

SECTION 2.1

Graphing linear equations

Graph the following linear equations using at least 3 points.

1.  $2x - 3y = 7$
2.  $10x + 2y - 9 = 0$
3.  $-3x - 5y = 10$
4.  $4x + 3y = 12$
5.  $-5x + 7y = 9$
6.  $\frac{1}{2}x - 2y = 5$
7.  $x + \frac{2}{3}y = 9$
8.  $\frac{1}{3}x - 4y = 2$
9.  $0.4x - 0.2y = 1$
10.  $-1.2y - 2.4x = 3$

SECTION 2.1

Graphing linear equations using intercepts

Graph the following linear equations using the x- and y- intercepts.

1.  $2x - 3y = 6$
2.  $3y - 5x = 10$
3.  $-x + 4y - 8 = 0$
4.  $2x - 5y = 7$
5.  $9 = 6x - y$
6.  $\frac{1}{5}x - y = 2$
7.  $2x + \frac{1}{4}y + 3 = 0$
8.  $\frac{2}{3}x - \frac{1}{4}y = 2$
9.  $-0.5x - 0.3y - 1.2 = 0$
10.  $3.2x - y = 1.6$

SECTION 2.2

Slope

Determine the slope of the line passing through the two points.

1.  $(-3, 2)$  and  $(5, -5)$
2.  $(6, 1)$  and  $(3, -2)$
3.  $(1, -\frac{1}{3})$  and  $(2\frac{1}{2}, -3)$

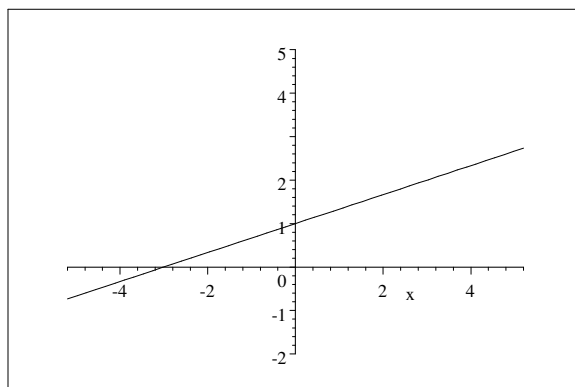
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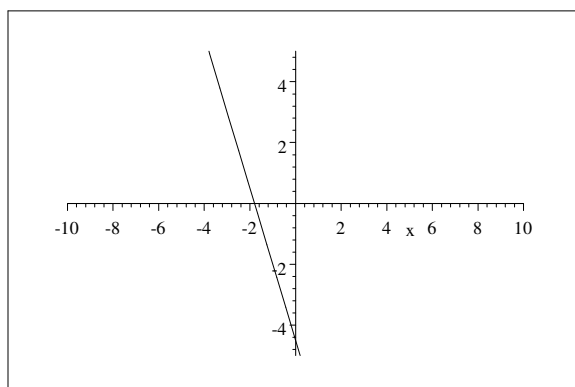
4.  $(\frac{1}{2}, 4)$  and  $(3, -\frac{1}{4})$
5.  $(0.5, 1.75)$  and  $(-0.25, 3.5)$
6.  $(1.6, -2.3)$  and  $(-5.2, 6.2)$

7. Determine the slope of the lines graphed below.

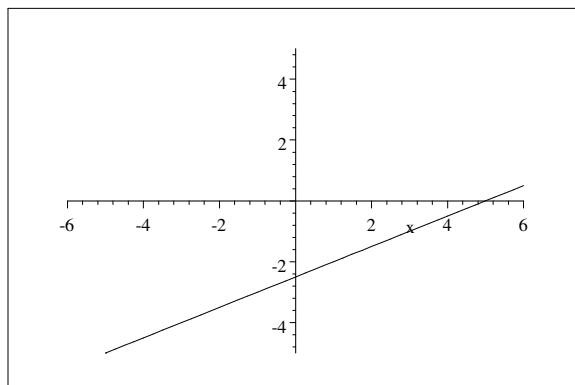
a.



b.

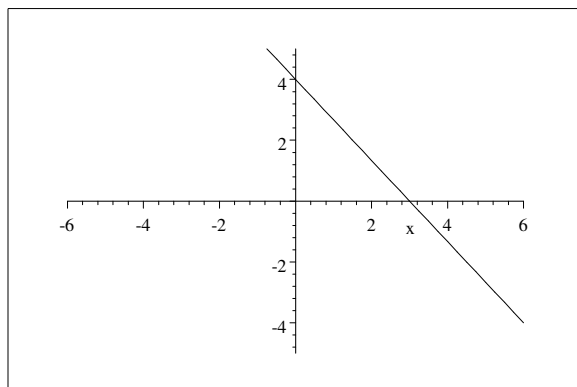


c.



d.

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Determine the slope of the line with the equation below using 2 points on the line.

8.  $-2x + 4y = 6$

9.  $3x - 2y - 4 = 0$

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

Draw a line through the given point having the given slope:

11.  $(-2, -4)$  and  $m = 1$

12.  $(0, 3)$  and  $m = -\frac{3}{4}$

13.  $(-\frac{1}{2}, 4)$  and  $m = -\frac{1}{3}$

14.  $(-3, -2)$  and  $m = 4$

Match the graph of the lines with the slopes.

