

Unit 0: Linear Equations and Proportions

1. What operation should be performed first when solving $\frac{2x-4}{3} = 12$? **(A.REI.1)**

- Addition
- Division
- Multiplication
- Subtraction

2. Solve for h if $V = \frac{1}{3}bh$. **(A.CED.4)**

- $h = \frac{V}{3b}$
- $h = \frac{3V}{b}$
- $h = \frac{b}{3V}$
- $h = V - \frac{b}{3}$

3. A student solved the inequality $2(x - 4) - 4x < -6x + 9x + 4$ as shown below. Did the student solve the equation correctly? If not identify the error(s) and give the correct solution. **(A.REI.3)**

$$\begin{aligned}
 2(x - 4) - 4x &< -6x + 9x + 4 \\
 2x - 8 - 4x &< -6x + 9x + 4 \\
 -2x - 8 &< 3x + 4 \\
 \underline{-3x} \quad \underline{-3x} & \\
 -5x - 8 &< 4 \\
 \underline{+8} \quad \underline{+8} & \\
 -5x &< \underline{12} \\
 \underline{-5} \quad \underline{-5} & \\
 x &< \underline{-\frac{12}{5}}
 \end{aligned}$$

4. Jason wants to earn money by raking leaves. He buys a rake that costs \$20.00. He plans to charge \$6.00 for each lawn that he rakes. **(A.CED.2)**

- Write an equation to represent P , the amount of Jason's profit, if the number of lawns he rakes is r .
- Use your equation to calculate the amount of profit Jason will make if he rakes 15 lawns.

5. The equation $p = \frac{F}{A}$ gives p , pressure, on a surface when a force F is applied and A is the area of the surface on which the force is being applied **(A.CED.4)**

- Solve the equation for A . State a property or provide an explanation for each step.
- Determine the area of a surface on which a force of 8 Newtons is applied resulting in a pressure of 4 Newtons per square meter.

6. Samantha solved the equation $6x + 11 + 3x = 47$. Her work is shown below. Did Samantha solve the problem correctly? If so, list a property or explanation for each step. If not, solve the equation correctly and list a property or explanation for each step. **(A.REI.3)**

$$6x + 11 + 3x = 47$$

$$6x + 3x + 11 = 47$$

$$9x + 11 = 47$$

$$9x = 47 + 11$$

$$9x = 58$$

$$x = \frac{58}{9} \text{ or } 6\frac{4}{9}$$

Unit 0: Linear Equations and Proportions

7. Two friends, Christy and Stephanie, went for a run. Christy began running 50 seconds before Stephanie.

- Christy ran at a rate of 7 feet per second
- Stephanie ran at a rate of 10 feet per second.

How many seconds had Christy been running at the time when the two girls had run exactly the same distance? **(A.CED.1)**

−	/	/	/	/	
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0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

8. Marie goes to the pet store to buy food for her puppy Bruiser. She has \$25.00. A bag of food costs \$12.00. She also finds a bin of toys where each toy costs \$1.50. If she must buy the food, at most how many toys can she buy for Bruiser? **(A.CED.1)**

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0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Unit 1: Functions and Their Graphs Part 1

1. The sequence below shows the number of trees a nursery plants each year.

2, 8, 14, 20...

Which formula could be used to determine the number of trees the nursery will plant next year, NEXT, if the number of trees planted this year, NOW, is known? **(F.BF.2)**

- $\text{NEXT} = 4 + \text{NOW}$
 - $\text{NEXT} = 4 \cdot \text{NOW}$
 - $\text{NEXT} = 4 \cdot \text{NOW} + 2$
 - $\text{NEXT} = \text{NOW} + 6$
2. A spring stretches 4 inches for each ounce of weight. This can be represented by the function $f(x) = 4x$. Which of the following data points would NOT lie on the graph representing this function? **(F.IF.5)**
- (0, 0)
 - (1, 3.5)
 - (2, 8)
 - (0.5, 2)
3. If $f(x) = -1.5x - 1$, give a coordinate point on the graph of f corresponding to $f(-2)$. **(F.IF.2)**
- (2, -2)
 - (-4, -2)
 - (-2, 2)
 - (-2, -4)

4. Identify the set of ordered pairs that represents a function. **(F.IF.1)**

- $\{(1, -3), (-2, 8), (0, 0), (1, -2)\}$
- $\{(1, -1), (-2, -7), (0, 1), (-1, -1)\}$
- $\{(2, -3), (-3, 6), (-2, -2), (2, 3)\}$
- $\{(-3, 2), (1, 6), (2, 2), (1, 3)\}$

