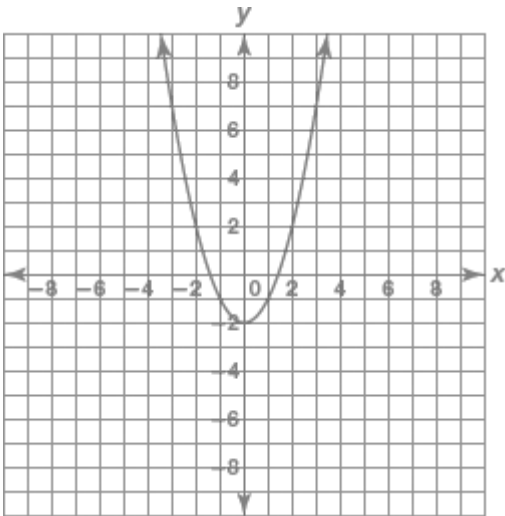


INTEGRATED MATH 1 END OF COURSE REVIEW ANSWERS

Answer Section

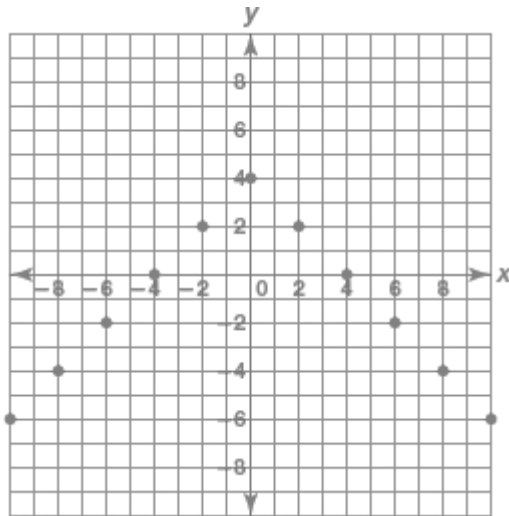
1. ANS:
The independent quantity is the number of cars washed. The dependent quantity is the time it takes to wash the cars.
2. ANS:
The independent quantity is the time in minutes. The dependent quantity is the distance, in miles, that David is away from home.
3. ANS:
 - a. not a function
 - b. function
4. ANS:
 - a. increasing
 - b. decreasing
 - c. decreasing
 - d. constant
5. ANS:
 - a. linear function
 - b. quadratic function
 - c. exponential function
 - d. linear function
6. ANS:
 - a. absolute maximum
 - b. none
 - c. absolute minimum
 - d. none
7. ANS:
Sample answers shown.

a.



$$x^2 - 2$$

b.



$$-|x| + 4$$

8. ANS:

	Time	Height
Units	Seconds	Feet
	0	0
	1	12
	2	24
	3	36

	4.5	54
	5	60
Expression	t	$12t$

a. The height of the elevator in feet depends on the time in seconds, so the dependent quantity is the height of the elevator and the independent quantity is the time.

b. The unit rate of change is 12 feet per second.

c. See table.

d. $h(t) = 12t$

$$h(14) = 12(14)$$

$$h(14) = 168$$

At a time of 14 seconds, the height of the elevator is 168 feet.

9. ANS:

$$5x + 20 - 8 = x + 32$$

$$5x + 12 = x + 32$$

$$5x + 12 - 12 = x + 32 - 12$$

$$5x = x + 20$$

$$5x - x = x - x + 20$$

$$4x = 20$$

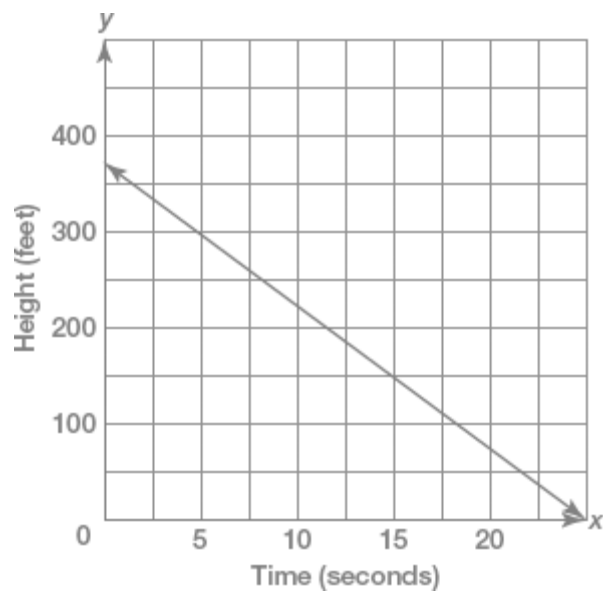
$$\frac{4x}{4} = \frac{20}{4}$$

$$x = 5$$

10. ANS:

a. $h(t) = -15t + 372$ or $h(t) = 372 - 15t$

b.



c. The graph appears to show the elevator at 200 feet after about 12 seconds.

d.

$$h(t) = -15t + 372$$

$$200 = -15t + 372$$

$$200 + 15t = -15t + 15t + 372$$

$$200 + 15t = 372$$

$$200 - 200 + 15t = 372 - 200$$

$$15t = 172$$

$$t = 11.4\bar{6} \text{ seconds}$$

11. ANS:

a. $f(x) = 31.572x - 17.741$

$$f(6.2) = 31.572(6.2) - 17.741$$

$$f(6.2) = 178.0054$$

b. $f(x) = 31.572x - 17.741$

$$f(-27.018) = 31.572(-27.018) - 17.741$$

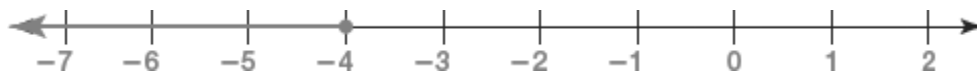
$$f(-27.018) = -870.753296$$

12. ANS:

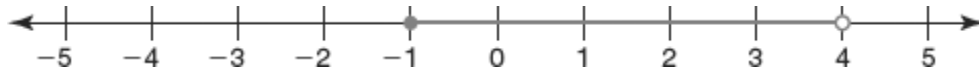
$$-4x - 4 \geq 12$$

$$-4x \geq 16$$

$$x \leq -4$$



13. ANS:



14. ANS:

a. $|-8| = 8$

b. $|-56| = 56$

15. ANS:

$$(2x - 5) = 7 \quad -(2x - 5) = 7$$

$$2x - 5 = 7 \quad 2x - 5 = -7$$

$$2x = 12 \quad 2x = -2$$

$$x = 6 \quad x = -1$$

16. ANS:

a. $f(x) = 390x + 21,855$, where x represents the number of years since 2003

b. $r = 0.942$; the r -value tells me that the line is a good fit with the data.