15.  $m = -3$

16.  $m = -\frac{1}{2}$

17.  $m = 0$

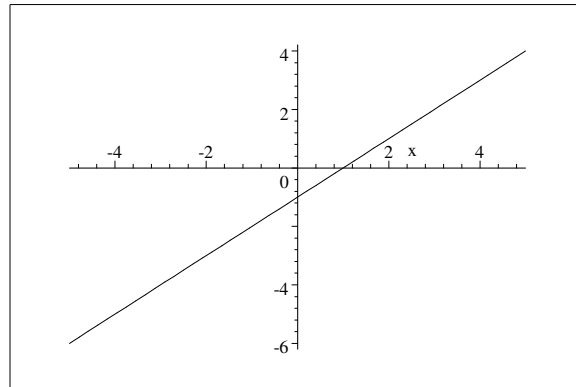
18.  $m = 1$

19.  $m = 4$

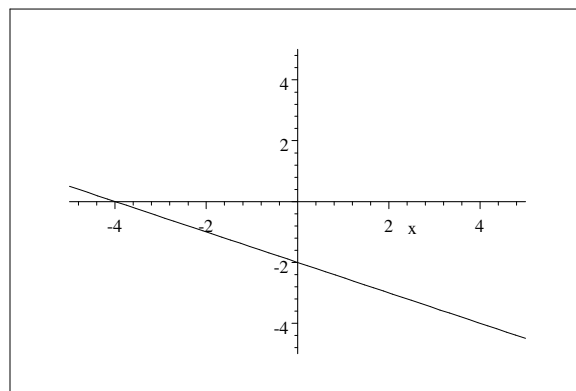
20.  $m = \text{undefined}$

a.

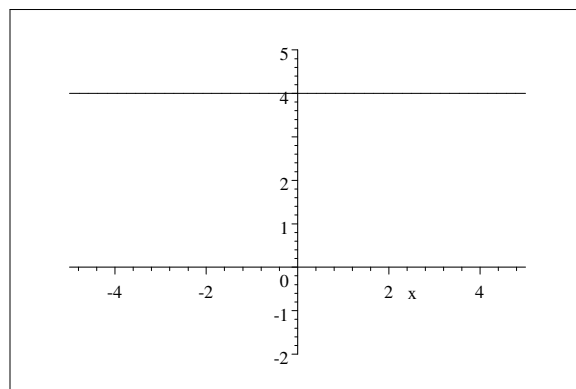
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b.

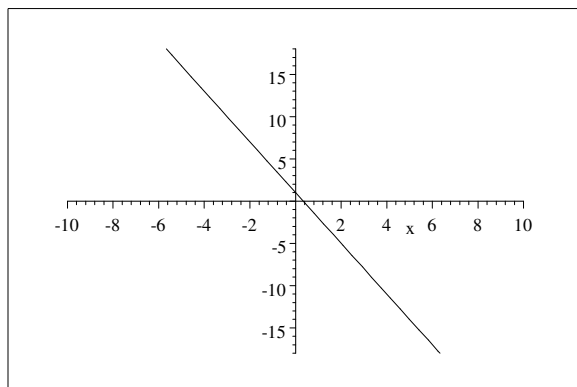


c.

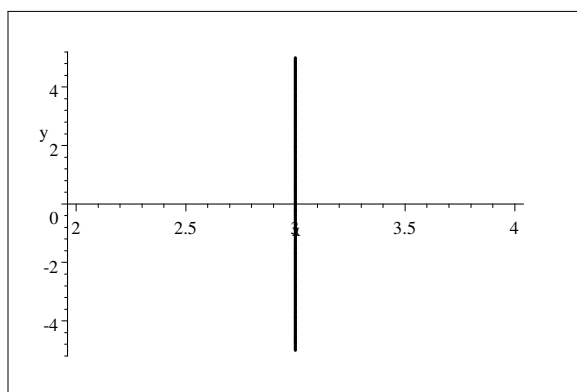


d.

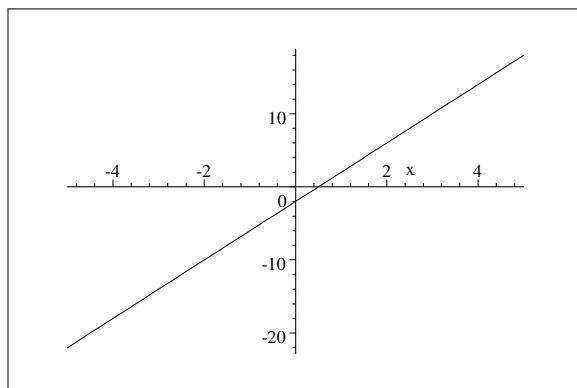
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e.



f.



21. Use slope to determine if the points  $(1, 0)$ ,  $(2, 1)$  and  $(-5, -4)$  are on the same line (collinear).

22. Use slope to determine if the points  $(-1, 3)$ ,  $(0, 6)$  and  $(-3, -3)$  are on the same line.

23. The value of a laptop decreases with time. If a laptop cost \$1300 in 2004 and sells used in 2008 for \$700, what was the rate of depreciation of the laptop with respect to time in years?

24. The  $y$ -coordinate of a line decreases by 3 for each time the  $x$ -coordinate increases by 2. If  $(3, -2)$  is a point on this line what point is on the line when  $x$  increases by 6?

## SECTION 2.2

### Horizontal and Vertical lines

1. Write an equation of the horizontal line through the point  $(-3, 4)$ .
2. Write an equation of the vertical line through the point  $(-5, \frac{1}{3})$ .
3. Write an equation of the line through the point  $(8, \sqrt{2})$  which is parallel to the  $x$ -axis.
4. Write an equation of the line through the point  $(-12, 6)$  which is perpendicular to the  $y$ -axis.
5. What are the equations of the  $x$  – and  $y$  –axes?
6. Write equations for lines parallel to  $x = -5$  which are 6 units away?