5. Write a function to represent the sequence: -12, -11.75, -11.5, -11.25...? **(F.IF.3)**

- $f(n) = -12 + 0.25n$
- $f(n) = -12 - 0.25(n - 1)$
- $f(n) = -12.25 + 0.25n$
- $f(n) = -0.25 + 12(n - 1)$

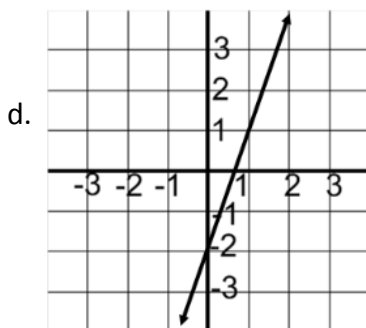
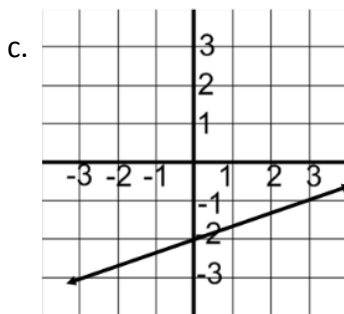
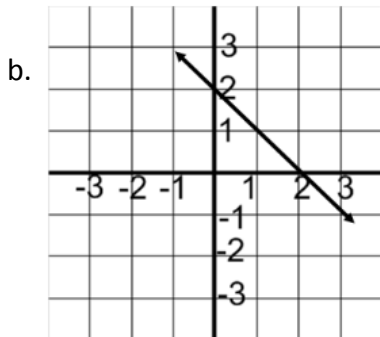
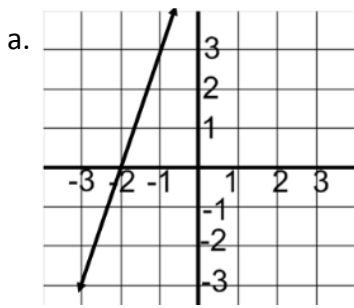
6. Given the following table, which of the following choices could be used as the range so that the table represents a linear function? **(F.IF.1)**

x	-4	-2	3	4
y				

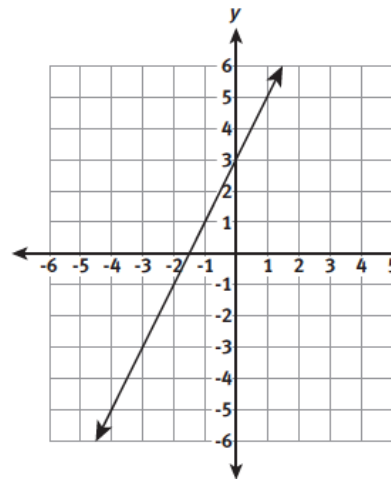
- {14, 5, -7, -9}
 - {15, 3, 8, 15}
 - {18, 6, 11, 18}
 - {17, 9, -11, -15}
7. The equation $y = 461.19x + 3,492$ represents the value of a work of art from 1964 to 2005. What does the number 461.19 represent? **(F.IF.6)**
- The value of the work of art in 1964
 - The value of the work of art in 2005
 - The yearly decrease in value
 - The yearly increase in value

Unit 1: Functions and Their Graphs Part 1

8. Which is the graph of $x - 3y = 6$? (F.IF.7)



9. Shawn compared the slope of the function graphed below to the slope of the function with an x-intercept of 2 and a y-intercept of 4. What is the slope of the function with the greater slope? (F.IF.9)



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0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

10. In 1983, the average price of a home was \$50,000. By 2008, the average price of a home is \$200,000. What is the annual rate of change? (F.IF.6)

-	/	/	/	/	
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0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Unit 1: Functions and Their Graphs Part 1

11. Big's Gym charges a membership fee that includes an initial charge of \$30.00 and an additional \$10.00 per month of membership. Little's Gym charges a membership fee that can be represented by the function $m(x) = 8x + 40$. **(F.IF.4 & F.IF.2)**

- Describe the similarities and differences in the membership fees at each gym.
- Describe how the graph of the function representing the membership fee at Big's Gym compares to the graph of the function representing the membership at Little's gym.