c. The population for 2020 will be 28,485. I determined that the year 2020 would be year 17 in the data. I substituted 17 for x in the linear regression equation and simplified.

$$f(x) = 390x + 21,855$$

$$f(17) = 390(17) + 21,855$$

$$f(17) = 6,630 + 21,855$$

$$f(17) = 28,485$$

17. ANS:

a. $35s + 20p = 150$

b. $35s + 20p = 150$

$$35(3) + 20p = 150$$

$$105 + 20p = 150$$

$$20p = 45$$

$$p = 2.25$$

If Holly buys 3 sweaters, the greatest number of pants she can buy is 2. If she wants to buy more than 2, she will need more than \$150.

c. $35s + 20p = 150$

$$35s + 20(0) = 150$$

$$35s + 0 = 150$$

$$35s = 150$$

$$s = 4.29$$

If Holly buys no pants, the greatest number of sweaters she can buy is 4. If she wants to buy more than 4, she will need more than \$150.

18. ANS:

$$C = 2\pi r$$

$$\frac{C}{2\pi} = r$$

19. ANS:

$$x + 4y = 12$$

20. ANS:

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

21. ANS:

a. $t(x) = 0.75(x - 5)$, or $t(x) = 0.75x - 3.75$

b. $t(x) = 0.75(x - 5)$

$$t(80) = 0.75(80 - 5)$$

$$t(80) = 0.75(75)$$

$$t(80) = 56.25$$

Harland would earn \$56.25 if he distributed 80 tomatoes.

c. $c(x) = 0.6(x - 3)$, or $c(x) = 0.6x - 1.8$

d. No. Harland is not correct. The two x 's represent different values. One represents tomatoes and one represents cucumbers. Those terms cannot be combined.

22. ANS:

a. Each figure has 1 more row of dots at the bottom. That row has one more dot than the bottom row in the previous figure.

b.



c. 3, 6, 10, 15, 21

23. ANS:

a. arithmetic; common difference: 3

b. geometric; common ratio: -2

c. geometric; common ratio: $\frac{1}{4}$

d. arithmetic; common difference: 0.25

24. ANS:

a. $g_n = 5 \cdot 2^{n-1}$
 $g_{15} = 81,920$

b. $a_n = \frac{1}{2} + \frac{1}{2}(n-1)$
 $a_n = \frac{15}{2}$

25. ANS:

a. 0.23
 $a_n = a_{n-1} + 0.02$

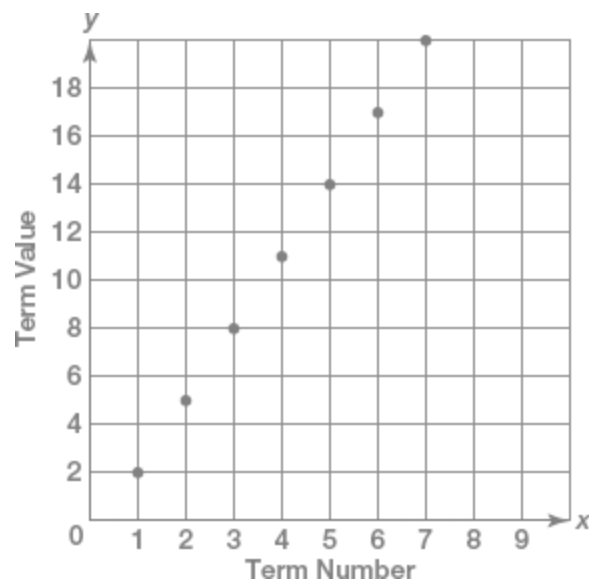
b. $\frac{1}{48}$
 $g_n = g_{n-1} \cdot \frac{1}{2}$

26. ANS:

a. $f(n) = 0.2n + 4.8$

b. $f(n) = -1.5 \cdot (-2)^n$

27. ANS:



28. ANS:

a.

Time	6 months	1 year	5 years	20 years
Simple Interest Balance	20,250	20,500	22,500	30,000

Compound Interest Balance	20,248	20,500	22,628	32,772
----------------------------------	---------------	---------------	---------------	---------------

- b. Simple interest: The average rate of change for the simple interest account is \$500 per year because each year the balance increases by \$500.

Compound Interest:

$$\frac{20,500 - 20,248}{1 - 0.5} = \frac{252}{0.5} = \frac{504 \text{ dollars}}{1 \text{ year}}$$

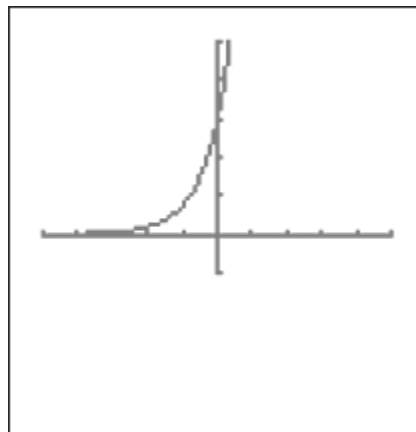
$$\frac{22,628 - 20,500}{5 - 1} = \frac{2128}{4} = \frac{532 \text{ dollars}}{1 \text{ year}}$$

$$\frac{32,772 - 22,628}{20 - 5} = \frac{10,144}{15} \approx \frac{676.27 \text{ dollars}}{1 \text{ year}}$$

The average rate of change for the compound interest account is increasing over time.

- c. A constant rate of change, such as in the simple interest account, tells me that the graph of the equation is a straight line which represents a linear function. An increasing rate of change, such as in the compound interest account, tells me that the graph of the equation is a smooth curve which represents an exponential function.

29. ANS:



- a. none
b. (0, 3)
c. $f(x) = 0$
d. all real numbers
e. $f(x) > 0$
f. increasing over the entire domain

30. ANS:

- a. $m(x) = -10(x - 5)$

b. $m(x) = 3^x + 4$

c. $m(x) = 2(x + 2)^2 - 1$

31. ANS:

a. The graph of $f(x)$ is 3 units to the left of the graph of $h(x)$.

b. The graph of $f(x)$ is 1 unit up from the graph of $h(x)$.

c. The graph of $f(x)$ is a reflection of the graph of $h(x)$ about the vertical line $x = 0$.