## SECTION 2.3

### The Point Slope Form of a Line

1. Determine the equation of the line that has slope  $-\frac{1}{2}$  and passes through the point  $(-3, 5)$  in the form  $y =$
2. Determine the equation of the line that has slope 4 and passes through the point  $(6, 10)$  in the form  $y =$
3. Determine the equation of the line that has slope  $\frac{2}{3}$  and passes through the point  $(-1, -1)$  in the form  $y =$
4. Determine the equation of the line that has slope  $\sqrt{2}$  and passes through the point  $(-\sqrt{2}, 5)$  in the form  $y =$
5. Determine the equation of the line that passes through the points  $(-2, -1)$  and  $(3, -4)$  in the form  $y =$
6. Determine the equation of the line that passes through the points  $(5, 0)$  and  $(-\frac{1}{2}, 3)$  in the form  $y =$
7. Determine the equation of the line that passes through the points  $(0.2, -2.4)$  and  $(-3.2, 4.4)$  in the form  $y =$
8. Determine the equation of the line that crosses the  $x$ -axis at  $-6$  and the  $y$ -axis at  $2\frac{2}{3}$  in the form  $y =$
9. A classroom is normally  $70^\circ$ . The temperature rises one-fifth of a degree for every student in the room.
  - a) Write a linear equation to represent the temperature ( $y$ ) of the room in terms of the number of students ( $x$ ) present in the classroom.

b) How many students would be in the classroom if the temperature is  $76^{\circ}$ .

10. The grass is  $2\frac{1}{4}$  inches 6 days after the last mowing. It is  $3\frac{1}{2}$  inches 12 days after the last mowing.

a) Write a linear equation to represent the height of the grass ( $y$ ) in terms of the number of days ( $x$ ) after the last mowing.

b) How tall will the grass be if the lawn is not mown for a month (30 days)?

## SECTION 2.4

Writing equations and determine the slope given an equation.

1. Write the equation of the line with slope  $-\frac{2}{3}$  and  $y$ -intercept  $(0, \frac{3}{2})$  in slope-intercept form.
2. Write the equation of the line with slope  $-0.8$  which crosses the  $y$ -intercept at  $-3.7$  in the form  $y =$
3. Write the equation in slope-intercept form of the horizontal line with  $y$ -intercept  $(0, -7)$ .
4. Write the equation of the vertical line with  $y$ -intercept  $(0, -1.5)$ .
5. Determine the slope and  $y$ -intercept of the graph of  $12x - 14y + 30 = 0$ .
6. Determine the slope and  $y$ -intercept of the graph of  $-6x - 3y = 8$ .
7. What is the slope of the line with equation  $\frac{1}{2}x - 5y - 7 = 0$ ?
8. What is the slope of the line with equation  $2.1x + 3.6y = 8.2$ ?

## SECTION 2.4

The General and Slope Intercept Forms

1. Write the equation  $y = -3x + 7$  in general form.
2. Write the equation  $y = \frac{3}{4}x - \frac{1}{2}$  in general form.
3. Write the equation  $\frac{1}{3}y - \frac{2}{5}x - 3 = 0$  in general form.
4. Write the equation  $y = 3.3x - 7.5$  in general form.

## SECTION 2.4.

Graph Linear Functions

1. Graph the linear function  $f(x) = -4x + 2.5$
2. Graph the linear function  $g(x) = \frac{3}{5}x - 2$
3. Graph the linear function  $h(x) = x - \sqrt{2}$

4. Graph the linear function  $i(x) = -\frac{1}{4}x + 1$

## SECTION 2.4

### Parallel and Perpendicular lines

Determine whether the lines  $\ell_1$  and  $\ell_2$  through the pairs of points are parallel, perpendicular, or neither.

1.  $\ell_1$ :  $(-2, 5)$  and  $(-4, 9)$   
 $\ell_2$ :  $(4, -1)$  and  $(3, 1)$

2.  $\ell_1$ :  $(5, 6)$  and  $(4, 3)$   
 $\ell_2$ :  $(-5, -2)$  and  $(4, 1)$

3.  $\ell_1$ :  $(2, -2)$  and  $(5, 2)$   
 $\ell_2$ :  $(-2, 7)$  and  $(6, 1)$

4.  $\ell_1$ :  $(5, 0)$  and  $(-5, 2)$   
 $\ell_2$ :  $(-2, -4)$  and  $(3, -3)$

Determine whether the lines with equations below are parallel, perpendicular, or neither.

5.  $-4x + 7y + 8 = 0$  and  $5x + 8y = 10$

6.  $2x + 3y = 3$  and  $3x - 2y = 4$

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

8.  $4.5x - 3y = 6.8$  and  $\frac{3}{2}x + y = \frac{1}{6}$

9. Determine the equation of a line which passes through the point  $(6, -2)$  which is parallel to the line  $5x - 3y = 15$ .

10. Determine the equation of a line which passes through the point  $(-4, \frac{1}{2})$  which is perpendicular to the line  $4x = 12 - 3y$ .

11. Determine the equation of a line which is perpendicular to the line  $-2x - 4y + 6 = 0$  and has the same  $y$ -intercept.

12. Determine the equation of a line which is parallel to the line  $6.4x + 2.4y = 8.5$  which crosses the  $x$ -axis at  $-1.8$ .