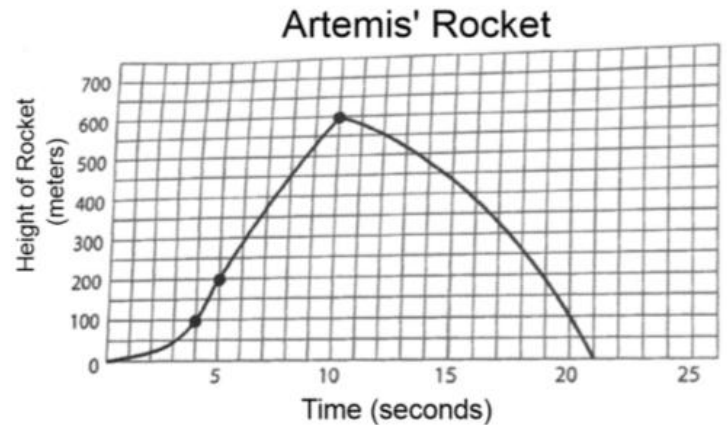
12. Carri is making a quilt. The total number of triangles in the quilt after she completes each stage of the quilt is represented in the table below. Let $C(t)$ represent the pattern of triangles in Carri's quilt. **(F.IF.2)**

Stage Number	Number of Triangles
1	4
2	8
3	12
4	16
5	20
6	24
7	28

- Determine $C(10)$. Interpret the meaning of this value.
- Write a NEXT/NOW equation to represent the situation.

Use the following information for questions 13 and 14.

Artemis and his friends shoot off a miniature rocket. It accelerates for 5 seconds, ascends at a steady pace for 5 seconds, then runs out of fuel and falls to the ground. The graph below shows the flight of the rocket. Use the graph to respond to questions 9 and 10. **(F.IF.5 & F.IF.6)**



- The graph represents a function $R(t)$. Identify the domain and range of the function.
- What is the rate of increase between 5 seconds and 10 seconds?
 - 40 m/sec
 - 75 m/sec
 - 80 m/sec
 - 100 m/sec

Unit 1: Functions and Their Graphs Part 1

15. After knee surgery, your trainer tells you to return to jogging slowly. He suggests jogging for 12 minutes each day for the first week. Each week thereafter, he suggests that you increase your time by 6 minutes per day. **(F.LE.1)**

- a. Complete the table below to represent the minutes you jog based on the number of weeks.

Week	1	2	3	4	5
Minutes per day	12				

- b. Write a function to represent the number of minutes you jog based on the number of weeks.
- c. How many weeks will it be before you are jogging 60 minutes per day?

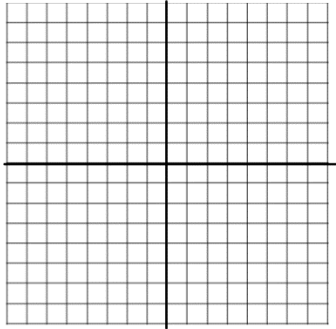
Unit 2: Systems of Equations and Inequalities

1. To solve the following system of equations, you could multiply the top equation by _____ and the bottom equation by _____ to eliminate the y . **(A.REI.5)**

$$\begin{aligned} 2x + 5y &= 18 \\ 4x - 6y &= -15 \end{aligned}$$

2. Which of the points below would be a solution for the system of inequalities? **(A.REI.12)**

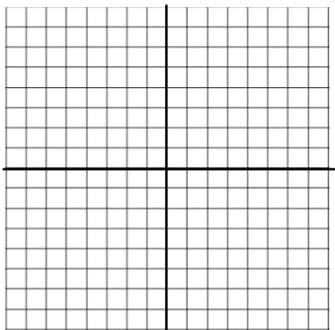
$$\begin{aligned} y &< \frac{2}{3}x + 5 \\ 2x + 5y &\geq -7 \end{aligned}$$



- a. $(-3, -7)$
- b. $(-8, 1)$
- c. $(5, 3)$
- d. $(8, -10)$

3. Which point is **a part of** the solution set of the system of inequalities below? **(A.REI.12)**

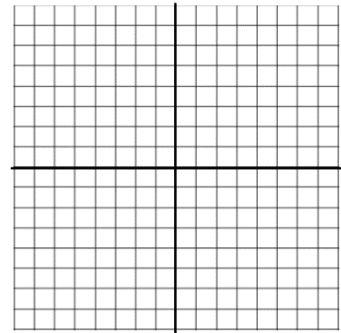
$$\begin{aligned} y &< 2x + 3 \\ y &< -2x + 3 \end{aligned}$$



- a. $(5, 0)$
- b. $(4, 2)$
- c. $(6, -2)$
- d. $(0, -1)$

4. A region is defined by the system:

$$\begin{aligned} y &> 4x + 2 \\ y &\leq -3x - 5 \end{aligned}$$



In which quadrant of the coordinate plane is the region located? **(A.REI.12 & A.CED.3)**

- a. I, II, and III only
 - b. II and III only
 - c. III and IV only
 - d. I, II, III, and IV only
5. Emerson decided to sell cupcakes at the county fair. Her ingredients cost her 25 cents per cupcake. Renting a booth at the fair costs \$30 per day. She sells each cupcake for \$1. Emerson's expenses can be modeled by the function $c(x) = 0.25x + 30.00$. Her income can be modeled by the function $p(x) = 1.00x$. How many cupcakes must she sell to break even? **(A.REI.11)**

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0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Unit 2: Systems of Equations and Inequalities

6. The Carl Winslow Comedy Club charges \$7 for an adult ticket and \$4.50 for a student ticket. Last Saturday, the sale of the student tickets was three times the sale of the adult tickets. If the total amount collected for the ticket sales was \$2009, how many students purchased tickets?

