Math Connections Worksheets

MAT0028C Developmental Math II

Chapter 4

Graphing Linear Equations and Inequalities

Name: Date:
Instructor: Section:

Chapter 4 GRAPHING LINEAR EQUATIONS AND INEQUALITIES

4.1 The Rectangular Coordinate System

KEY PROPERTIES, PROCEDURES, OR STRATEGIES

Identifying the Coordinates of a Point

Plotting a Point

Identifying Quadrants

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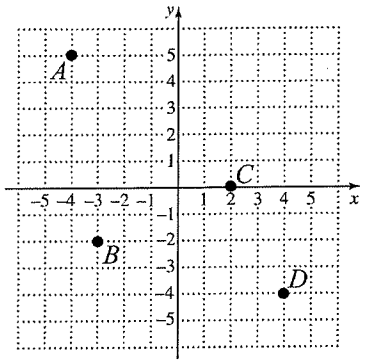
GUIDED EXAMPLE
Write the coordinates for each point shown.



Solution

A: (,)

From point *A*, a vertical line intersects the *x*-axis at _____ and a horizontal line intersects the *y*-axis at _____.

B: (,)

From point *B*, a vertical line intersects the *x*-axis at _____ and a horizontal line intersects the *y*-axis at _____.

C: (,)

From point *C*, a vertical line intersects the *x*-axis at _____ and a horizontal line intersects the *y*-axis at _____.

D: (,)

From point *D*, a vertical line intersects the *x*-axis at _____ and a horizontal line intersects the *y*-axis at _____.

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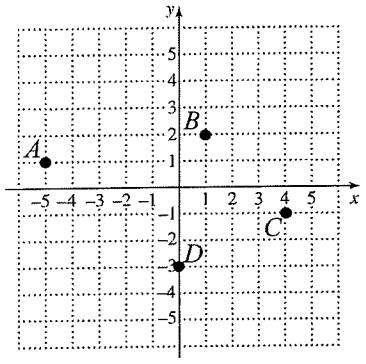
PRACTICE PROBLEMS

Write the coordinates for each point.

1.



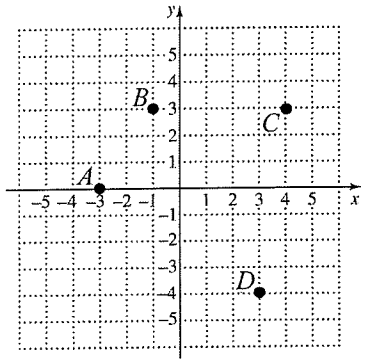
1. _____

_____

_____

_____

2.



2. _____

_____

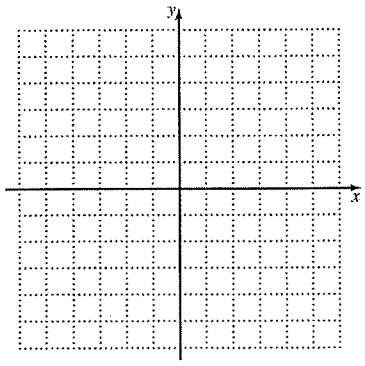
_____

_____

Plot and label the points indicated by the coordinate pairs.

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

3.



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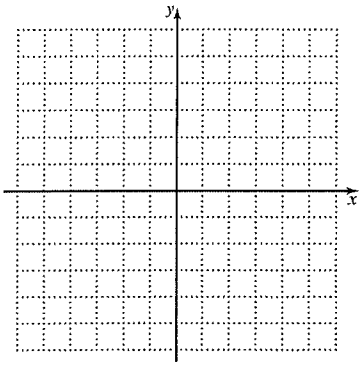
4. $(-2,5)$, $(0,1)$, $(1,-5)$, $(5,5)$

4.



State the quadrant in which the point is located. If the point lies on an axis, state which axis.