13. Determine whether the quadrilateral with vertices  $(-2, 3)$ ,  $(4, 2)$ ,  $(-3, -1)$ , and  $(3, -3)$  is a



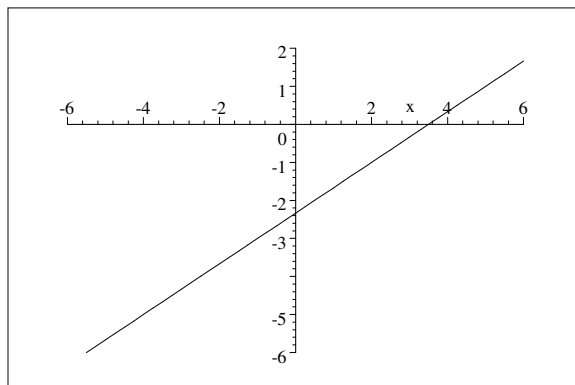
parallelogram.

14. Determine whether the quadrilateral with vertices  $(-4, -1)$ ,  $(4, 3)$ ,  $(-1, -4)$ , and  $(3, -2)$  is a trapezoid.

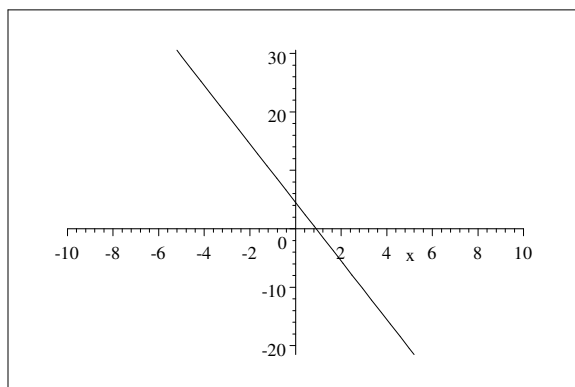
15. Determine whether the triangle with vertices  $(-2, 3)$ ,  $(1, -4)$ , and  $(7, -1)$  is a right triangle.

16. Show that the diagonals of the square with vertices  $(-a, a)$ ,  $(-a, -a)$ ,  $(a, a)$ , and  $(a, -a)$  are perpendicular.

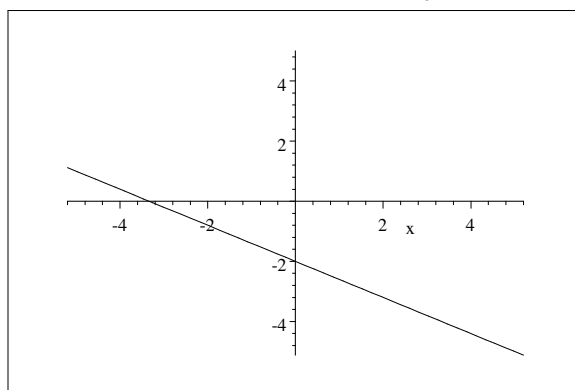
1.  $2x - 3y = 7$ , Solution is:  $\{y = \frac{2}{3}x - \frac{7}{3}\}$



2.  $10x + 2y - 9 = 0$ , Solution is:  $\{y = -5x + \frac{9}{2}\}$

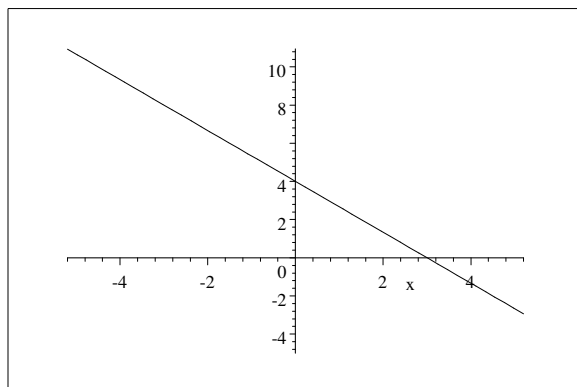


3.  $-3x - 5y = 10$ , Solution is:  $\{y = -\frac{3}{5}x - 2\}$

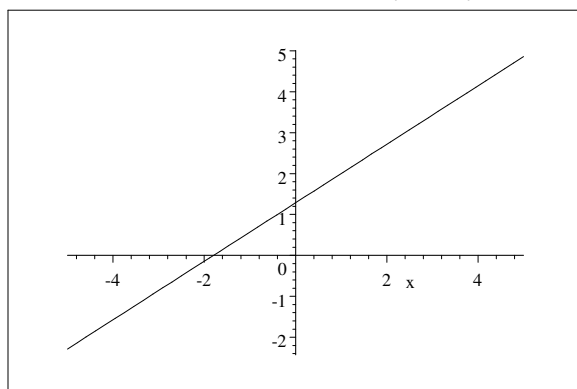


4.  $4x + 3y = 12$ , Solution is:  $\{y = -\frac{4}{3}x + 4\}$

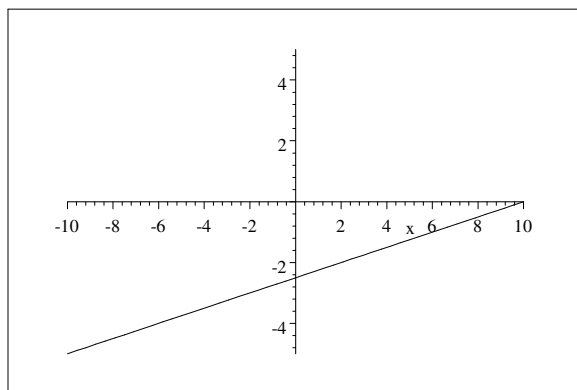
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5.  $-5x + 7y = 9$ , Solution is:  $\left\{y = \frac{5}{7}x + \frac{9}{7}\right\}$