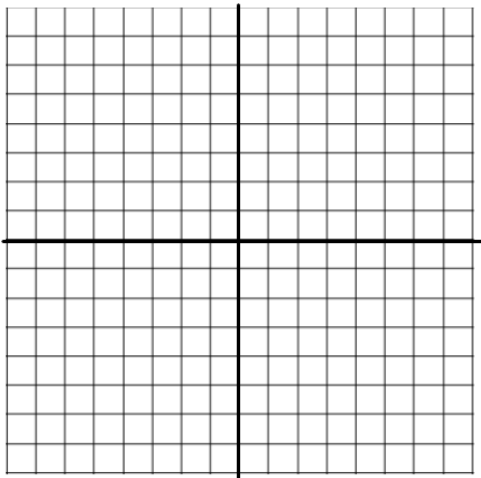
(A.REI.11)

−	/	/	/	/	
.	
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

7. In the space below, graph the following system of inequalities and **identify two solutions:** **(A.REI.12)**

$$y > 3x + 1$$

$$y \leq -2x - 4$$



8. Create a system of equations that has infinitely many solutions. How do you know that your system has infinitely many solutions? Justify your response using complete sentences. **(A.REI.11)**

9. Paul wants to buy flagpoles and flags. He can only buy a total of 10 flagpoles and flags. Flagpoles cost \$20 and flags cost \$15. Paul only has \$100 to spend. **(A.CED.3 & A.REI.12)**

- Write a system of inequalities to represent the situation.
- Could Paul buy 6 flagpoles and 5 flags? Explain your response.

10. In the system of equations listed below, what will be substituted for y into the second equation to solve using substitution? **(A.REI.6)**

$$6x + y = 9$$

$$4x + 2y = 10$$

Unit 3: Descriptive Statistics

1. The table below shows the population (**in thousands**) of North Carolina cities in the year 2010.

Name	Population (in thousands)
Cary	135
Charlotte	731
Durham	228
Fayetteville	201
Greensboro	270
Raleigh	404
Wilmington	106
Winston-Salem	230

Mount Holly, NC had a population of about 14,000 in the year 2010. Which statement is true if Mount Holly, NC is included in the data? **(S.ID.3)**

- The mean increases
 - The range decreases
 - The interquartile range decreases
 - The standard deviation increases
2. The table below is a two-way relative frequency table of favorite leisure activities of 50 adults, 30 females and 20 males. Which of the following statements is true? **(S.ID.5)**

	Dance	Sports	TV	Total
Men	0.04	0.20	0.16	0.40
Women	0.32	0.12	0.16	0.60
Total	0.36	0.32	0.32	1.00

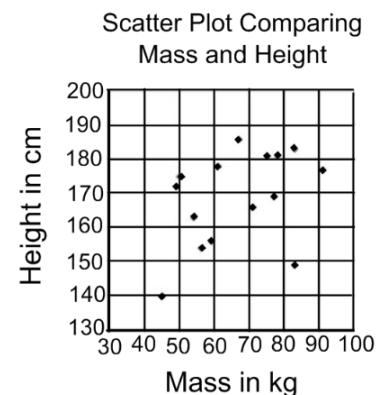
- 10 more women prefer dance than men
- 4 more women prefer sports than men
- TV is the most preferred leisure activity
- 16 women prefer dance

3. The table below shows the heights and weights of 10 friends. **Approximately**, what percent of the friends are more than 10 kg different from the predicted weight? **(S.ID.2)**

Name	Height (cm)	Weight (kg)
Albert	180	87
Beth	176	55
Cindy	144	52
David	195	94
Emily	159	87
Frank	185	79
Gary	166	59
Helen	173	64
Ida	149	45
Jeremy	168	77

- 50%
- 40%
- 30%
- 10%

4. The scatter plot below shows the relationship of mass (kg) and height (cm) of 15 individuals. Which statement best describes the relationship of mass to height? **(S.ID.6)**



- Strong positive correlation
- Weak positive correlation
- Strong negative correlation
- Weak negative correlation

Unit 3: Descriptive Statistics

5. The data shows the time, in seconds, of the fifteen fastest times for the men and the women in a city's marathon. What is the difference in the interquartile ranges for the men's time versus the women's times?