5. $(7.2,-112)$ **5.**_____

6. $(0,708)$ **6.**_____

7. $(-65,301)$ **7.**_____

8. $(-34,0)$ **8.**_____

9. $(45,267)$ **9.**_____

10. $(-58,-0.26)$ **10.**_____

Determine whether the set of points is linear or nonlinear.

11. (age of tree, number of growth rings): **11.**_____
$(1,15)$, $(2,20)$, $(10,30)$, $(20,100)$

12. (age of child, height): **12.**_____
$(2,32)$, $(3,36)$, $(4,40)$, $(5,44)$

13. (age of child, ounces of milk): **13.**_____
$(1,8)$, $(3,6)$, $(5,6)$, $(7,10)$

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Chapter 4 GRAPHING LINEAR EQUATIONS AND INEQUALITIES

4.2 Graphing Linear Equations

KEY PROPERTIES, PROCEDURES, OR STRATEGIES

Checking a Potential Solution for an Equation with Two Variables

Finding Solutions to Linear Equations with Two Variables

Graphing Linear Equations

Horizontal Lines

In the Language of Math	In Your Own Words

Vertical Lines

In the Language of Math	In Your Own Words

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GUIDED EXAMPLES

1. Determine whether the ordered pair is a solution for the equation.

$(2,-4); 9x-9y=15$

Solution

$9x-9y=15$

$9(\quad)-9(\quad)\overset{?}{=}15$ **Replace x with 2 and y with -4.**

$(\quad)-(\quad)\overset{?}{=}15$

$\_\_\_\_\_\overset{?}{=}15$ **The ordered pair [is / is not] a solution for the equation.**

2. Find three solutions for the equation $3x+2y=6$.

Solution

To find a solution, we replace one of the variables with a chosen value then solve for the value of the other variable. There are an infinite number of correct solutions for a given equation in two variables.

For the first solution, we will choose x to be 0.

$3x+2y=6$

$3(\quad)+2y=6$

$\_\_\_\_\_=6$

$\_\_\_\_\_=\_\_\_\_\_$

Solution: $(\quad,\quad)$

For the second solution, we will choose x to be 2.

$3x+2y=6$

$3(\quad)+2y=6$

$\_\_\_\_\_=6$

$\_\_\_\_\_=\_\_\_\_\_$

$\_\_\_\_\_=\_\_\_\_\_$

Solution: $(\quad,\quad)$

For the third solution, we will choose y to be -3.

$3x+2y=6$

$3x+2(\quad)=6$

$\_\_\_\_\_=6$

$\_\_\_\_\_=\_\_\_\_\_$

$\_\_\_\_\_=\_\_\_\_\_$

Solution: $(\quad,\quad)$

We can summarize the solutions in a table.

x	y	**Ordered Pair**

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PRACTICE PROBLEMS

Determine whether the given ordered pair is a solution for the equation.

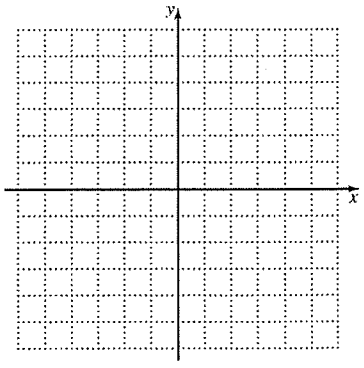
1. $(-3,-5);5x+3y=15$ **1.**_____

2. $(2,6);y=3x+11$ **2.**_____

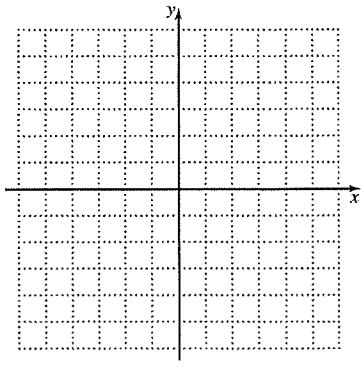
3. $\left(0,\frac{5}{6}\right);4x+6y=5$ **3.**_____

Find three solutions for the given equation. Then graph. (Answers may vary for the three solutions.).