32. ANS:

a. $10^{\frac{1}{3}}$

b. $d^{\frac{1}{4}}$

33. ANS:

a. $x = 3$

b. $x = -5$

34. ANS:

a. $y = 3x - 5$

$$2x + 7(3x - 5) = -12$$

$$2x + 21x - 35 = -12$$

$$23x = 23$$

$$x = 1$$

$$y = 3(1) - 5 = -2$$

$$(1, -2)$$

b. $x = 8y - 5$

$$-2(8y - 5) = -10y - 2$$

$$-16y + 10 = -10y - 2$$

$$12 = 6y$$

$$y = 2$$

$$x = 8(2) - 5 = 11$$

$$(11, 2)$$

35. ANS:

a. 0 solutions

b. infinitely many solutions

c. 1 solution

36. ANS:

After 14 years, both schools have an average attendance of 950 students.

37. ANS:

a. linear combinations

b. substitution

c. substitution

38. ANS:

$$\begin{array}{l} \text{a.} \quad 6x + 2y = 2 \\ \quad 2(-3x - 4y = -13) \\ \hline \quad -6y = -24 \\ \quad y = 4 \end{array} \qquad \begin{array}{l} 6x + 2(4) = 2 \\ 6x = -6 \\ x = -1 \\ (-1, 4) \end{array}$$

$$\begin{array}{l} \text{b.} \quad 3(0.5x - 0.25y = -0.5) \\ \quad 0.2x + 0.75y = 6.6 \\ \hline \quad 1.7x = 5.1 \\ \quad x = 3 \end{array} \qquad \begin{array}{l} 0.2(3) + 0.75y = 6.6 \\ 0.75y = 6 \\ y = 8 \\ (3, 8) \end{array}$$

39. ANS:

$$\begin{cases} y = 2000 + 0.15s \\ y = 2200 + 0.10s \end{cases} \qquad \begin{array}{l} 2000 + 0.15s = 2200 + 0.10s \\ 0.05s = 200 \\ s = 4000 \end{array}$$

Brittany and Lynn each need to sell \$4000 in order to earn the same amount each month.

40. ANS:

a. Answers will vary.

$$(8, 8), (9, 7), (10, 9)$$

$$8 \geq 0.75(8) \quad 7 \geq 0.75(9) \quad 9 \geq 0.75(10)$$

$$8 \geq 6 \quad 7 \geq 6.75 \quad 9 \geq 7.5$$

$$8 \leq 2(8) - 7 \quad 7 \leq 2(9) - 7 \quad 9 \leq 2(10) - 7$$

$$8 \leq 9 \quad 7 \leq 11 \quad 9 \leq 13$$

b. Answers will vary.

(15, 3), (12, 2), (10, 1)

$$3 < 0.5(15) - 2 \quad 2 < 0.5(12) - 2 \quad 1 < 0.5(10) - 2$$

$$3 < 5.5 \quad 2 < 4 \quad 1 < 3$$

$$3 > -0.25(15) + 3 \quad 2 > -0.25(12) + 3 \quad 1 > -0.25(10) + 3$$

$$3 > -0.75 \quad 2 > 0 \quad 1 > 0.5$$

41. ANS:

$$\begin{cases} x > -2 \\ x \leq 2 \\ y < 3 \\ y \geq -x \end{cases}$$

42. ANS:

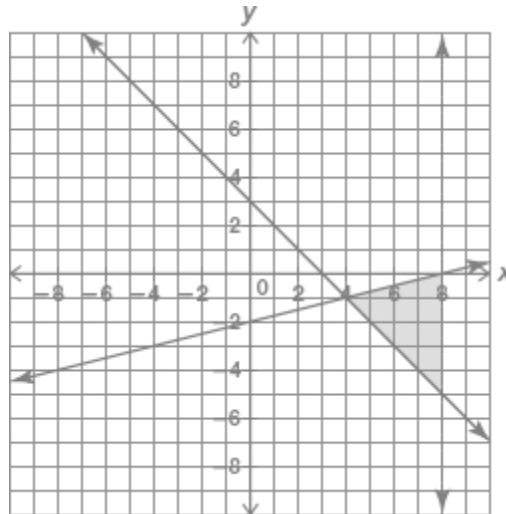
a. dashed line

b. solid line

43. ANS:

$$\begin{cases} x + y \leq 20,000 \\ x \geq 5000 \\ y \geq 8000 \end{cases}$$

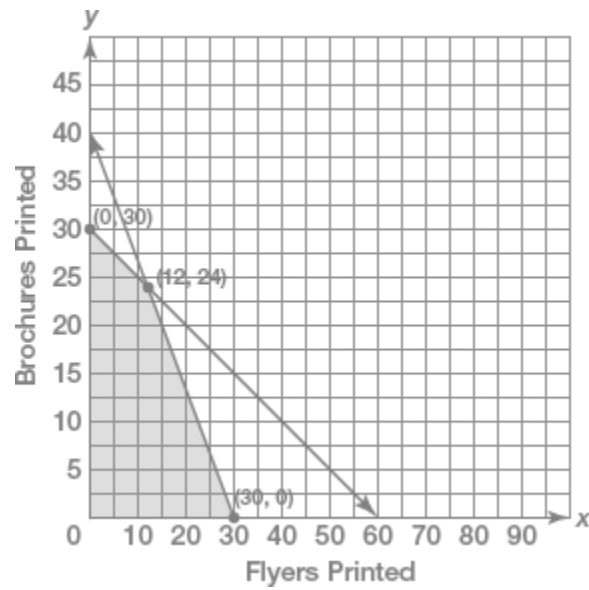
44. ANS:



45. ANS:

a.
$$\begin{cases} x \geq 0 \\ y \geq 0 \\ 2x + 4y \leq 120 \\ 12x + 9y \leq 360 \end{cases}$$

b.



$$P(x, y) = x + 2y$$

$$P(0, 30) = 0 + 2(30) = 60$$

$$P(12, 24) = 12 + 2(24) = 60$$

$$P(30, 0) = 30 + 2(0) = 30$$

The company can maximize their profit by printing either 12 flyers and 24 brochures or 0 flyers and 30 brochures.

46. ANS:

a.



b. Minimum = 1

$$Q1 = 3$$

$$Q3 = 8$$

$$\text{Lower Fence} = Q1 - (\text{IQR} \cdot 1.5)$$

$$= 3 - (5 \cdot 1.5)$$

$$= -4.5$$

$$\text{Maximum} = 11$$

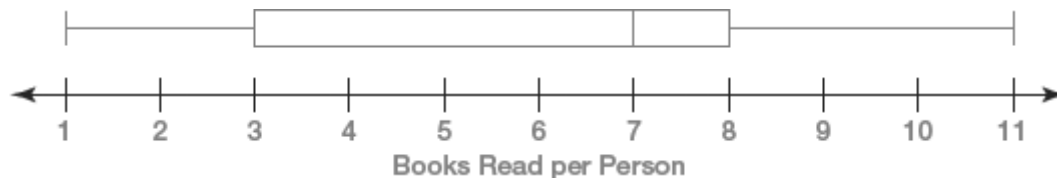
$$\text{Median} = 7$$

$$\text{IQR} = 8 - 3 = 5$$

$$\begin{aligned}\text{Upper Fence} &= Q3 + (\text{IQR} \cdot 1.5) \\ &= 8 + (5 \cdot 1.5) \\ &= 15.5\end{aligned}$$

c. No. All values are between the lower fence and the upper fence.

d.