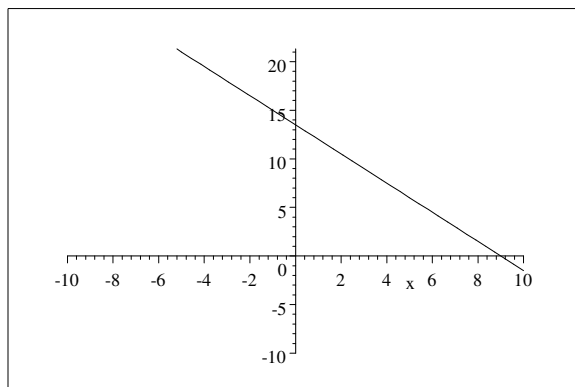


6.  $\frac{1}{2}x - 2y = 5$ , Solution is:  $\left\{y = \frac{1}{4}x - \frac{5}{2}\right\}$

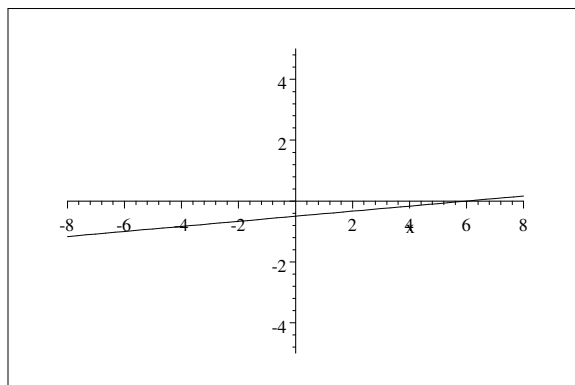


7.  $x + \frac{2}{3}y = 9$ , Solution is:  $\left\{y = -\frac{3}{2}x + \frac{27}{2}\right\}$

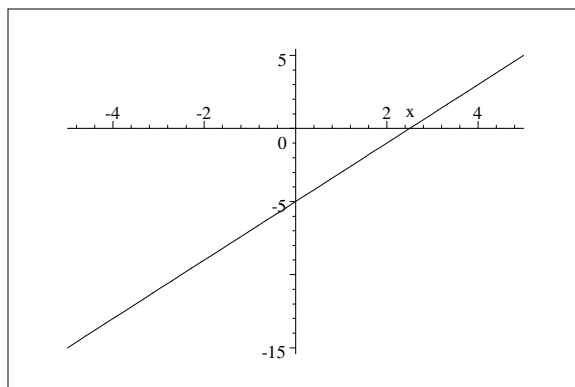
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8.  $\frac{1}{3}x - 4y = 2$ , Solution is:  $\{y = \frac{1}{12}x - \frac{1}{2}\}$

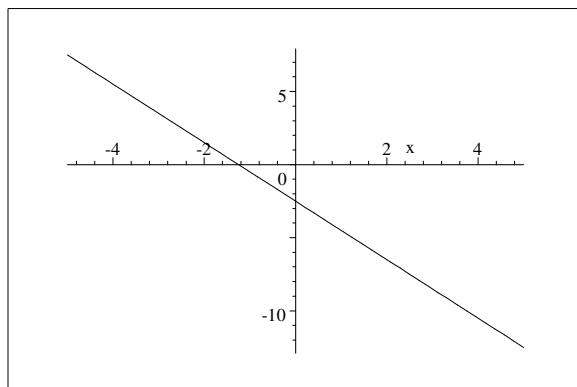


9.  $0.4x - 0.2y = 1$ , Solution is:  $\{y = 2.0x - 5.0\}$



10.  $-1.2y - 2.4x = 3$ , Solution is:  $\{y = -2.0x - 2.5\}$

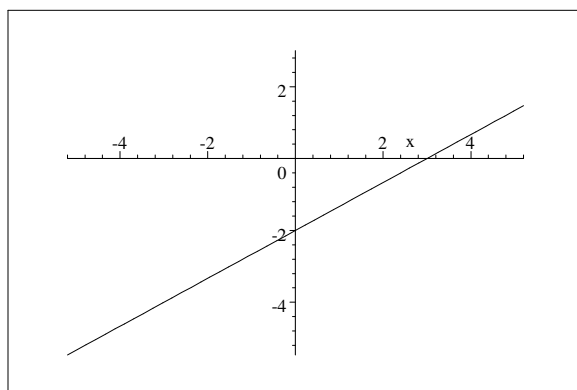
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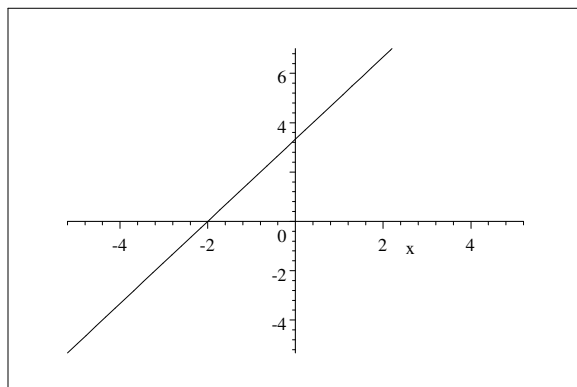
SECTION 2.1