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



5. $y=4x$ **5.**



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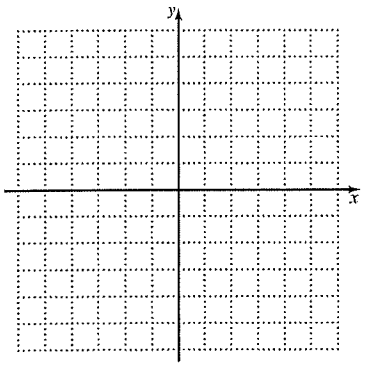
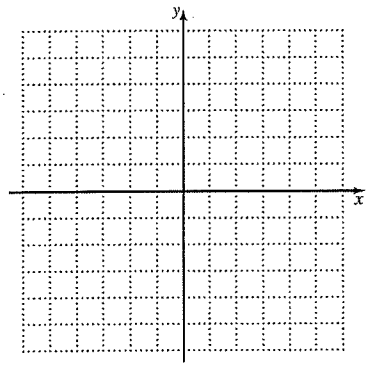
6. $y = -\frac{1}{4}x + 3$

6.



7. $4x - 5y = 20$

7.



Solve.

8. A businesswoman buys a new computer for \$1600. For each year that it is in use, she can deduct its depreciated value. The equation $c = -200n + 1600$ gives the value after n years of use.

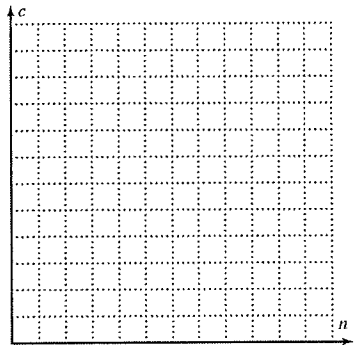
- **a.** Find the value of the computer after 2 years.
- **b.** In how many years will the computer be worth half of its initial value?
- **c.** After how many years will the computer be worth \$0?
- **d.** Graph the equation with n along the horizontal axis and c along the vertical axis. Because n and c are nonnegative, the graph is restricted to the first quadrant only.

8a._____

b._____

c._____

d.



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Chapter 4 GRAPHING LINEAR EQUATIONS AND INEQUALITIES

4.3 Graphing Using Intercepts

KEY VOCABULARY

Term	Definition	Example
***x*-intercept**		
***y*-intercept**		

KEY PROPERTIES, PROCEDURES, OR STRATEGIES

Finding the *x*- and *y*-intercepts

To find an *x*-intercept:	To find a *y*-intercept:

Intercepts for $y = mx$

In the Language of Math	In Your Own Words

The *y*-intercept for $y = mx + b$

In the Language of Math	In Your Own Words

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Intercepts for $y = c$

In the Language of Math	In Your Own Words

Intercepts for $x = c$

In the Language of Math	In Your Own Words

GUIDED EXAMPLE

Find the x- and y-intercepts for $4x+2y=8$.

Solution

For the x-intercept, replace y with 0 and solve for x.

$4x+2y=8$

$4x+2(\_\_\_\_)=8$

$\_\_\_\_\_=8$

$\_\_\_\_\_=\_\_\_\_\_$

x-intercept: (,)

For the y-intercept, replace x with 0 and solve for y.

$4x+2y=8$

$4(\_\_\_\_)+2y=8$

$\_\_\_\_\_=8$

$\_\_\_\_\_=\_\_\_\_\_$

y-intercept: (,)

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PRACTICE PROBLEMS

Find the x- and y-intercepts.

