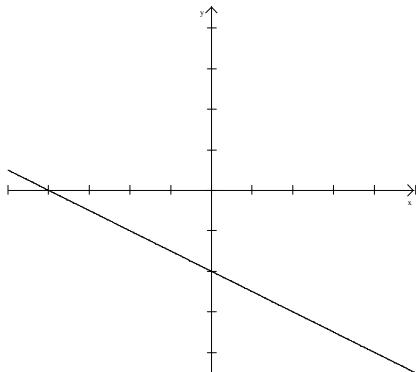
a.



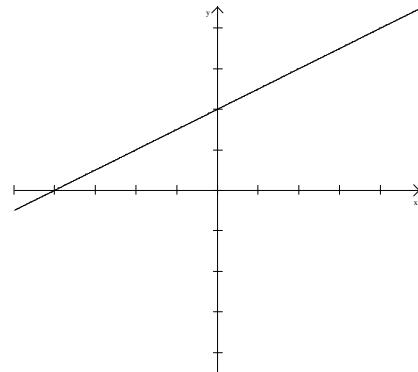
b.



c.



d.



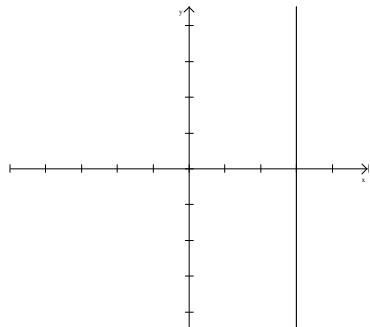
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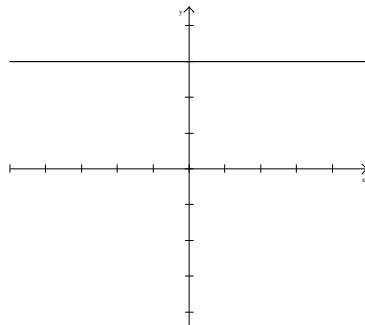
Chapter 3 Test Form F cont'd

4. $x = 3$

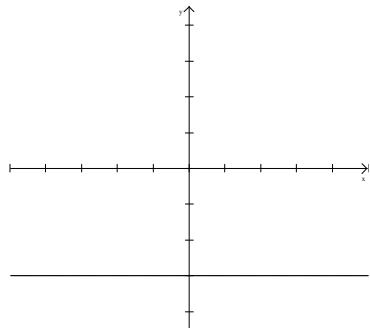
a.



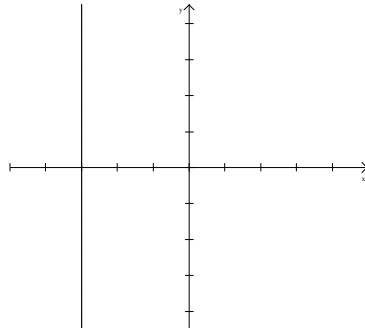
b.



e.

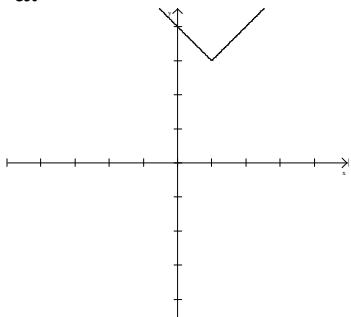


d.

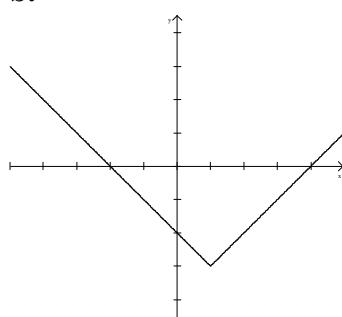


4. $y = |x + 1| + 3$

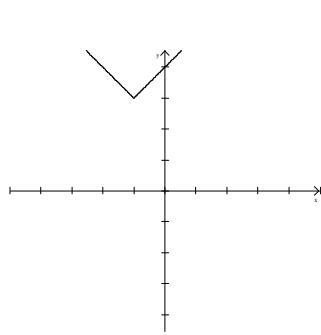
a.



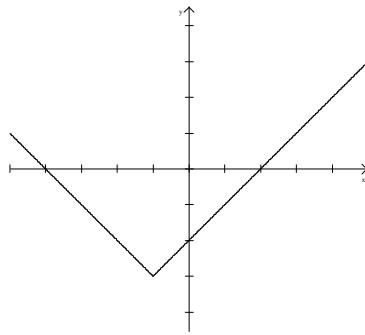
b.



