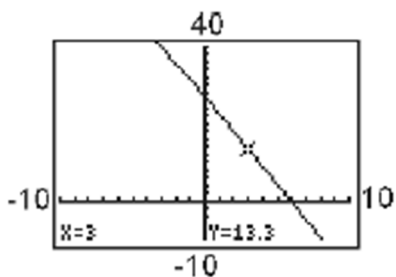


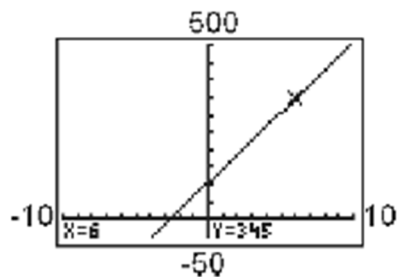
## Section 4.4 Applications of Linear Equations and Modeling

### Section 4.4 Calculator Exercises

1. 13.3



3. 345



### Section 4.4 Practice Exercises

1.  $5x + 2y = -6$

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

$$y = \frac{-5}{2}x - \frac{6}{2}$$

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

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

3.  $5x + 6y = 30$

$$x\text{-intercept: } 5x + 6(0) = 30$$

$$5x = 30$$

$$x = 6 \quad (6, 0)$$

$$y\text{-intercept: } 5(0) + 6y = 30$$

$$6y = 30$$

$$y = 5$$

$$(0, 5)$$

5.  $y = -2x - 4$

$$x\text{-intercept: } 0 = -2x - 4$$

$$2x = -4$$

$$x = -2 \quad (-2, 0)$$

$$y\text{-intercept: } (0, -4)$$

7.  $y = -9$

$$x\text{-intercept: none}$$

$$y\text{-intercept: } (0, -9)$$

9. (a)  $y = 0.14x + 1.60$

$$= 0.14(10) + 1.60$$

$$= 1.40 + 1.60$$

$$= 3.00$$

The minimum wage in 1980 was

\$3.00.

(b)  $y = 0.14x + 1.60$

$$= 0.14(45) + 1.60$$

$$= 6.30 + 1.60 = 7.90$$

The minimum wage in 2015 will be \$7.90.

(c) The y-intercept is (0, 1.6). This indicates that the minimum wage was \$1.60 per hour in the year 1970.

(d) The slope is 0.14. This indicates that the minimum wage has risen approximately \$0.14 per year during this period.

11. (a) Using the points (70, 42) and (84, 46) the slope can be found.

$$m = \frac{46 - 42}{84 - 70} = \frac{4}{14} = \frac{2}{7} \approx 0.3$$

(b) Using the points (70, 40) and (84, 48) the slope can be found.

$$m = \frac{48 - 40}{84 - 70} = \frac{8}{14} = \frac{4}{7} \approx 0.6$$

(c)  $m = \frac{2}{7}$  means that Grindel's weight is increasing at a rate of 2 oz in 7 days.  $m = \frac{4}{7}$  means that Frisco's weight is increasing at a rate of 4 oz. in 7 days.

(d) Frisco is gaining weight more rapidly.

13.  $y = 0.095x + 11.95$   $x \geq 0$

(a)  $y = 0.095(1000) + 11.95$   
 $y = \$106.95$

(b)  $y = 0.095(2000) + 11.95$   
 $y = \$201.95$

(c) y-intercept:  $y = 4.20(0)$   
 $y = 0$  (0, 0)

For 0 kilowatt-hours used, the cost is

\$0 plus a fixed monthly tax of \$11.95.

(d)  $m = 0.095$

The cost increases by \$0.095 for each kilowatt-hour used.

15. (a) Using the points (0, 7.6) and (25, 5.6) the slope of the equation can be found.

$$m = \frac{976 - 902}{75 - 150}$$

$$= -\frac{74}{75}$$

$$\approx -1.0$$

(b) Use this slope, the point (0, 7.6), and the point-slope formula the equation can be determined.

$$y - 976 = -1.0(x - 75)$$

$$y - 976 = -x + 75$$

$$y = -x + 1051$$

(c) The minimum pressure was approximately 921 mb

$$y = -x + 1051$$

$$y = -130 + 1051$$

$$y = 921$$

17. (a) Use the points (0, 57) and (4, 143) to determine the slope.

$$m = \frac{143 - 57}{4 - 0} = \frac{86}{4}$$

$$= 21.5$$

(b) The slope means that the consumption of wind energy in the United States increased by 21.5 trillions of Btu per year.

(c)  $y - y_1 = m(x - x_1)$   
 $y - 57 = 21.5(x - 0)$

$$y - 57 = 21.5x$$

$$y = 21.5x + 57$$

(d) Year 2010 corresponds to  $x = 10$ .

$$y = 21.5(10) + 57$$

$$= 272$$

The consumption of wind energy will be 272 trillion Btu in the year 2010.

19. (a)  $y = 0.10x + 5000$

(b)  $y = 0.10(11,300) + 5000$

$$y = 1130 + 5000$$

$$y = 6130$$

His bill would be \$6130.

21. (a)  $y = 90x + 105$

(b)  $y = 90(12) + 105$

$$y = 1080 + 105 = 1185$$

It will cost \$1185 to rent the unit for 1 year.

23. (a)  $y = 0.8x + 100$

(b)  $y = 0.8(200) + 100$

$$y = 160 + 100 = 260$$

It will cost \$260 to produce 200 loaves of bread in one day.