

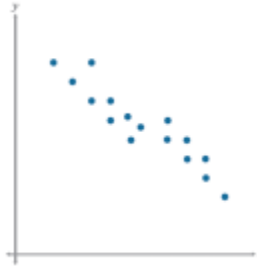
Part A: Correlation and Scatter Plots

**Practice 1**

1.

As  $x$  increases,  $y$  decreases.

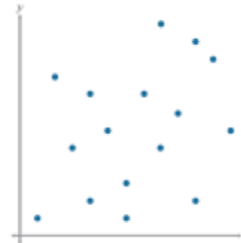
Sample



2.

As  $x$  increases,  $y$  is not related.

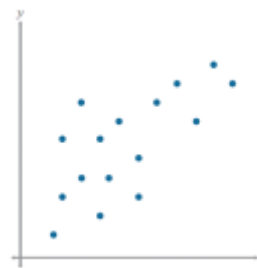
Sample



3.

As  $x$  increases,  $y$  increases.

Sample



4.

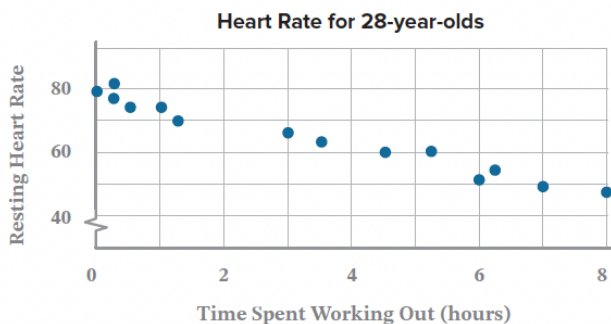
This is a strong positive correlation. As the number of hours increases, the wages earned increases. When you get paid hourly, the more hours you work, the more you get paid. The correlation coefficient is  $r = 1$ , or perfect correlation. This is because it shows a slope of \$10/1 hour worked.

5.

This is a weak negative correlation. As the temperature increases, the number of layers of clothing decreases. The hotter it is, the less likely it will be for someone to wear a sweater or jacket.

6. There is no correlation between the height of a person and a test score. Your height does not determine your test grade, nor does a test grade determine height.

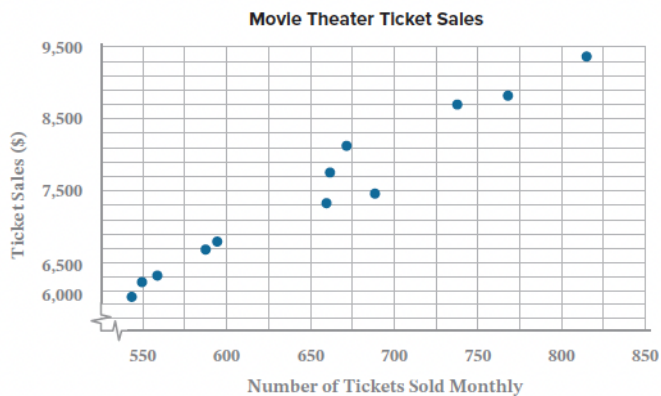
7.



8. Sample: The scale for the  $x$ -axis counts by ones because the domain is from 0 through 8. The graph shows a break on the  $y$ -axis because the data has a range from 48 through 82 therefore showing 0–40 on the  $y$ -axis is not necessary.

9. The correlation is negative. As time spent exercising increases, the resting heart rate decreases.

10.



11. The scale on the  $x$ -axis is counting by 25s from 550 to 850. The scale on the  $y$ -axis is counting by 1000s from 6,000 to 10,000. A break was needed on both axes because the data was very far away from 0 on either axis.

12. The correlation is positive. As the number of tickets sold increases, the amount of money earned increases. A movie theater will make more money if more people are buying tickets.