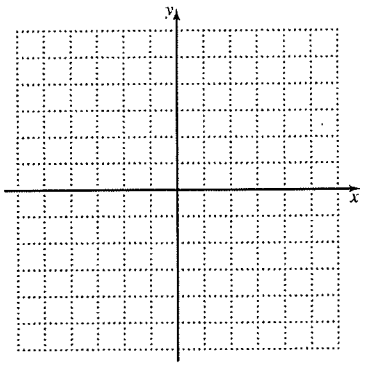
1. $6x+5y=30$ **1.**_____

2. $y=2x+5$ **2.**_____

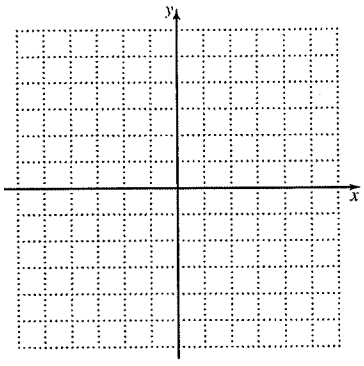
3. $x-4=0$ **3.**_____

Graph using the x- and y-intercepts.

4. $x-5y=10$ **4.**



5. $y=2x$ **5.**



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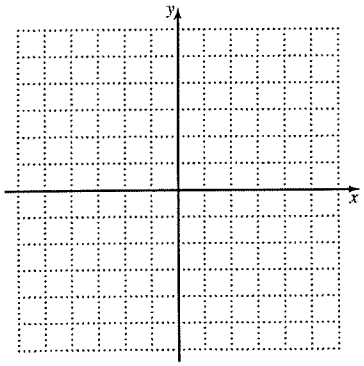
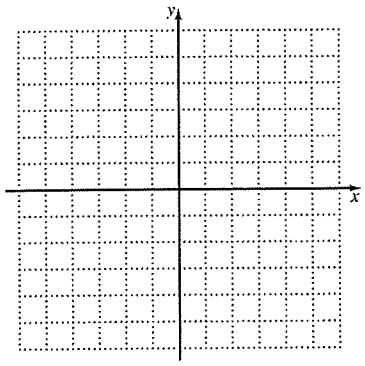
6. $2x-2=y$

6.



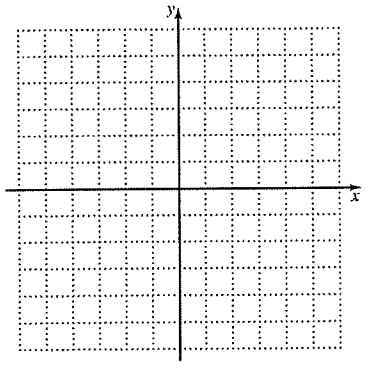
7. $2x+y=4$

7.



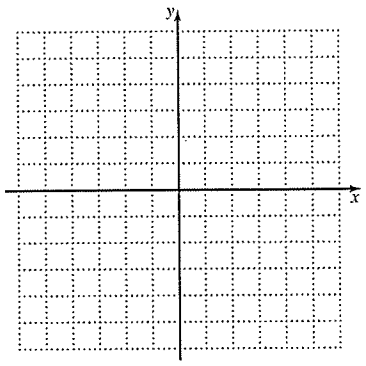
8. $y+3=0$

8.



9. $x-1=0$

9.



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Chapter 4 GRAPHING LINEAR EQUATIONS AND INEQUALITIES

4.4 Slope-Intercept Form

KEY VOCABULARY

Term	Definition	Example
Slope		

KEY PROPERTIES, PROCEDURES, OR STRATEGIES

Graphs of $y = mx$

Graphing Equations in Slope-Intercept Form

Equation of a Line Given Its Slope and y-Intercept

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The Slope Formula

Zero Slope

In the Language of Math	In Your Own Words

Undefined Slope

In the Language of Math	In Your Own Words

GUIDED EXAMPLE

Find the slope of the line connecting the given points.

$(2,9)$ and $(-4,6)$

Solution

Using $m = \dfrac{y_2 - y_1}{x_2 - x_1}$, replace the variables with their corresponding values and then simplify. Let $(2,9)$ be (x_1, y_1) and $(-4,6)$ be (x_2, y_2).