(S.ID.2)

Women	Men
8,589	7,723
8,612	7,744
8,636	7,747
8,743	7,755
8,753	7,756
8,773	7,796
8,869	7,825
8,917	7,830
8,932	7,882
8,940	7,885
8,948	7,918
8,954	7,934
8,956	7,945
8,967	7,990
9,113	8,013

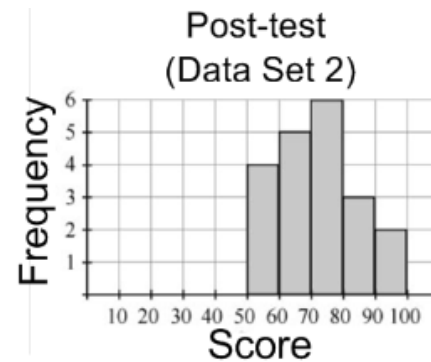
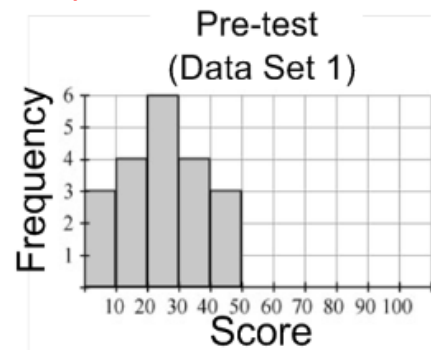
- a. 32
 b. 234
 c. 1,087
 d. 1,100
6. The highway patrol placed a stationary radar detector on a highway bridge and recorded the individual speeds of vehicles that passed the radar over a twenty-four-hour period. The mean of the speeds was 59.5 mph. The lowest speed measured was 35 mph. The lower quartile was 55 mph. Assuming that the distribution was symmetric about the mean, what was the upper quartile, in mph?

(S.ID.2)

- a. 64.0
 b. 94.5
 c. 110.0
 d. 114.5

7. The results of the pretest and posttest for a particular chapter in a science class are presented by the graphs shown. Which statement is true about the data sets?

(S.ID.3)



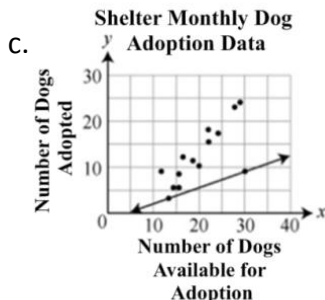
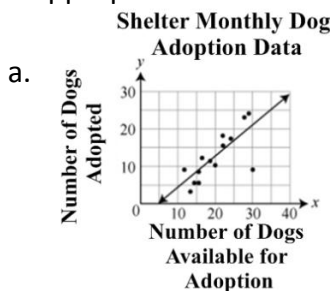
- a. The means of the data sets are the same, and data set 2 has a greater range than data set 1.
 b. The means of the data sets are the same, and data set 1 has a greater range than data set 2.
 c. The ranges of the data sets are the same, and data set 2 has a greater mean than data set 1.
 d. The ranges of the data set are the same, and data set 1 has a greater mean than data set 2.

Unit 3: Descriptive Statistics

8. The scatter plot shows the relationship between the number of dogs available for adoption per month at an animal shelter and the number of dogs adopted that month.



Which scatter plot shows this data with the most appropriate line of best fit? (S.ID.6)

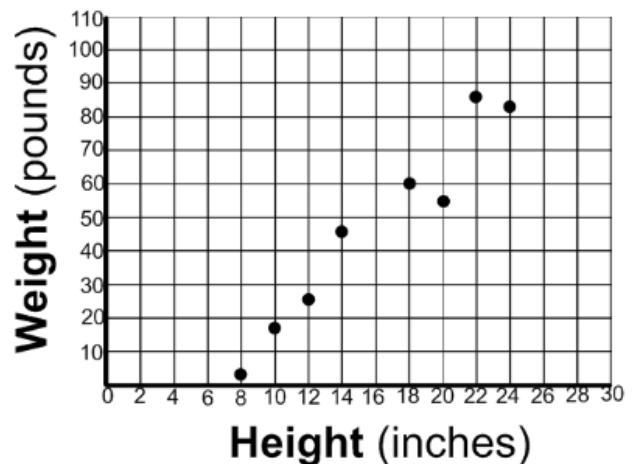


9. The sales department of a company that makes skis found that company profits could be modeled by the equation,

$P = 85.50s - 230$, where P represents the profit in dollars and s represents the number of pairs of skis the company makes. In the equation, what could the number 85.50 represent? (S.ID.7)