**Practice 2**

1. B

*x*-axis: Weight of Vehicle

*y*-axis: Gas Mileage

2. C

*x*-axis: Weeks

*y*-axis: Weight of Puppy

3. A

*x*-axis: Time on Computer

*y*-axis: Typing Speed

4.

As distance driven in miles increases, the gas remaining in the tank decreases.

This shows a negative correlation.

5.

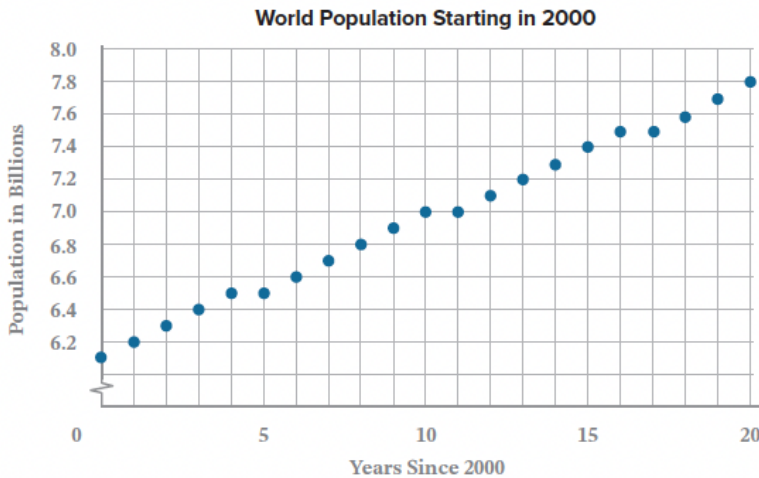
As height in inches increases, the number of pairs of socks is not related to height.

This data set has no correlation.

6.

As the age of a dishwasher increases, the number of repairs needed increases. This shows positive correlation.

7.



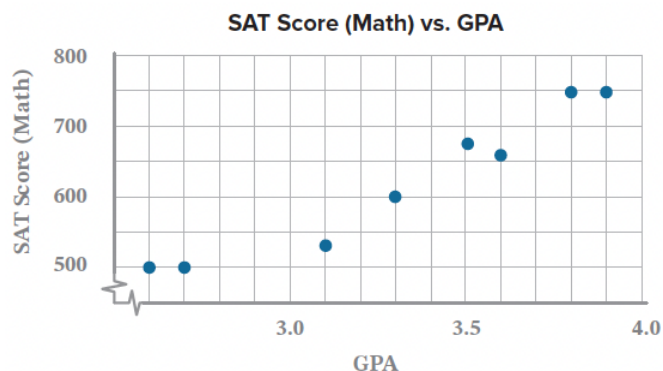
8.

As years continue, the population increases. This is a strong positive correlation.

9.

The trend will continue since the data shows that each year the world population gets larger. (Remember that the *y*-axis is in billions of people, so 0.1 billion is 100 million people.)

10.



11.

The graph has a positive correlation. (Strong/weak is difficult to determine because the data set is small.) As a student’s GPA increases, their SAT math score increases.

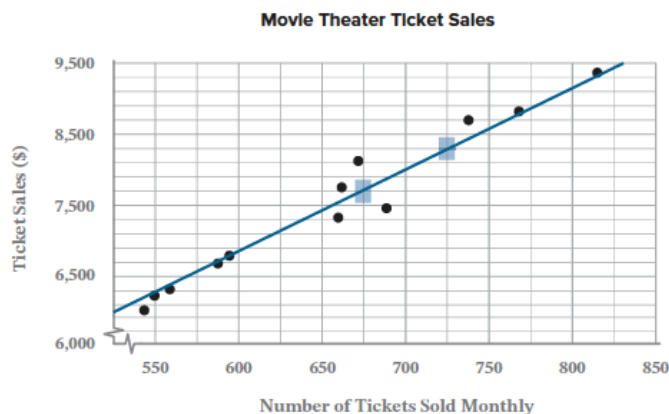
12.