ANSWERS — Graphing linear equations using intercepts

1.  $2x - 3y = 6$ , Solution is:  $\{y = \frac{2}{3}x - 2\}$

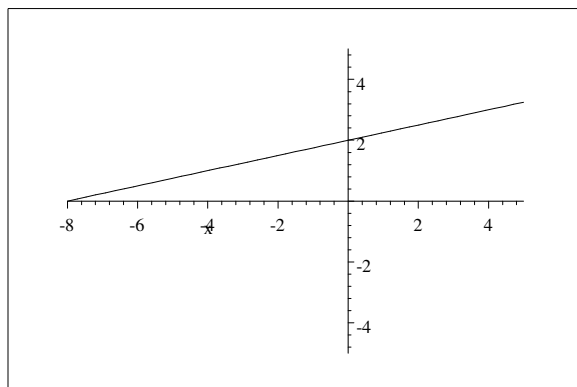


2.  $3y - 5x = 10$ , Solution is:  $\{y = \frac{5}{3}x + \frac{10}{3}\}$

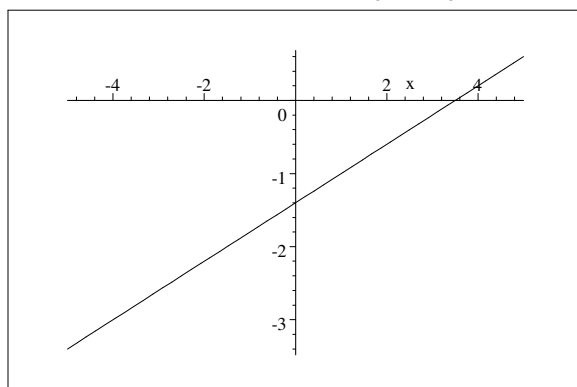


3.  $-x + 4y - 8 = 0$ , Solution is:  $\{y = \frac{1}{4}x + 2\}$

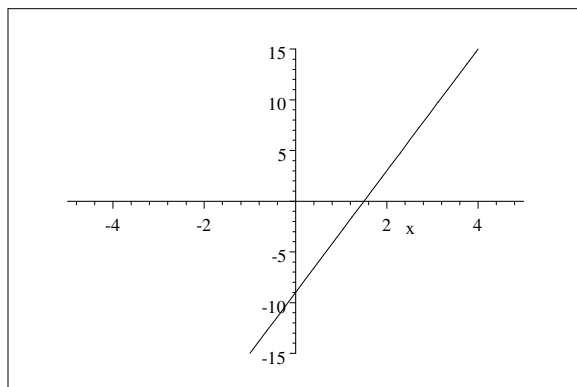
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4.  $2x - 5y = 7$ , Solution is:  $\{y = \frac{2}{5}x - \frac{7}{5}\}$

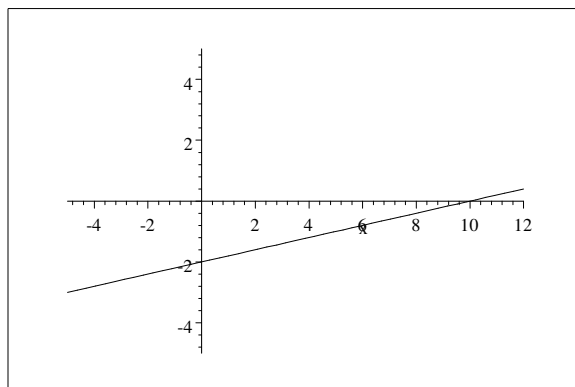


5.  $9 = 6x - y$ , Solution is:  $\{y = -9 + 6x\}$

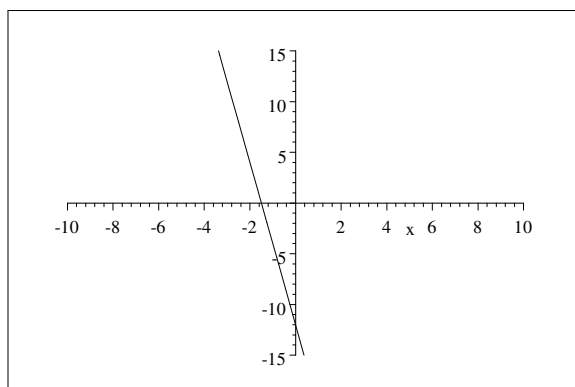


6.  $\frac{1}{5}x - y = 2$ , Solution is:  $\{y = \frac{1}{5}x - 2\}$

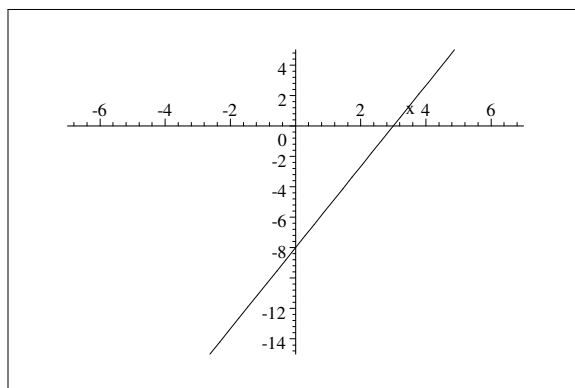
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7.  $2x + \frac{1}{4}y + 3 = 0$ , Solution is:  $\{y = -8x - 12\}$