$m =$

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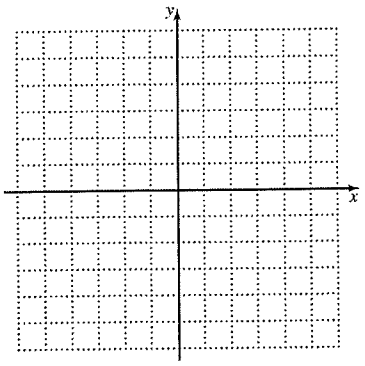
PRACTICE PROBLEMS

Graph each set of equations on the same grid. For each set of equations, compare the slopes, y-intercepts, and their effects on the graphs.

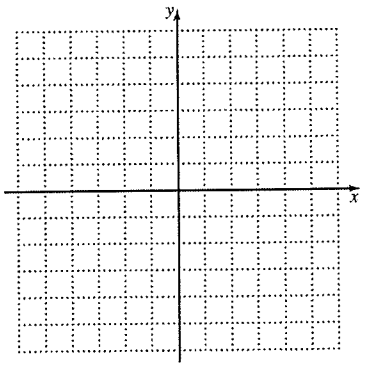
1. $y = \frac{1}{4}x$
$y = x$
$y = 4x$

1.



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

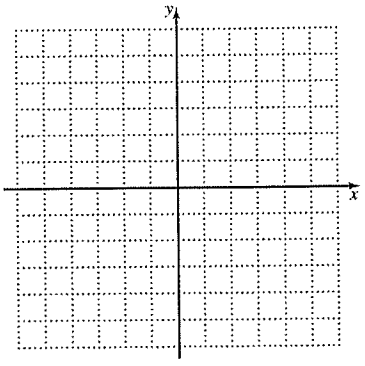
2.



Determine the slope and the y-intercept. Then graph the equation.

3. $2x + y = 4$

3._____



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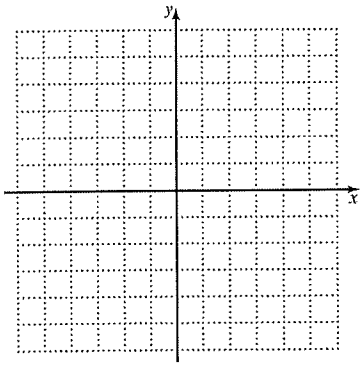
4. $2x+5y=10$

4._____



Write the equation of the line in slope-intercept form given the slope and the coordinates of the y-intercept.

5. $m=4;\left(0,-\frac{1}{2}\right)$

5._____

6. $m=-0.4;(0,2.3)$

6._____

Find the slope of the line through the given points.

7. $(2,3),(5,7)$

7._____

8. $(-4,2),(3,5)$

8._____

9. $(1,-7),(8,0)$

9._____

10. $(5,4),(5,-9)$

10._____

Answers to Worksheets for Classroom or Lab Practice

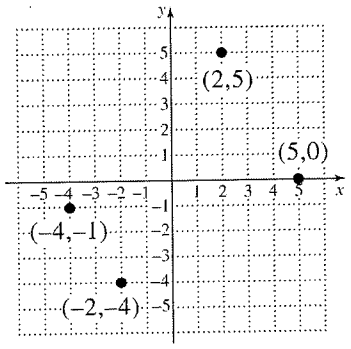
Chapter 4 GRAPHING LINEAR EQUATIONS AND INEQUALITIES

4.1 The Rectangular Coordinate System

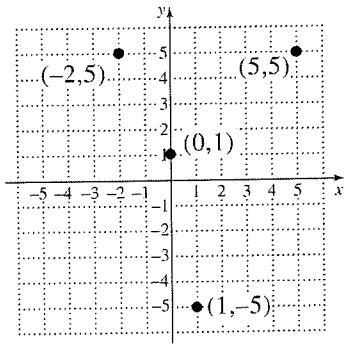
1. $A(-5,1)$, $B(1,2)$, $C(4,-1)$, $D(0,-3)$

2. $A(-3,0)$, $B(-1,3)$, $C(4,3)$, $D(3,-4)$

3.



4.