PTS: 1 REF: 8.1 | 8.3 NAT: S.ID.1 | S.ID.3 | S.ID.1 | S.ID.2 | S.ID.3

47. ANS:

a.
$$\bar{x} = \frac{\sum x}{n} = \frac{7+8+9+10+10+12+14}{7} = 10$$

b.
$$\begin{aligned}(7-10)^2 &= 9 & (9-10)^2 &= 1 & (10-10)^2 &= 0 & (14-10)^2 &= 16 \\ (8-10)^2 &= 4 & (10-10)^2 &= 0 & (12-10)^2 &= 4\end{aligned}$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}} = \sqrt{\frac{9+4+1+0+0+4+16}{7}} \approx 2.2$$

48. ANS:

a. Data set A is skewed right.
Data set B is symmetric.

b. The median is the best measure of center for data set A because it is skewed.
The mean is the best measure of center for data set B because the data is symmetric.

c. The IQR is the best measure of spread for data set A because the median is the best measure of center.
The standard deviation is the best measure of spread for data set B because the mean is the best measure of center.

49. ANS:

a. $y = -0.75x + 4.92$

b. $r \approx 0.982$

c. A correlation coefficient of 0.982 is close to 1, which indicates that a linear model is a good fit for the data. Because the correlation coefficient is positive, the linear model has a positive slope.

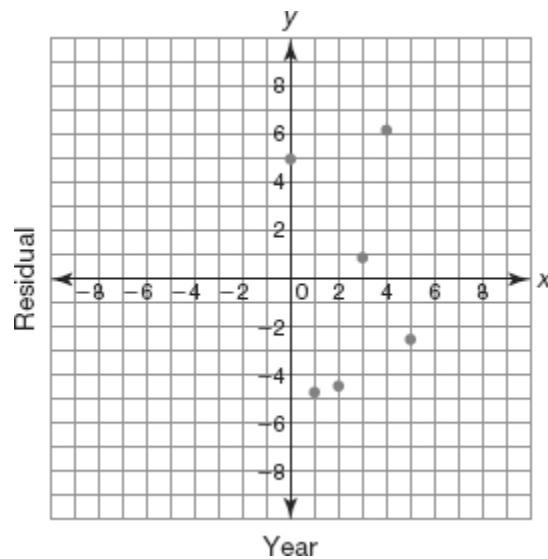
50. ANS:

a.

Year	Number of Students	Predicted Number of Students	Residual Value
------	--------------------	------------------------------	----------------

0	22	$y = 13.7(0) + 17.0 = 17.0$	$22 - 17.0 = 5$
1	26	$y = 13.7(1) + 17.0 = 30.7$	$26 - 30.7 = -4.7$
2	40	$y = 13.7(2) + 17.0 = 44.4$	$40 - 44.4 = -4.4$
3	59	$y = 13.7(3) + 17.0 = 58.1$	$59 - 58.1 = 0.9$
4	78	$y = 13.7(4) + 17.0 = 71.8$	$78 - 71.8 = 6.2$
5	83	$y = 13.7(5) + 17.0 = 85.5$	$83 - 85.5 = -2.5$

b.



c. Yes. The residual plot indicates that a linear model may be a good fit for the data because there is no pattern in the residual plot.

51. ANS:

Answers will vary.

Fewer people are outside in the rain, so there are fewer potential customers.

People who are outside in the rain are rushing to their destinations and less likely to stop and buy items.

52. ANS:

Answers will vary.

The people who reduced the fat in their diet might also have exercised more, leading to lower blood pressure.

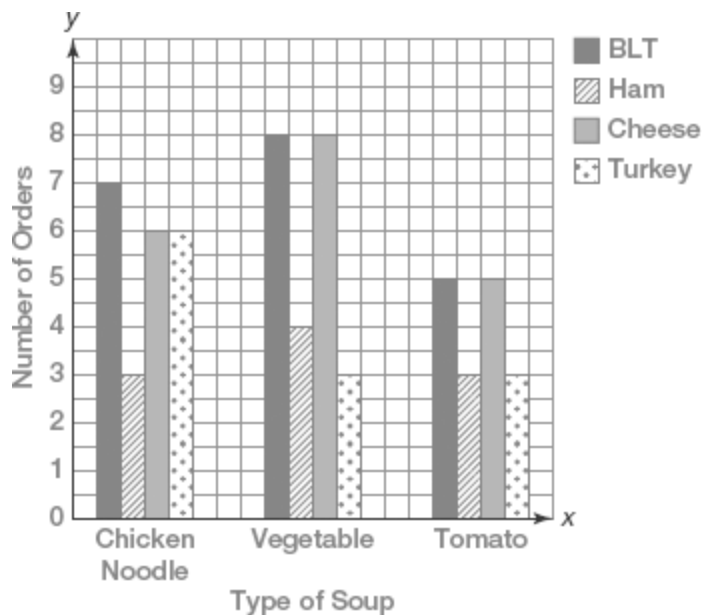
The people who ate a higher-fat diet might have eaten more processed food, and those who ate a reduced fat diet might also have eaten more fruits and vegetables that reduced their blood pressure.

53. ANS:

a.

		Sandwich				Total
		BLT	Ham	Cheese	Turkey	
Soup	Chicken Noodle	7	3	6	6	22
	Vegetable	8	4	8	3	23
	Tomato	5	3	5	3	16
	Total	20	10	19	12	61

b.



c. Answers will vary.

Tomato soup seems to be the least favorite type of soup. BLT seems to be the favorite type of sandwich. Ham sandwich seems to be the least favorite type of sandwich.

d.