- The sale price of a pair of skis
- The cost required to make a pair of skis
- The number of people who buy a pair of skis
- The number of pairs of skis bought by 230 people

10. Sharon made a scatter plot comparing the shoulder heights of dogs to their weights. Sharon's dog has a shoulder height of 28 inches. Using a linear model, which is the **best** prediction of her dog's weight? (S.ID.6)



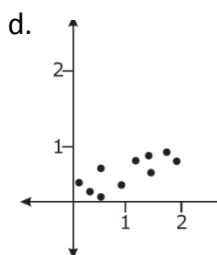
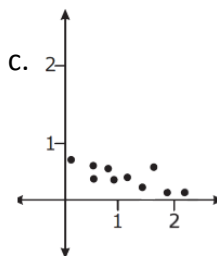
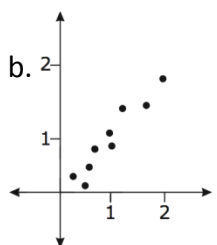
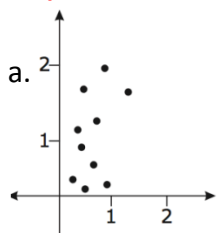
- 85 pounds
- 90 pounds
- 105 pounds
- 120 pounds

Unit 3: Descriptive Statistics

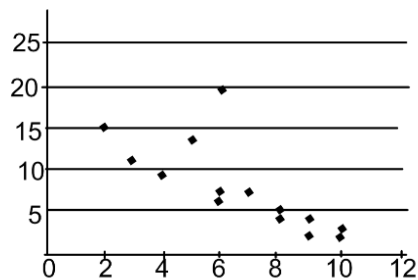
11. A computer repair business charges an initial fee of \$35 and an additional \$45 per hour to make the repair. The function $C = 45t + 35$ represents the cost, C , of a job requiring t hours of repair work. What does the slope of function C represent? **(S.ID.7)**

- Cost of the repair
- Initial fee for the repair
- Time required for the repair
- Hourly charge for the repair

12. James is fitting the linear equation $y = \frac{1}{2}x$ to a data set. Which scatterplot shows the data set that the linear equation would fit **best**. **(S.ID.6)**



13. Choose the function that most accurately fits the data in the graph below. **(S.ID.6)**



- $y = 1.66x + 18.75$
- $y = 16.6x - 1.85$
- $y = -1.66x + 18.75$
- $y = -1.66x - 18.75$

14. Determine whether correlation and/or causation occur for the following scenario: Most students tend to have a higher GPA when they spend less time watching TV. **(S.ID.9)**

- There is a negative correlation between GPA and hours spent watching TV; therefore, there is causation.
- There is a positive correlation between GPA and hours spent watching TV; therefore, there is causation.
- There is a negative correlation between GPA and hours spent watching TV; but there is no causation, since it is not always the case.
- There is a positive correlation between GPA and hours spent watching TV; but there is no causation, since it is not always the case.

Unit 3: Descriptive Statistics

15. The table below is a two-way relative frequency table of favorite leisure activities of 50 adults, 30 females, and 20 males.

(S.ID.5)

	Dance	Sports	TV	Total
Men	0.04	0.20	0.16	0.40
Women	0.32	0.12	0.16	0.60
Total	0.36	0.32	0.32	1.00

Tell whether the following statements are true or false. Explain your reasoning.

- 2 men prefer dance. True or False. Explain
- 4 more men prefer sports than women. True or False. Explain.
- Dance is the most preferred leisure activity. True or False. Explain.
- 18 women prefer dance. True or False. Explain.

16. Paige is the owner of a small company. Her annual salary is \$125,000. There are a total of 10 employees in the company including herself. The salaries of the other employees are given below. (S.ID.1)

\$28,000, \$31,000, \$42,000, \$45,000, \$53,000, \$55,000, \$55,000, \$72,000, and \$88,000

- Find the median salary for the 10 employees. Show your work.
- Paige wants to use a box plot to present salary data to her company's investors. Find the upper quartile and lower quartile for the 10 employees. Show your work.
- Using the results from part A and B, create a box plot.

17. The table below shows the population (*in thousands*) of North Carolina cities in the year 2010. Gastonia, NC had a population of about 71,000 in the year 2010. Answer each statement with true or false if Gastonia, NC is included in the data? Explain your reasoning. (S.ID.3)

Name	Population (in thousands)
Cary	135
Charlotte	731
Durham	228
Fayetteville	201
Greensboro	270
Raleigh	404
Wilmington	106
Winston-Salem	230

- The mean decreases. True or False. Explain.
- The range decreases. True or False. Explain.
- The interquartile range decreases. True or False. Explain.
- The standard deviation increases. True or False. Explain.