Sample: The scatter plot does not have labels on the  $x$ -axis or  $y$ -axis. The  $x$ -axis should be the “number of tickets sold monthly.” The  $y$ -axis should be “ticket sales” in dollars. The graph is not scaled correctly. There needs to be a break on each axis. The  $x$ -axis should start at 500 and count by 50s through 800. The  $y$ -axis should start around \$5,000 and count by 1,000s through \$10,000.

Part B: Line of Best Fit

Practice 1

1.



2.

Sample: (675, 7,700) and (725, 8,300)

$$m = \frac{(8,300 - 7,700)}{(725 - 675)} = \frac{600}{50} = 12$$

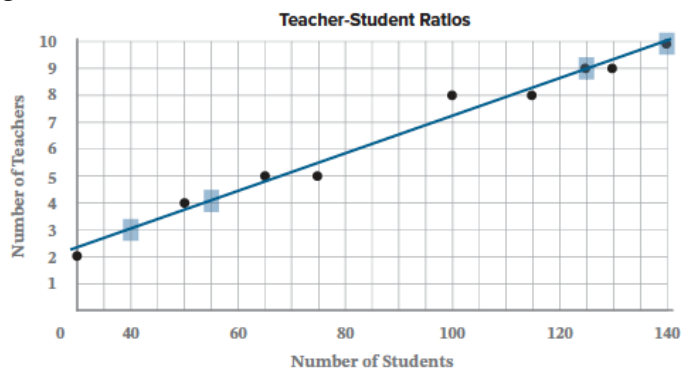
$$y - 7,700 = 12(x - 675)$$

$$y - 7,700 = 12x - 8,100$$

$$y = 12x - 400$$

Technology:  $y = 11.81x - 240.27$ ;  $r = 0.98$

3.



4.

Sample: (40, 3) and (125, 9)

$$m = \frac{(9 - 3)}{(125 - 40)} = \frac{6}{85}$$

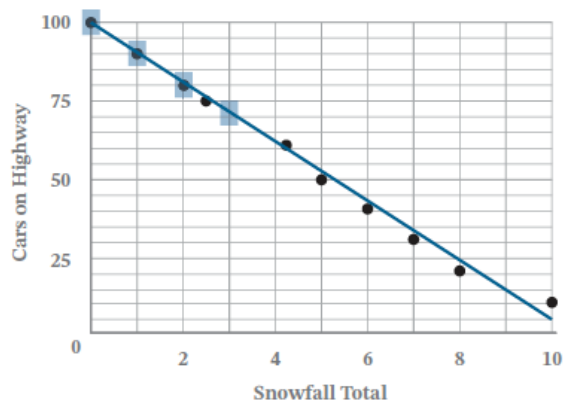
$$y - 3 = \frac{6}{85}(x - 40)$$

$$y - 3 = \frac{6}{85}x - \frac{48}{17}$$

$$y = \frac{6}{85}x + \frac{3}{17}$$

Technology:  $y = 0.07x + 0.23$ ;  $r = 0.99$

5.



6.

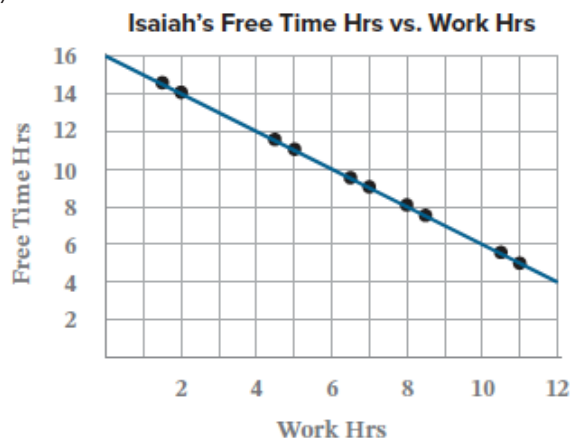
Sample: (0, 100), (1, 90)

$$m = \frac{(90 - 100)}{(1 - 0)} = \frac{-10}{1} = -10$$

$$y = -10x + 100$$

Technology:  $y = -9.43x + 98.65$ ;  $r = -0.99$

7.