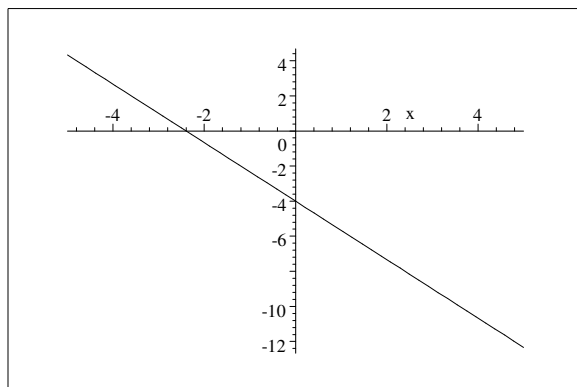


8.  $\frac{2}{3}x - \frac{1}{4}y = 2$ , Solution is:  $\{y = \frac{8}{3}x - 8\}$

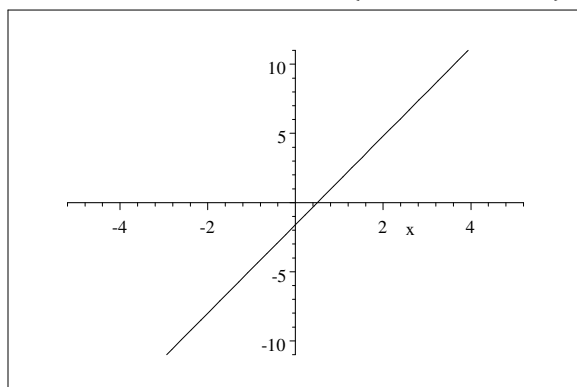


9.  $-0.5x - 0.3y - 1.2 = 0$ , Solution is:  $\{y = -1.6667x - 4.0\}$

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10.  $3.2x - y = 1.6$ , Solution is:  $\{y = 3.2x - 1.6\}$



SECTION 2.2  
ANSWERS — Slope

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

2. 1

3.  $-\frac{16}{9}$

4.  $-\frac{17}{10}$

5.  $-\frac{7}{3}$

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

7.

a.  $m = \frac{1}{3}$

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

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

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

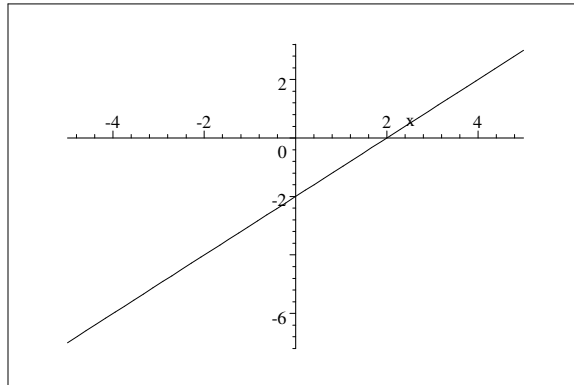
8.  $m = \frac{1}{2}$



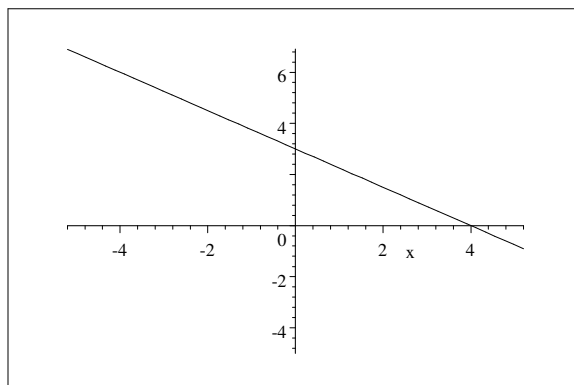
9.  $m = \frac{3}{2}$

10.  $m = -6$

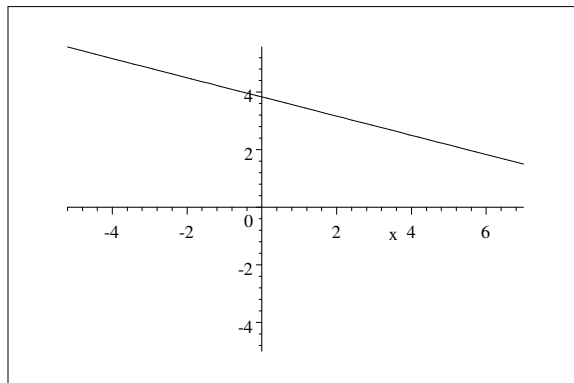
11.



12.

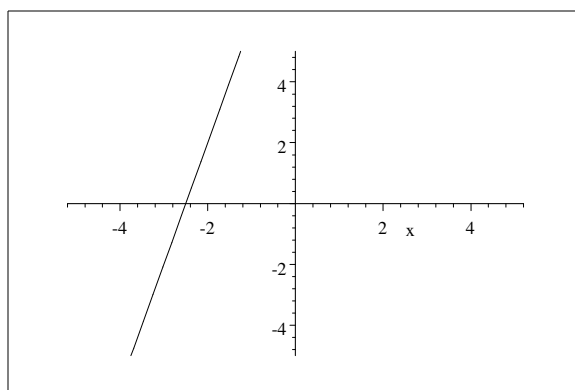


13.



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14.