		Sandwich				Total
		BLT	Ham	Cheese	Turkey	
Soup	Chicken Noodle	$\frac{7}{61} \approx 0.115$	$\frac{3}{61} \approx 0.049$	$\frac{6}{61} \approx 0.098$	$\frac{6}{61} \approx 0.098$	$\frac{22}{61} \approx 0.361$
	Vegetable	$\frac{8}{61} \approx 0.131$	$\frac{4}{61} \approx 0.066$	$\frac{8}{61} \approx 0.131$	$\frac{3}{61} \approx 0.049$	$\frac{23}{61} \approx 0.377$
	Tomato	$\frac{5}{61} \approx 0.082$	$\frac{3}{61} \approx 0.049$	$\frac{5}{61} \approx 0.082$	$\frac{3}{61} \approx 0.049$	$\frac{16}{61} \approx 0.262$
	Total	$\frac{20}{61} \approx 0.328$	$\frac{10}{61} \approx 0.164$	$\frac{19}{61} \approx 0.311$	$\frac{12}{61} \approx 0.197$	$\frac{61}{61} = 1$

e.

		Sandwich				Total
		BLT	Ham	Cheese	Turkey	
Soup	Chicken Noodle	$\frac{7}{20} = 35\%$	$\frac{3}{10} = 30\%$	$\frac{6}{19} \approx 31.6\%$	$\frac{6}{12} = 50\%$	$\frac{22}{61} \approx 36.1\%$
	Vegetable	$\frac{8}{20} = 40\%$	$\frac{4}{10} = 40\%$	$\frac{8}{19} \approx 42.1\%$	$\frac{3}{12} = 25\%$	$\frac{23}{61} \approx 37.7\%$
	Tomato	$\frac{5}{20} = 25\%$	$\frac{3}{10} = 30\%$	$\frac{5}{19} \approx 26.3\%$	$\frac{3}{12} = 25\%$	$\frac{16}{61} \approx 26.2\%$
	Total	$\frac{20}{20} = 100\%$	$\frac{10}{10} = 100\%$	$\frac{19}{19} = 100\%$	$\frac{12}{12} = 100\%$	$\frac{61}{61} = 100\%$

f. Answers will vary.

Vegetable soup is the favorite in combination with most sandwiches. Chicken noodle soup is the favorite in combination with a turkey sandwich. Tomato soup is the least favorite overall and in combination with any sandwich.

g. Answers will vary.

The relative frequency conditional distribution best displays the combinations. Based on these data, I think the combinations should be vegetable soup with a BLT, ham sandwich, or cheese sandwich because the largest percent of these sandwiches were ordered with vegetable soup. I would also offer chicken noodle soup with a turkey sandwich because the greatest percentage of turkey sandwiches were served with chicken noodle soup.

54. ANS:

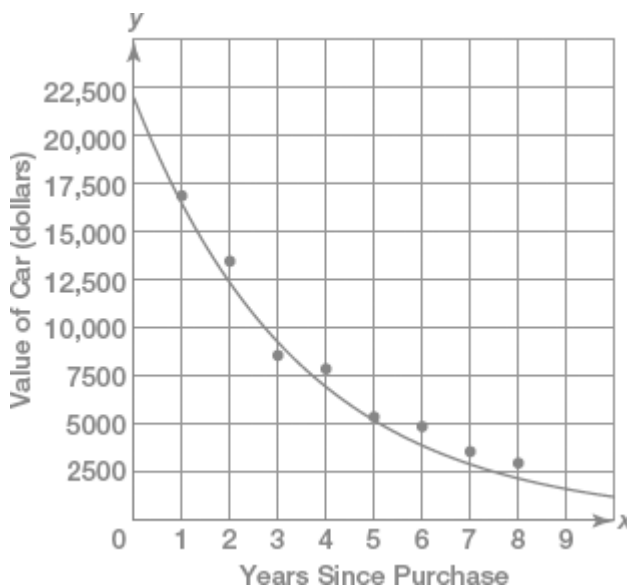
a. The relation is a function because at every time, there is just one water level. Also, the graph passes the Vertical Line Test. The function is a linear piecewise function.

b. The domain is all times from 0 to 24 minutes. The range is all water levels from 0 to 30 gallons.

- c. The absolute minimum value is 0. It is the lowest possible water level that the washing machine has during the cycle. The absolute maximum is 30. It is the greatest possible water level that the washing machine has during the cycle.
- d. 10 gallons
- e. The washing machine fills at a rate of 5 gallons per minute. It drains at a rate of 10 gallons per minute.
- f. Answers will vary.

The washing machine begins by filling at a rate of 5 gallons per minute for the first 4 minutes. Once it fills to 20 gallons, it stops filling and soaks for 4 minutes. It then drains for the next 2 minutes at a rate of 10 gallons per minute. The machine then goes through its spin cycle for the next 2 minutes before refilling. It fills at a rate of 5 gallons per minute for the next 6 minutes until it reaches 30 gallons. It soaks for 3 minutes then drains at a rate of 10 gallons per minute finishing the full cycle in 24 minutes.

55. ANS:



- a. See graph.
- b. Answers will vary.

See graph.

My function belongs to the exponential family of functions.

- c. Answers will vary.

At 0 years since purchase, the value of the car is about \$22,000. This is the value of the car when it was new.

- d. Answers will vary.

At 10 years since purchase, the value of the car is about \$12,500.

e. $y = -1910x + 16,568$
 $y = 20,616(0.78)^x$

The exponential equation is the better fit. The linear regression equation has a correlation coefficient of $r = -0.948$ and the exponential regression equation has a correlation coefficient of $r = -0.992$. While both models reasonably model the data, the exponential equation is the better fit. This makes sense since the data do not decrease at a constant rate.

f. After 10 years, the value of the car will be about \$1719. This value is close to the value I determined in part (d).

56. ANS:

$$x_1 = 5, y_1 = 12, x_2 = -1, y_2 = 6$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{((-1) - 5)^2 + (6 - 12)^2} = \sqrt{36 + 36} = \sqrt{72} \approx 8.49$$

57. ANS:

a. The coordinates of A' are $(-4, 5)$ and the coordinates of B' are $(-8, 2)$.

b. A horizontal translation changes the x -coordinate of both the endpoints, but the y -coordinates remain the same.

c. The length of the image and the pre-image are the same.