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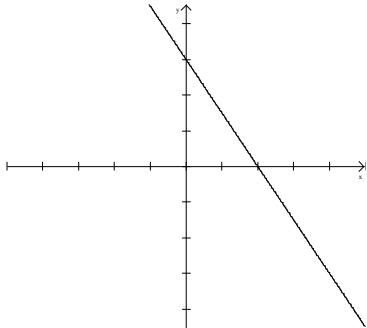
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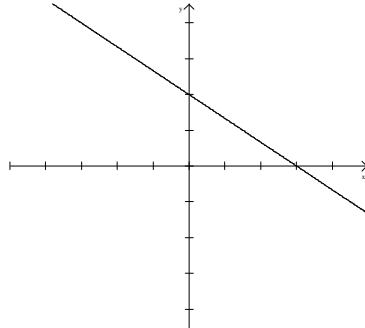
Match the function to the correct graph.

5. $y = \frac{2}{3}x$

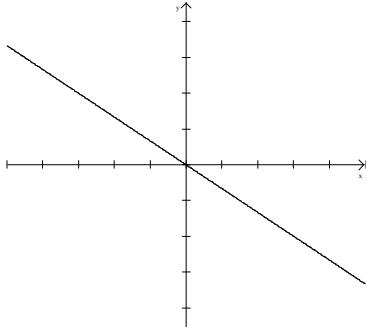
a.



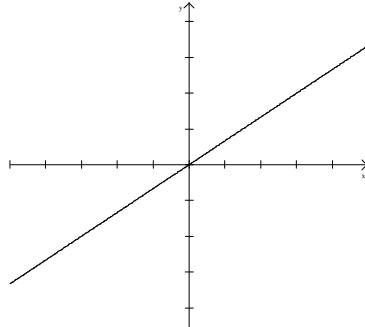
b.



c.



d.



6. Find the slope and the y -intercept of the line $-3x - 5y = 6$.

a. $m = -\frac{3}{5}$; $b = \frac{6}{5}$

b. $m = \frac{3}{5}$, $b = \frac{6}{5}$

c. $m = -\frac{3}{5}$, $b = -\frac{6}{5}$

d. $m = \frac{3}{5}$, $b = -\frac{6}{5}$

7. Find the slope of the line that passes through $(7, 9)$ and $(-1, 2)$.

a. $\frac{7}{8}$

b. $-\frac{7}{8}$

c. $\frac{8}{7}$

d. $-\frac{8}{7}$

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8. Find the slope and the y -intercept of the line $2x + 5y = -3$.

a. $m = -\frac{2}{5}$; $b = \frac{3}{5}$

b. $m = -\frac{2}{5}$, $b = -\frac{3}{5}$

c. $m = -\frac{5}{2}$, $b = -\frac{5}{3}$

d. $m = \frac{5}{2}$, $b = \frac{5}{3}$

Find the equation of each line in standard form satisfying the conditions given.

9. through $(-1, 6)$; slope -2

a. $2x + y = 8$

b. $2x + y = 7$

c. $-2x - y = 4$

d. $2x + y = 4$

10. horizontal; through $(-3, 5)$

a. $x = -3$

b. $x = 3$

c. $x = -5$

d. $y = 5$

11. Vertical; through $(-3, -5)$

a. $y = 5$

b. $y = -5$

c. $x = 3$

d. $x = -3$

12. If $f(x) = 3x^2 + 2x - 6$, find $f(-2)$.

a. -22

b. 2

c. 10

d. -14

13. If $f(x) = -x^3 + 2x - 5$, find $f(-3)$.

a. -48

b. 16

c. -28

d. 28

Find an equation of each line in function notation satisfying the conditions given.

14. through $(5, -2)$ and $(-1, 3)$

a. $f(x) = -\frac{5}{6}x + \frac{13}{6}$

b. $f(x) = -\frac{5}{6}x + 4$

c. $f(x) = \frac{5}{6}x + \frac{23}{6}$

d. $f(x) = \frac{5}{6}x + 4$

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15. perpendicular to $-2x + 7y = 6$; through (3, -4)

a. $f(x) = -\frac{7}{2}x + \frac{13}{2}$ b. $f(x) = \frac{2}{7}x - 7$
c. $f(x) = -\frac{2}{7}x - \frac{15}{7}$ d. $f(x) = \frac{7}{2}x + \frac{13}{2}$

16. parallel to $5x - 3y = 11$; through (2, 5)

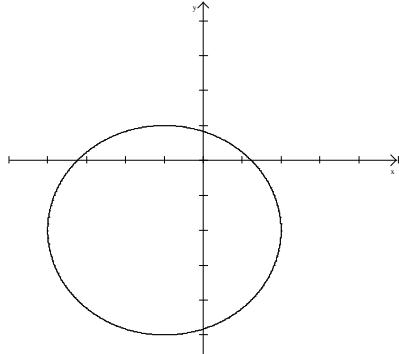
a. $f(x) = \frac{5}{3}x + \frac{5}{3}$ b. $f(x) = \frac{5}{3}x + 3$
c. $f(x) = \frac{5}{4}x - \frac{25}{3}$ d. $f(x) = \frac{5}{3}x - \frac{5}{3}$

17. through (2, -6) with slope -4

a. $f(x) = -4x - 2$ b. $f(x) = -4x - 14$
c. $f(x) = -4x + 14$ d. $f(x) = -4x + 2$

Find the domain and range of each relation.