Sample: (1, 15), (8, 8)

$$m = \frac{(8 - 15)}{(8 - 1)} = \frac{-7}{7} = -1$$

$$y - 15 = -1(x - 1)$$

$$y - 15 = -1x + 1$$

$$y = -1x + 16$$

Technology:  $y = -1x + 16$ ;  $r = -1$ 

8.

The slope is  $-1$ . This means Isaiah's hours of free time decrease by 1 as the hours of work increase by 1. (The more Isaiah works, the less free time he has.)

The  $y$ -intercept (0, 16) means that if Isaiah works 0 hours, he will have 16 hours of free time.

9.

$$y = -1x + 16$$

$$y = -1(9.5) + 16$$

$$y = -9.5 + 16$$

$$y = 6.5$$

If Isaiah works for 9.5 hours he will have 6.5 hours of free time.

10.

$$(x, 12)$$

$$y = -1x + 16$$

$$12 = -1x + 16$$

$$-4 = -1x$$

$$x = 4$$

If Isaiah works for 4 hours, he will have 12 hours of free time.

11.

$$(16, y)$$

$$y = -1x + 16$$

$$y = -1(16) + 16$$

$$y = 0$$

If Isaiah works for 16 hours he will have 0 hours of free time. This is the  $x$ -intercept (16,0)

12.

$(x, 18)$

$y = -1x + 16$

$18 = -1x + 16$

$2 = -1x$

$x = -2$

This equation cannot be used when Isaiah spends more than 16 hours of free time because the line moves past the  $y$ -axis and the  $x$ -values become negative. This would mean that Isaiah worked a negative number of hours which is not possible. Instead, it is more likely that Isaiah did not work at all and only slept for 6 hours.

13.

$(8, y)$

$y = 2x + 130.50$

$y = 2(8) + 130.50$

$y = 146.50$

Joel's family should expect to pay \$146.50 in 2021. This is extrapolation because the number is outside of the set of data given.

14.

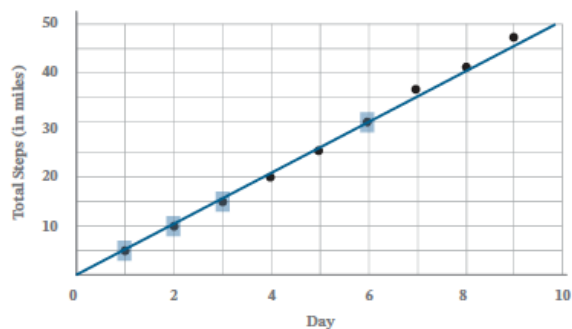
(year since 2013, electric cost)

The slope is 2. This means the electric bill will increase \$2 per year after 2013.

The  $y$ -intercept  $(0, 130.50)$  means that at year 0, or 2013, the average cost of electricity was \$130.50. This is very close to the actual amount of \$131 that Joel paid.

**Practice 2**

1.



2.

Sample:  $(1, 5), (3, 15)$ 

$$m = \frac{(15 - 5)}{(3 - 1)} = \frac{10}{2} = 5$$

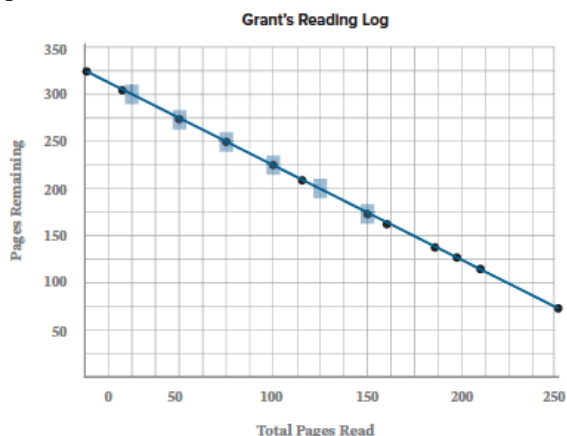
$$y - 5 = 5(x - 1)$$

$$y - 5 = 5x - 5$$

$$y = 5x$$

Technology:  $y = 5.12x - 0.23$ ;  $r = 0.99$

3.