58. ANS:



59. ANS:

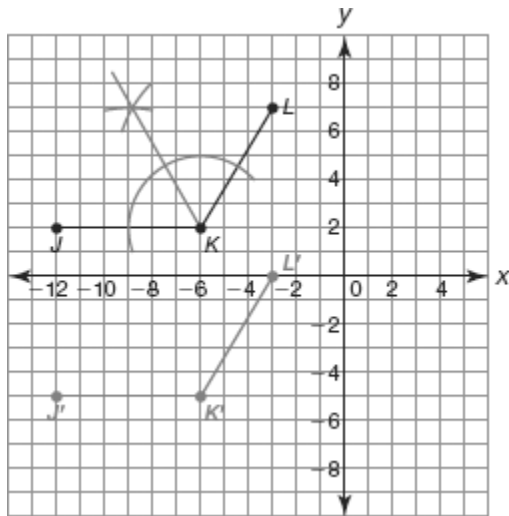
$$x_1 = -2, y_1 = -1, x_2 = 6, y_2 = 3$$

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) = \left(\frac{-2 + 6}{2}, \frac{-1 + 3}{2} \right) = \left(\frac{4}{2}, \frac{2}{2} \right) = (2, 1)$$

60. ANS:

The lengths of \overline{GI} and \overline{IH} are the same. The midpoint of a line segment divides the line segment into two equal parts.

61. ANS:

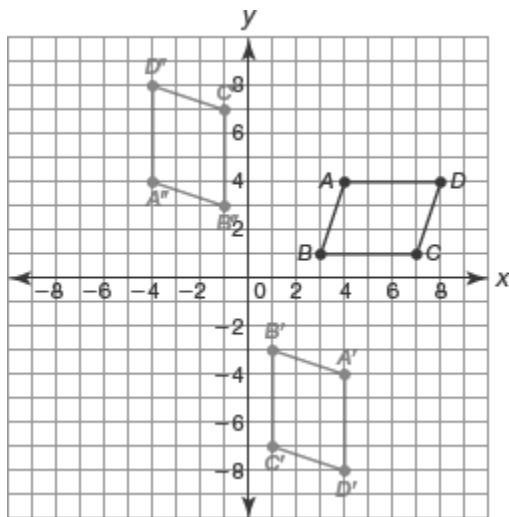


- a. See graph.
- b. A vertical translation changes the y -coordinates of the angle endpoints, but the x -coordinates remain the same.
- c. See graph.

62. ANS:

- a. Answers may vary.
An equation of a line that is parallel to line m is $y = \frac{1}{3}x + 6$. The slopes of parallel lines are equal.
- b. Answers may vary.
An equation of a line that is perpendicular to line m is $y = -3x + 6$. The slopes of perpendicular lines are negative reciprocals.

63. ANS:



- a. $A'(4, -4)$, $B'(1, -3)$, $C'(1, -7)$, $D'(4, -8)$

b. $A''(-4, 4), B''(-1, 3), C''(-1, 7), D''(-4, 8)$

64. ANS:

a. Triangle MNO was reflected over the x -axis to create triangle STU .

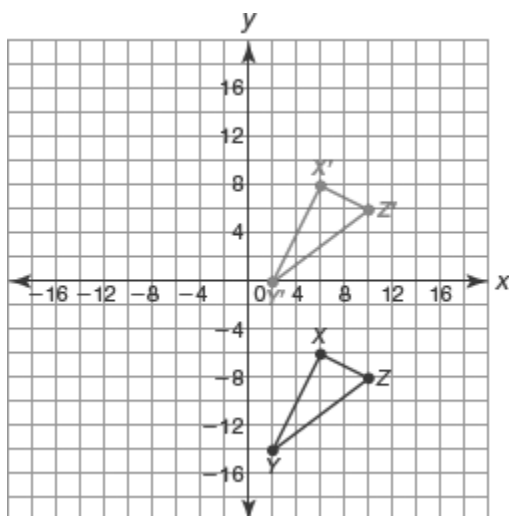
b. $\triangle MNO \cong \triangle STU$

c. $\angle M \cong \angle S$ $\overline{MN} \cong \overline{ST}$

$\angle N \cong \angle T$ $\overline{NO} \cong \overline{TU}$

$\angle O \cong \angle U$ $\overline{OM} \cong \overline{US}$

65. ANS:



a. $XY = \sqrt{(6-2)^2 + (-6-(-14))^2}$
 $= \sqrt{4^2 + 8^2}$
 $= \sqrt{16 + 64}$
 $XY = \sqrt{80}$

$YZ = \sqrt{(10-2)^2 + (-8-(-14))^2}$
 $= \sqrt{8^2 + 6^2}$
 $= \sqrt{64 + 36}$
 $YZ = 10$

$ZX = \sqrt{(10-6)^2 + (-8-(-6))^2}$
 $= \sqrt{4^2 + (-2)^2}$
 $= \sqrt{16 + 4}$
 $ZX = \sqrt{20}$

$$\begin{aligned}
 \text{b. } X'Y' &= \sqrt{(6-2)^2 + (8-0)^2} & Y'Z' &= \sqrt{(10-2)^2 + (6-0)^2} \\
 &= \sqrt{4^2 + 8^2} & &= \sqrt{8^2 + 6^2} \\
 &= \sqrt{16 + 64} & &= \sqrt{64 + 36} \\
 X'Y' &= \sqrt{80} & X'Y' &= 10
 \end{aligned}$$

$$\begin{aligned}
 Z'X' &= \sqrt{(10-6)^2 + (6-8)^2} \\
 &= \sqrt{4^2 + (-2)^2} \\
 &= \sqrt{16 + 4} \\
 X'Y &= \sqrt{20}
 \end{aligned}$$

According to the SSS Theorem, if three sides of one triangle are congruent to the corresponding sides of another triangle, then the triangles are congruent. The lengths of the corresponding sides of triangle XYZ and triangle $X'Y'Z'$ are equal, therefore the triangles are congruent.

66. ANS:

Note: While students only need to determine the measure of two sides and their included angle, we have included all measures here for ease in checking student answers.

$$\begin{array}{ll}
 DE = \sqrt{32} & \angle D = 90^\circ & KL = \sqrt{32} & \angle K = 90^\circ \\
 EF = \sqrt{50} & \angle E = 40^\circ & LM = \sqrt{50} & \angle L = 40^\circ \\
 DF = \sqrt{18} & \angle F = 50^\circ & KM = \sqrt{18} & \angle M = 50^\circ
 \end{array}$$

The length of two sides and the included angle are congruent.

Therefore, triangle DEF and triangle KLM are congruent by the SAS Congruence Theorem.

67. ANS:

a. Note: While students only need to determine the measure of two angles and their included side, we have included all measures here for ease in checking student answers.

$$\begin{array}{ll}
 QR = 3 & \angle Q = 45^\circ & HI = \sqrt{10} & \angle H = 35^\circ \\
 RP = \sqrt{17} & \angle R = 105^\circ & IG = \sqrt{17} & \angle I = 120^\circ \\
 QP = \sqrt{32} & \angle P = 30^\circ & HG = \sqrt{41} & \angle G = 25^\circ
 \end{array}$$

The measures of two angles and the included side are not congruent.

Therefore, triangle GHI and triangle PQR are not congruent.