18.



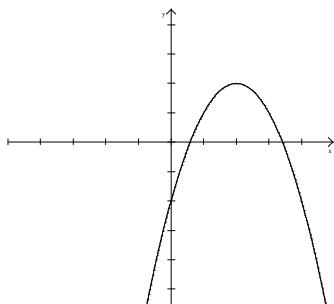
- a. Domain [-5, 1]; Range [-4, 2] b. Domain [-4, 2]; Range $(-\infty, \infty)$
c. Domain $(-\infty, \infty)$, Range [-5, 1] d. Domain [-4, 2]; Range [-5, 1]

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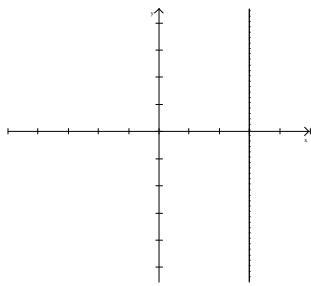
19.



- a. Domain $[2, \infty)$; Range $(-\infty, 2]$
c. Domain $(-\infty, \infty)$; Range $(-\infty, 2]$

- b. Domain $(-\infty, 2]$; Range $(-\infty, \infty)$
d. Domain $(-\infty, \infty)$; Range $(-\infty, \infty)$

20.



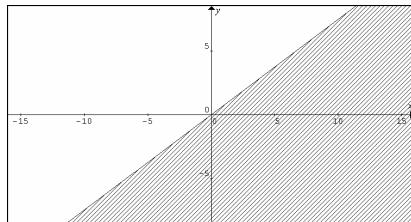
- a. Domain $(-\infty, \infty)$; Range $[3]$
c. Domain $(-\infty, \infty)$; Range $(-\infty, \infty)$

- b. Domain $[3]$; Range $(-\infty, \infty)$
d. Domain $[-3, 3]$; Range $[-3, 3]$

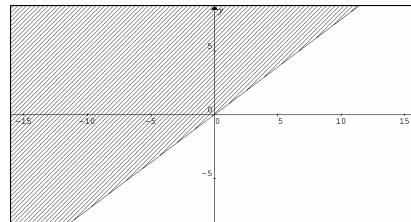
Match the graph to the inequalities.

21. $y < \frac{3}{4}x$

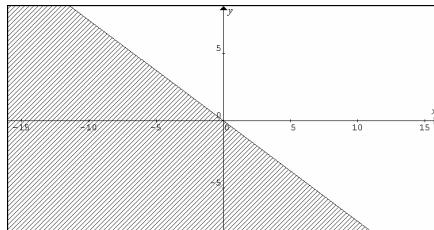
a.



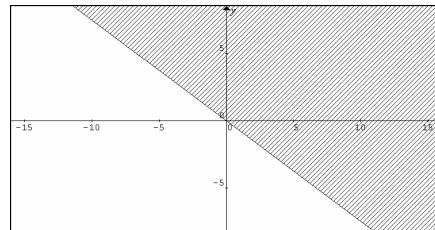
b.



c.



d.



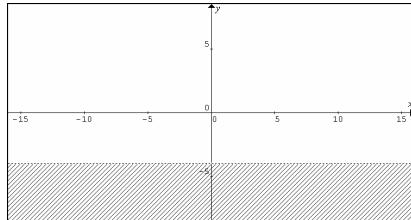
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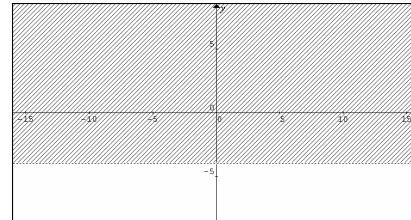
Chapter 3 Test Form F *cont'd*

22. $y > -4$

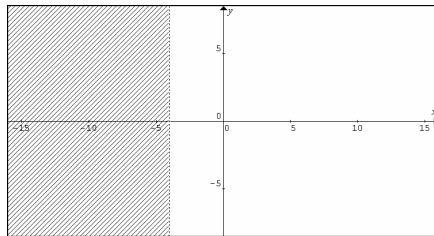
a.



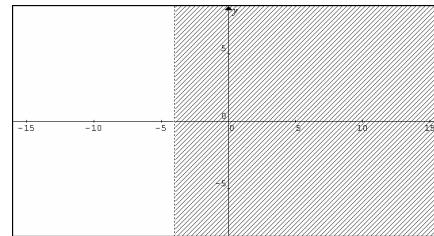
b.



c.