5. IV

6. y-axis

7. II

8. x-axis

9. I

10. III

11. nonlinear

12. linear

13. nonlinear

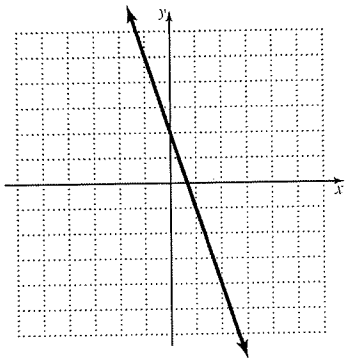
4.2 Graphing Linear Equations

1. no

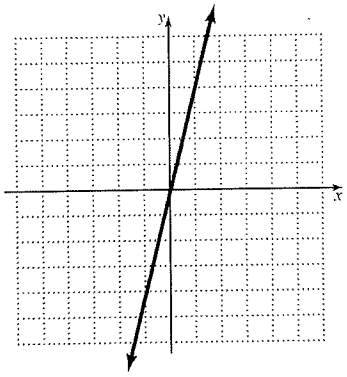
2. no

3. yes

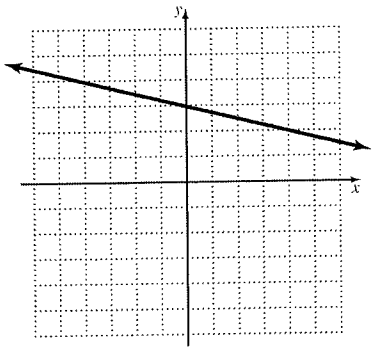
4. $(-1,5)$, $(0,2)$, $(1,-1)$



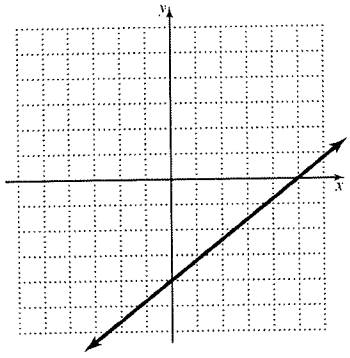
5. $(-1,-4)$, $(0,0)$, $(1,4)$



6. $(-4,4)$, $(0,3)$, $(4,2)$

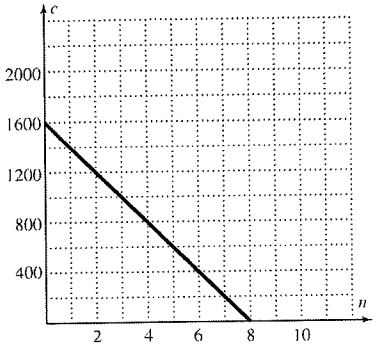


7. $(-5,-8)$, $(0,-4)$, $(5,0)$



8a. \$1200 b. 4 yr. c. 8 yr.

d.



4.3 Graphing Using Intercepts

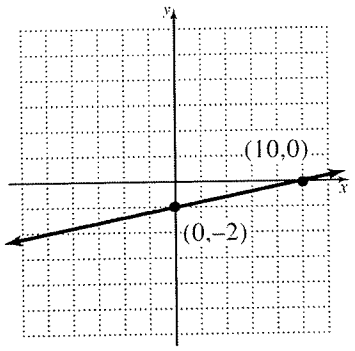
1. $(5,0),(0,6)$

2. $\left(-\frac{5}{2},0\right),(0,5)$

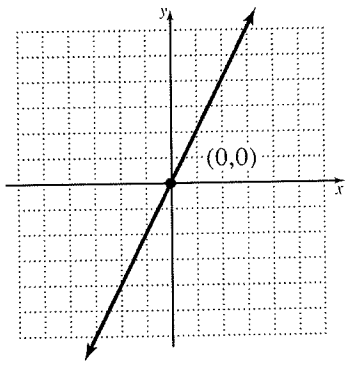
3. $(4,0)$; no y-intercept

Answers to Worksheets for Classroom or Lab Practice

4.



5.