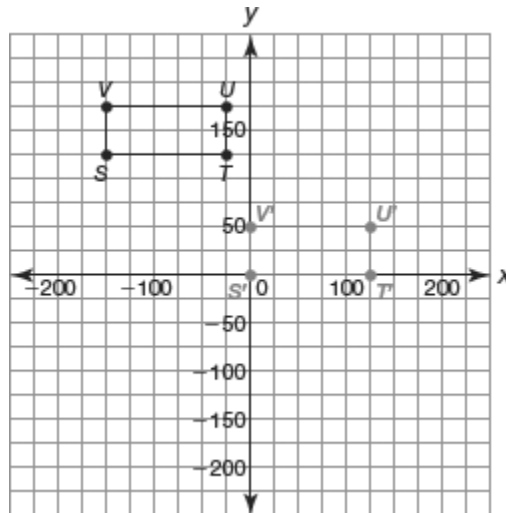
b. Note: While students only need to determine the measure of two angles and their non-included side, we have included all measures here for ease in checking student answers.

$$\begin{array}{llll}
 HI = \sqrt{10} & \angle H = 35^\circ & WX = \sqrt{10} & \angle W = 35^\circ \\
 IG = \sqrt{17} & \angle I = 120^\circ & XV = \sqrt{17} & \angle X = 120^\circ \\
 HG = \sqrt{41} & \angle G = 25^\circ & WV = \sqrt{41} & \angle V = 25^\circ
 \end{array}$$

The measures of two angles and the non-included sides are congruent.

Therefore, triangle GHI and triangle VWX are congruent by the AAS Congruence Theorem.

68. ANS:



a. Answers may vary.

To transform rectangle $STUV$ so that point S is on the origin, I must perform two translations. I must translate rectangle $STUV$ down 125 units and 150 units to the right. The coordinates of rectangle $S'T'U'V'$ are $S'(0, 0)$, $T'(125, 0)$, $U'(125, 50)$, and $V'(0, 50)$.

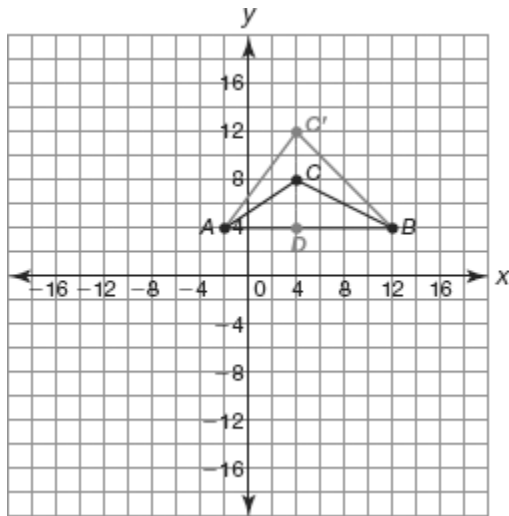
b.
$$\begin{aligned}
 \text{Perimeter} &= S'T' + T'U' + U'V' + V'S' \\
 &= 125 + 50 + 125 + 50 = 350
 \end{aligned}$$

The perimeter of rectangle $STUV$ is 350 units.

c.
$$\begin{aligned}
 \text{Area} &= S'T'(T'U') \\
 &= 125(50) \\
 &= 6250
 \end{aligned}$$

The area of rectangle $STUV$ is 6250 square units.

69. ANS:



a.
$$\begin{aligned} \text{Area} &= \frac{1}{2}bh \\ &= \frac{1}{2}(14)(4) \\ &= 28 \end{aligned}$$

The area of triangle ABC is 28 square units.

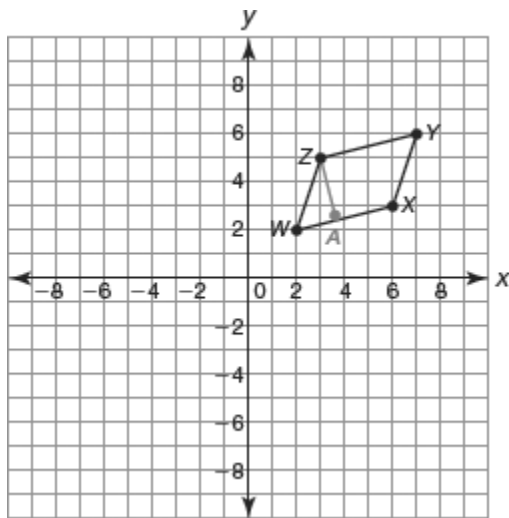
b. Answers may vary.

The height of triangle ABC is 4 units. To double the area, I must double the height. By translating point C up 4 units, the height will now be 8 units.

The location of point C' is $(4, 12)$.

Students may also translate point C down 12 units. The location of point C' is $(4, -4)$.

70. ANS:



a. Methods may vary.
I know the opposite sides of a parallelogram are congruent.

$$WX = \sqrt{(6-2)^2 + (3-2)^2}$$

$$= \sqrt{4^2 + 1^2}$$

$$WX = \sqrt{17}$$

$$ZY = \sqrt{17}$$

$$XY = \sqrt{(7-6)^2 + (6-3)^2}$$

$$= \sqrt{1^2 + 3^2}$$

$$XY = \sqrt{10}$$

$$ZW = \sqrt{10}$$

$$\text{Perimeter} = 2 \cdot \sqrt{17} + 2 \cdot \sqrt{10} \approx 14.57$$

The perimeter is approximately 14.57 units.

b. Slope of $WX = \frac{1}{4}$

Slope of $ZA = -4$

Equation of $WX: y = \frac{1}{4}x + \frac{3}{2}$

Equation of $ZA: y = -4x + 17$

Solve system of equations:

$$-4x + 17 = \frac{1}{4}x + \frac{3}{2}$$

$$-4.25x = -15.5$$

$$x \approx 3.647$$

$$y = -4(3.647) + 17$$

$$y \approx 2.412$$

The coordinates of point A are (3.647, 2.412).

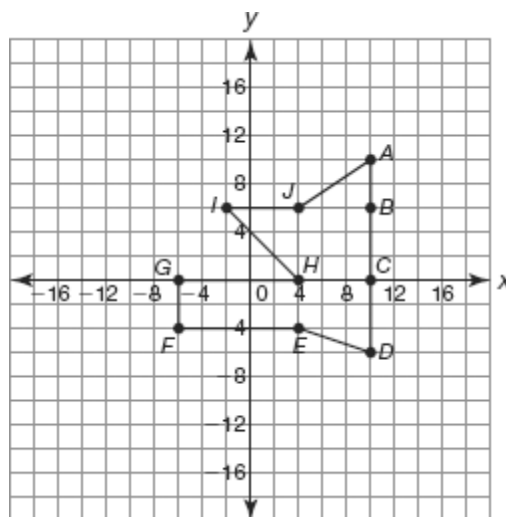
Height: $ZA \approx 2.67$

Area $\approx (2.67)(4.12)$

$$\approx 11$$

The area of the parallelogram is approximately 11 square units.