4.

Technology calculated regression line:  $y = -x + 325$

Sample: (50, 275), (100, 225)

$$m = \frac{(225 - 275)}{(100 - 50)} = \frac{-50}{50} = -1$$

$$y - 225 = -1(x - 100)$$

$$y - 225 = -x + 100$$

$$y = -x + 325$$

Technology:  $y = -x + 325$ ;  $r = -1$

5.

(0, y) If Grant wants to know the number of pages in his book, he needs to find out the remaining pages when he reads 0 pages.

$$y = -1(0) + 325$$

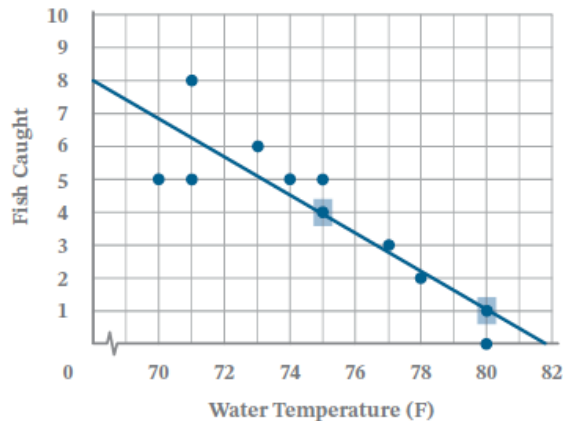
$$y = 325$$

There are 325 pages in Grant's book.

6.

The equation of the line of best fit can be used for predicting values through interpolation (between points) and extrapolation (outside of given points).

7.



8.

 $(75, 4), (80, 1)$ 

$$m = \frac{(1 - 4)}{(80 - 75)} = \frac{-3}{5} = -\frac{3}{5}$$

$$y - 1 = -\frac{3}{5}(x - 80)$$

$$y - 1 = -\frac{3}{5}x + 48$$

$$y = -\frac{3}{5}x + 49$$

Technology:  $y = -0.58x + 47.78$ ;  $r = -0.89$ 

9.

$$m = -\frac{3}{5}$$

The Goldbergs will catch 3 fewer fish per  $5^{\circ}\text{F}$  temperature increase.

10.

Sample:  $(1, 15), (4, 60)$ 

$$m = \frac{(60 - 15)}{(4 - 1)} = \frac{45}{3} = 15$$

$$y - 15 = 15(x - 1)$$

$$y - 15 = 15x - 15$$

$$y = 15x$$

Technology:  $y = 15x$ ;  $r = 1$ 

11.

 $(11, y)$ 

$$y = 15(11)$$

$$y = 165$$

Fred will charge \$165 for 11 dogs. This is extrapolation because this information cannot be seen on the graph.

12.

The slope is 15. This means that Fred charges \$15 per dog.

The  $y$ -intercept is  $(0, 0)$ . This means that Fred will earn \$0 when no dogs have been walked.

## Targeted Review

Problem	1	2	3	4-5	6	7	8-10	11-13	14	15	16	17
Lesson Origin	12	7, 12	9	9	7, 10	11	10	9	11	11	8, 12	11, 12

1.

$$m = \frac{2}{3} \parallel m = \frac{2}{3}$$

(5, -2)

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

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

$$y = \frac{2}{3}x - \frac{16}{3}$$

2.