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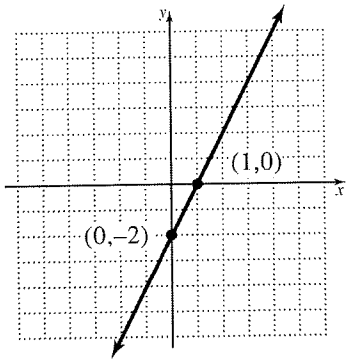
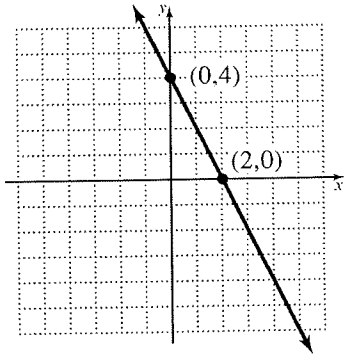
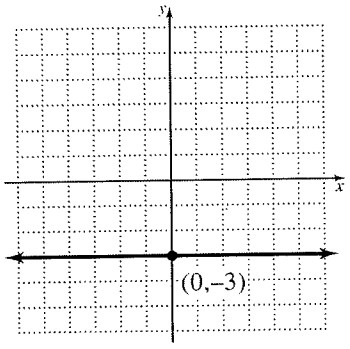


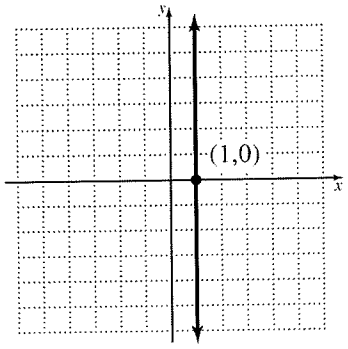
7.



8.

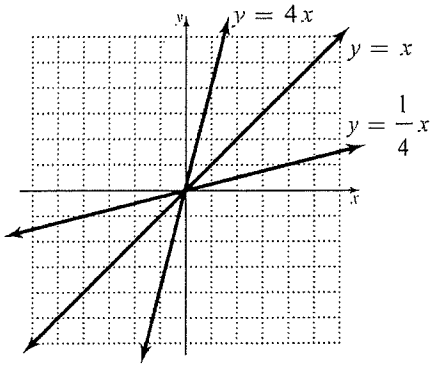


9.

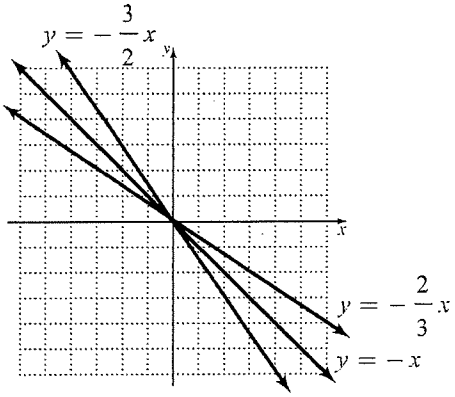


4.4 Slope-Intercept Form

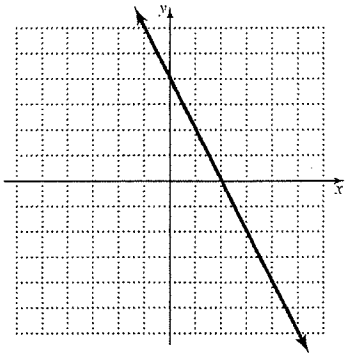
1.



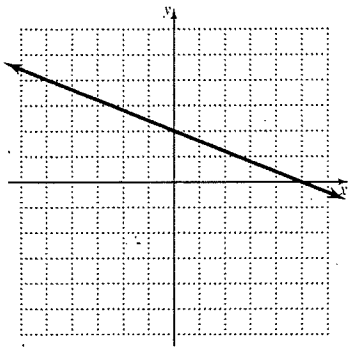
2.



3. $m=-2;(0,4)$



4. $m=-\frac{2}{5};(0,2)$



5. $y=4x-\frac{1}{2}$ 6. $y=-0.4x+2.3$ 7. $\frac{4}{3}$ 8. $\frac{3}{7}$ 9. 1

10. undefined