71. ANS:



a. Perimeter = $AD + DE + EF + FG + GH + HI + IJ + JA$
 $= 16 + \sqrt{40} + 10 + 4 + 10 + \sqrt{72} + 6 + \sqrt{52} \approx 68.0$

The perimeter of the composite figure is approximately 68.0 units.

b. Area = $12 + 66 + 40 + 18 = 136$

The area of the composite figure is 136 square units.

72. ANS:

a. $AB = \sqrt{(3 - (-2))^2 + (6 - 1)^2}$
 $= \sqrt{5^2 + 5^2}$

$AB = \sqrt{50}$

$CD = \sqrt{(3 - 8)^2 + (-4 - 1)^2}$
 $= \sqrt{(-5)^2 + (-5)^2}$

$CD = \sqrt{50}$

$BC = \sqrt{(8 - 3)^2 + (1 - 6)^2}$
 $= \sqrt{5^2 + (-5)^2}$

$BC = \sqrt{50}$

$AD = \sqrt{(3 - (-2))^2 + (-4 - 1)^2}$
 $= \sqrt{5^2 + (-5)^2}$

$AD = \sqrt{50}$

b. Slope of line segment AB :

$m = \frac{6 - 1}{3 - (-2)} = \frac{5}{5} = 1$

Slope of line segment CD :

$m = \frac{-4 - 1}{3 - 8} = \frac{-5}{-5} = 1$

Slope of line segment BC :

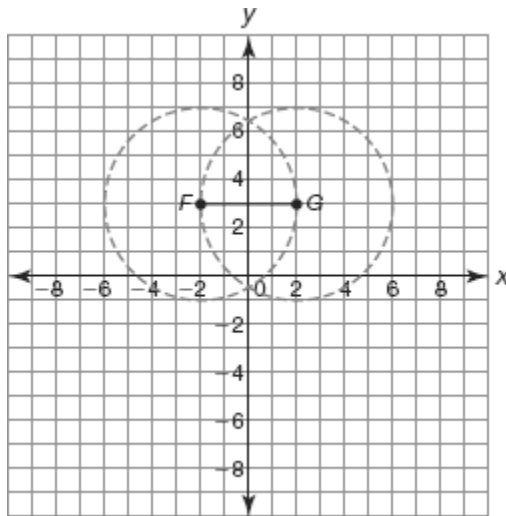
$m = \frac{1 - 6}{8 - 3} = \frac{-5}{5} = -1$

Slope of line segment AD :

$m = \frac{-4 - 1}{3 - (-2)} = \frac{-5}{5} = -1$

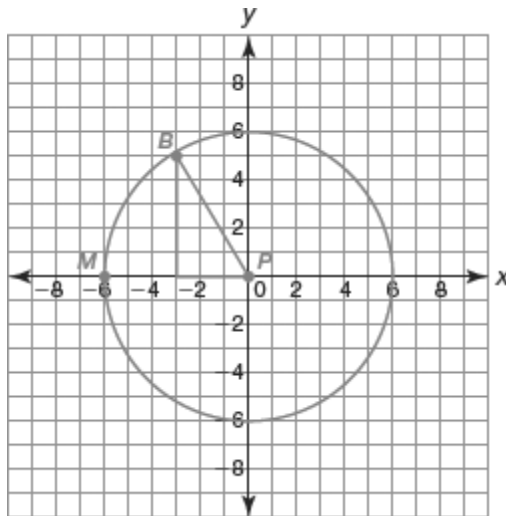
c. Quadrilateral $ABCD$ is a square. I know this is correct because all 4 sides of $ABCD$ are congruent. Also, the line segments that meet at a vertex are negative reciprocals, which means they are perpendicular. Therefore, quadrilateral $ABCD$ has 4 right angles.

73. ANS:



- a. There are two possible locations for point H . Circle F and circle G , both with radius FG , intersect at two locations. Either point of intersection is a possible location for point H .
- b. There are an infinite number of locations for point H . Point H could be located anywhere on line $x = 2$ except where $y = 3$.

74. ANS:



- a. See graph.
- b. MP is 6 units. It is the radius of circle P .
- c. The radius of circle P is 6 units. Therefore, I must determine if the length of segment PB is 6 units.

$$a^2 + b^2 = c^2$$

$$3^2 + 5^2 = c^2$$

$$9 + 25 = c^2$$

$$\sqrt{34} = c$$

$$5.8 = c$$

Point B is not on circle P because $5.8 \neq 6$.

75. ANS:

a. Calculate the length of radius AT :

$$\begin{aligned} AT &= \sqrt{(11-7)^2 + (1-(-2))^2} \\ &= \sqrt{16+9} \\ AT &= 5 \end{aligned}$$

Calculate the length of segment AB :

$$\begin{aligned} AB &= \sqrt{(2-7)^2 + (-2-(-2))^2} \\ &= \sqrt{25+0} \\ AB &= 5 \end{aligned}$$

Yes. Point B lies on circle A .

b. The diameter of circle A' is 10 units. The diameter of circle A' is the same as the diameter of circle A , because a reflection is a transformation. By definition, the pre-image and image are congruent.

76. ANS:

a. The next number in the sequence is 29,282. Each number is 11 times greater than the previous number.

b. I used inductive reasoning to determine the pattern of the sequence. Then I used deductive reasoning to calculate the next term.

77. ANS:

Statement: If a number is divisible by 10, then it is divisible by 5.

Conclusion: **Therefore, the number is divisible by 5.**

PTS: 1 REF: 16.2 TOP: Pre Test

KEY: conditional statement | propositional form | propositional variables | hypothesis | conclusion | truth table | truth value | converse | inverse | contrapositive | logically equivalent | biconditional statement

78. ANS:

p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

79. ANS:

a. Yes. The conditional statement is true.

b. If a triangle has exactly one obtuse angle, then it is an obtuse triangle.
This is true.

c. If a triangle is not an obtuse triangle, then it does not have exactly one obtuse angle.
This is true.

- d.** If a triangle does not have exactly one obtuse angle, then it is not an obtuse triangle.
This is true
- e.** A triangle is an obtuse triangle if and only if it has exactly one obtuse angle.