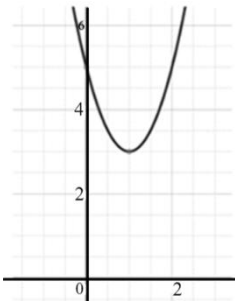
Unit 4: Expressions and Equations

1. A rectangular garden has a length 2 feet greater than its width, w . Jordan will increase **both** dimensions of the garden by 2 feet. Which equation represents the new area, N , of the garden? **(A.CED.1)**

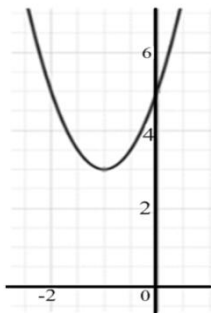
- $N = w^2 + 4w + 4$
- $N = w^2 + 6w + 8$
- $N = w^2 + 2w$
- $N = w^2 + 2w + 2$

2. Which is the graph of the function $f(x) = 2x^2 - 4x + 5$? **(A.CED.2)**

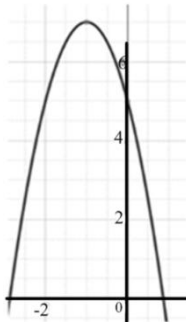
a.



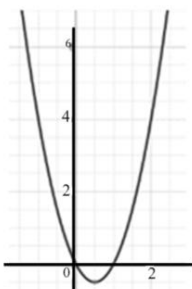
b.



c.



d.



3. Which expression is equivalent to $\sqrt[3]{27a^6b^5c^2}$? **(N.RN.1)**

- $27a^2b^{\frac{5}{3}}c^{\frac{2}{3}}$
- $3a^{\frac{2}{3}}b^{\frac{5}{3}}c^{\frac{2}{3}}$
- $27a^{\frac{1}{6}}b^{\frac{3}{5}}c^{\frac{2}{3}}$
- $3a^2b^{\frac{5}{3}}c^{\frac{2}{3}}$

4. What expression is equivalent to $x^2 - 81$? **(A.REI.4 & A.SSE.2)**

- $(x + 81)(x - 1)$
- $(x + 9)(x + 3)(x - 3)$
- $(x - 9)(x - 9)$
- $(x - 9)(x + 9)$

5. The area (A) of a trapezoid is found using the formula $A = \frac{1}{2}h(b_1 + b_2)$ where $h = \text{height}$, b_1 and b_2 are the bases. Which equation could be used to find the height when the area and the length of the bases are given? **(A.CED.4)**

- $h = \frac{b_1 + b_2}{2A}$
- $h = \frac{b_1 + b_2}{A}$
- $h = 2A - (b_1 + b_2)$
- $h = \frac{2A}{b_1 + b_2}$

Unit 4: Expressions and Equations

6. There were originally 3 statues in a museum. Each year the owner placed the same number of new statues in the museum. In the 26th year, there were 185 statues in the museum. Which function $s(n)$, can be used to determine the number of statues in the museum in any year, n ? **(A.CED.2)**

a. $S(n) = 26n + 3$

b. $S(n) = \frac{185}{26}n + 3$

c. $S(n) = \frac{185}{26}n - 3$

d. $S(n) = 7n + 3$

7. Vanessa collected Barbie dolls. She began with 2 dolls and added the same amount of dolls to her collection each year. In the 24th year, Vanessa had 98 dolls. Which function, $d(n)$, can be used to determine the number of dolls Vanessa had in any year? **(A.CED.2)**

a. $d(n) = 25n - 2$

b. $d(n) = 2n + 4$

c. $d(n) = 4n + 2$

d. $d(n) = 4n - 2$

8. Which expression is equivalent to $(m^{\frac{3}{5}})^{-5}$? **(N.RN.1)**

a. $\sqrt[3]{m}$

b. $\sqrt[5]{m}$

c. $\frac{1}{m^3}$

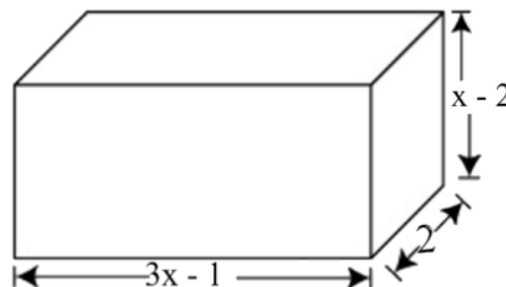
d. $\frac{1}{m^5}$

9. A parking lot is open for a Panthers game.
- The area of the parking lot is 600 square meters.
 - A car requires 6 square meters of space and a bus requires 30 square meters of space.
 - The parking attendant can handle a maximum of 60 vehicles.
 - The lot owner charges \$3 to park a car and \$8 to park a bus.