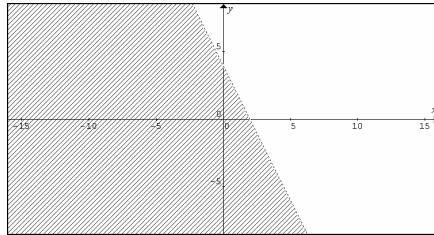


d.

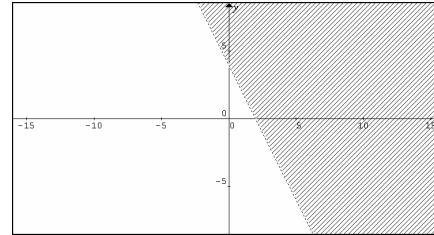


23. $2x + y > 4$

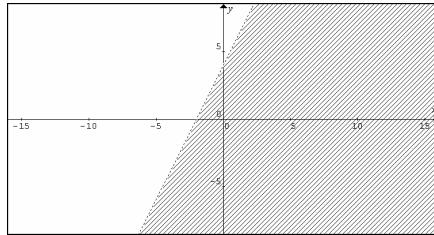
a.



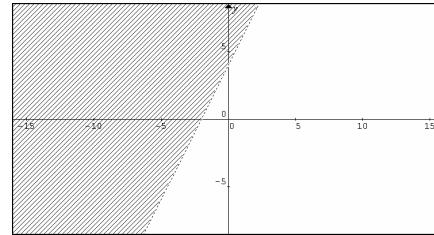
b.



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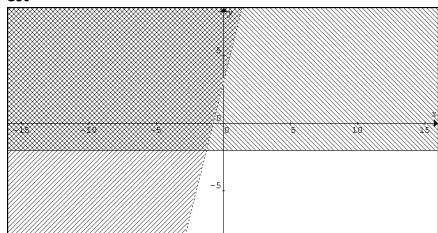
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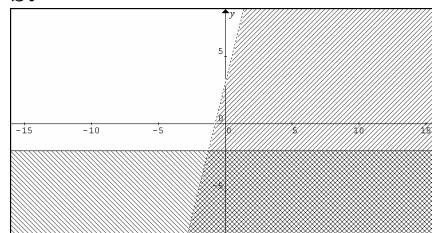
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24. The intersection of $4x - y < -3$ and $y \leq -2$

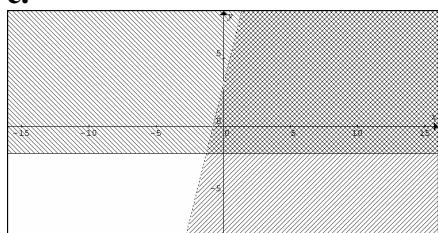
a.



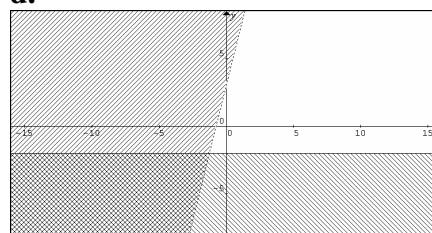
b.



c.

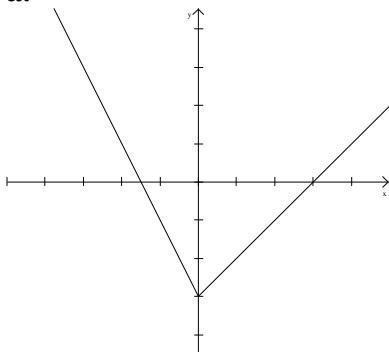


d.

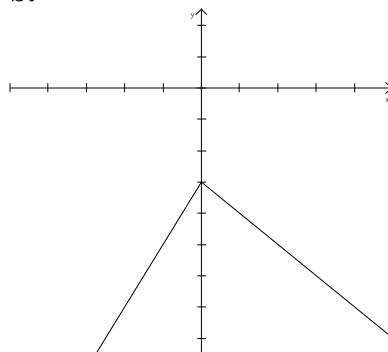


25. $f(x) = \begin{cases} -2x - 3; & x \leq 0 \\ x - 3; & x > 0 \end{cases}$

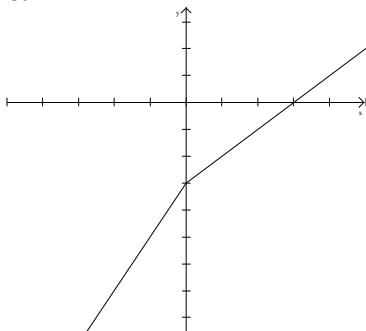
a.



b.



c.



d.