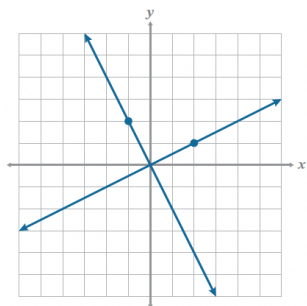
$$m = -2 \perp m = \frac{1}{2}$$

(0, 0)

$$y = \frac{1}{2}x + 0$$

$$g(x) = \frac{1}{2}x$$

3.



4.

The slope would be negative because the trees are losing leaves.

5.

The oak tree loses 50 leaves per day. The elm tree loses 40 leaves per day. The graph for the oak tree would have a steeper slope.

6.

$$c(g) = 4.25g$$

The price for 10.8 gallons would be:

$$c(10.8) = 4.25(10.8)$$

$$c(10.8) = 45.9$$

The cost of 10.8 gallons of gasoline is \$45.90.

7.

$$m = \frac{-1 - (-5)}{-1 - (-5)} = \frac{4}{4} = 1$$

Using point-slope form:

$$y + 5 = 1(x + 5)$$

$$y + 5 = x + 5$$

$$y = x$$

$$-x + y = 0$$

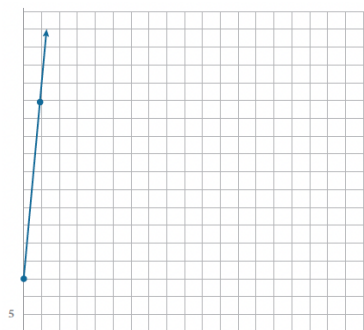
$$x - y = 0$$

8.

$$y = 50x + 15$$

9.

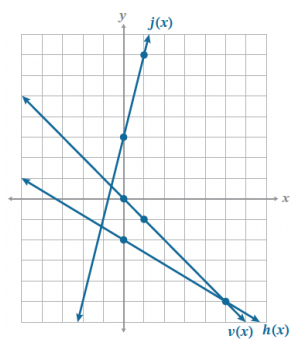
No. Jessica cannot work negative hours therefore she will not earn a negative amount of money.



10.

$$y = 50(2.5) + 15; \$140$$

11–13.



14.

$$a - 2(0) = 4$$

$$a = 4$$

$$(4, 0)$$

$$0 - 2b = 4$$

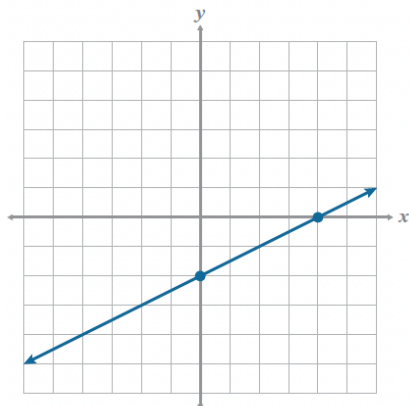
$$-2b = 4$$

$$b = -2$$

$$(0, -2)$$

$$m = -\left(\frac{A}{B}\right) = -\left(\frac{1}{-2}\right) = \frac{1}{2}$$

15.



16. A

A.  $f(x) \parallel g(x)$ B.  $f(x) \parallel h(x)$ C.  $g(x) \parallel h(x)$ 

D. cannot be determined

Distractor Rationale:

B, C, D are given to make sure your student carefully names the parallel functions.

17. B

$$3x - 6y = 7$$

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

B.  $-2$

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

D.  $2$

Distractor Rationale:

A. This is the opposite of the given slope but not the reciprocal.

C. This is the slope of the given line.

D. This is the reciprocal of the given line but not the opposite.

$$3x - 6y = 7$$

$$m = -\left(\frac{A}{B}\right)$$

$$m = -\left(\frac{3}{-6}\right) = -\frac{1}{2}$$

Perpendicular slope = 2