- 15. d.
- 16. b.
- 17. c.
- 18. a.
- 19. f.
- 20. e.
- 21. No
- 22. Yes
- 23. -\$150 per year
- 24. (9,7)

SECTION 2.2

ANSWERS — Horizontal and Vertical lines

- 1.  $y = 4$
- 2.  $x = -5$
- 3.  $y = \sqrt{2}$
- 4.  $y = 6$
- 5.  $x\text{-axis} : y = 0$   
 $y\text{-axis} : x = 0$
- 6.  $x = 1$  and  $x = -11$

SECTION 2.3

ANSWERS – The Point Slope Form of a Line

- 1.  $y = -\frac{1}{2}x + \frac{7}{2}$
- 2.  $y = 4x - 14$

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

4.  $y = \sqrt{2}x + 7$

5.  $y = -\frac{3}{5}x - \frac{11}{5}$

6.  $y = -\frac{6}{11}x + \frac{30}{11}$

7.  $y = -2x - 2$

8.  $y + \frac{4}{9}x + \frac{8}{3}$

9. a)  $y = \frac{1}{5}x + 70$

b) 30

10. a)  $y = \frac{5}{24}x + 1$

b)  $7\frac{1}{4}$

### SECTION 2.4

ANSWERS — Writing equations and determine the slope given an equation.

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

2.  $y = -0.8x - 3.7$

3.  $y = -7$

4.  $x = 0$

5.  $m = \frac{6}{7}, (0, 2\frac{1}{7})$

6.  $m = -2, (0, -2\frac{2}{3})$

7.  $m = \frac{1}{10}$

8.  $m = -\frac{7}{12}$

### SECTION 2.4

ANSWERS — The General and Slope Intercept Forms

1.  $3x + y = 7$

2.  $3x - 4y = 2$

3.  $6x - 5y = -45$

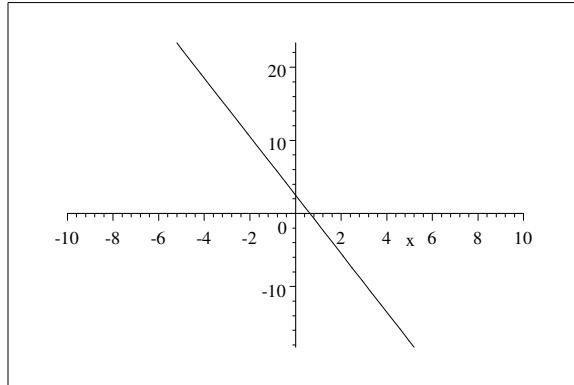
4.  $33x - 10y = 75$

### SECTION 2.4

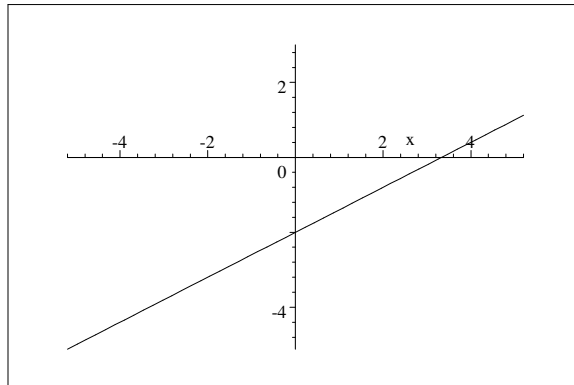
ANSWERS — Graph Linear Functions

1.  $f(x) = -4x + 2.5$

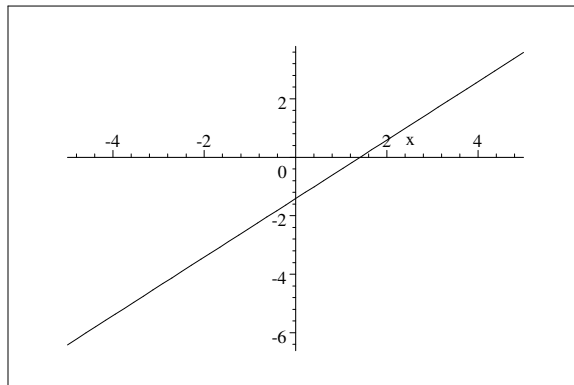
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2.  $g(x) = \frac{3}{5}x - 2$

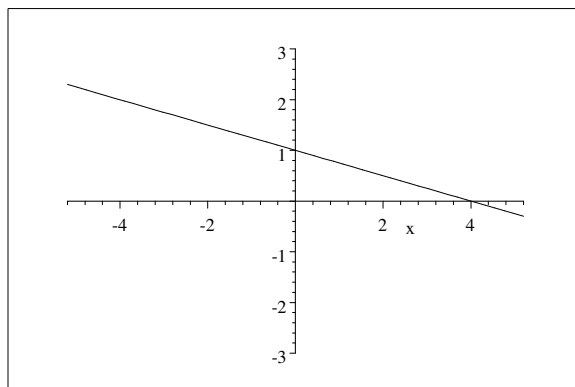


3.  $h(x) = x - \sqrt{2}$



4.  $i(x) = -\frac{1}{4}x + 1$

Fundamental Math 10033  
Chapter 2



SECTION 2.4  
ANSWERS — Parallel and Perpendicular lines

1. Parallel
2. Neither
3. Perpendicular
4. Neither
5. Neither
6. Perpendicular
7. Parallel
8. Neither
9.  $y = \frac{5}{3}x - 12$
10.  $y = \frac{3}{4}x + \frac{7}{2}$
11.  $y = 2x + \frac{3}{2}$
12.  $y = -\frac{8}{3}x - \frac{24}{5}$
13. No
14. Yes
15. No
16. The slopes are negative reciprocals (their product is negative one), specifically 1 and -1