What is the maximum revenue that could be generated from opening the lot for one game? **(A.CED.3)**

- a. \$180
b. \$230
c. \$310
d. \$400

10. The dimensions, in inches, of a rectangular solid are shown. What is the volume in cubic inches of the rectangular solid? ($V = lwh$) **(A.APR.1)**



- a. $3x^2 - 7x + 2$
b. $3x^2 - 7x + 4$
c. $6x^2 - 14x - 4$
d. $6x^2 - 14x + 4$

Unit 4: Expressions and Equations

11. The function $f(t) = -16t^2 - 48t + 160$ models the approximate height of an object t seconds after it is launched. How many seconds will it take for the object to hit the ground? **(A.SSE.3 and A.REI.4)**

−	/	/	/	/	
.	
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

12. Michelle walked 1 mile in 30 minutes. Zach walked 3,520 yards in 40 minutes. In miles per hour, how much faster did Zach walk than Michelle? (1 mile = 1,760 yds) **(N.Q.1)**

−	/	/	/	/	
.	
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

13. Five times Matthew's age plus 2 times Cooper's age is 52. Cooper's age is also 4 times Matthew's age. How old is Cooper? **(A.CED.1)**

−	/	/	/	/	
.	
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

14. A rectangle has a perimeter of 20 cm. The length of the rectangle is 1 more than twice the width. What is the measure of the length? **(A.APR.1 and A.CED.1)**

−	/	/	/	/	
.	
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

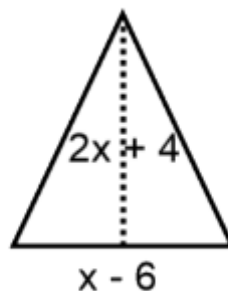
Unit 4: Expressions and Equations

15. What is the smallest of 3 consecutive positive integers if the product of the smallest and largest is 21 more than 9 times the middle number? **(A.CED.1)**

−	/	/	/	/	
.	
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

16. A rectangular table top is measured to be 4.2 ft x 3.1 ft. Explain why it is not accurate to say that the area of the tabletop is 13.02 ft²? **(N.Q.3)**

17. The area (A) of a triangle with the height, h , and the base, b , has the formula $A = \frac{1}{2}bh$. Write a simplified expression to represent the area of the triangle below. **(A.CED.2)**



Unit 5: Functions & Their Graphs Part 2

1. The function $f(x) = 4(2.0)^x$ models the population of rabbits on a farm after x months with no removal. The function $f(x) = 2(2.0)^x$ models the number of rabbits removed from the population after x months. Which function, $h(x)$, models the total number of rabbits on the farm after x months? **(F.BF.1)**

- a. $h(x) = 2(1.0)^x$
- b. $h(x) = 2(2.0)^x$
- c. $h(x) = 6(2.0)^x$
- d. $h(x) = 2(4.0)^x$

2. The function $y = 45x + 6$ can be used to determine the cost for a person to purchase x tickets to a concert. A person can purchase up to 8 tickets. What is an appropriate domain for the function? **(F.IF.5)**

- a. All integers ≤ 8
- b. All positive integers ≤ 8
- c. All positive real numbers ≤ 8
- d. All positive integers < 8

3. What happens to the y-intercept of a function $f(x)$ when 4 is added to $f(x)$? **(F.BF.3)**

- a. The y-intercept moves up 4 units
- b. The y-intercept remains at the origin
- c. The y-intercept does not exist
- d. The y-intercept moves down 4 units

4. A liquid is evaporating. The amount of a liquid remaining, in liters, after x weeks is modeled by the equation $y = 100(0.78)^{3x}$. **Approximately** what percent of the liquid evaporates per week? **(F.IF.8)**

- a. 22%
- b. 47%
- c. 53%
- d. 78%

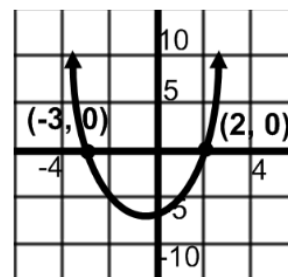
5. The sequence below shows the amount of bacteria that occurs after each hour:

2, 6, 18, 54, 162

Which formula can be used to determine the amount of bacteria in the next hour, NEXT, if the number of NOW bacteria is known? **(F.BF.2)**

- a. $NEXT = NOW \cdot 3$
- b. $NEXT = \frac{1}{3} \cdot NOW$
- c. $NEXT = 3 \cdot NOW + 2$
- d. $NEXT = NOW \div 3$

6. Which of the following quadratic equations can be solved with the graph shown? **(F.IF.4 & F.IF.8)**

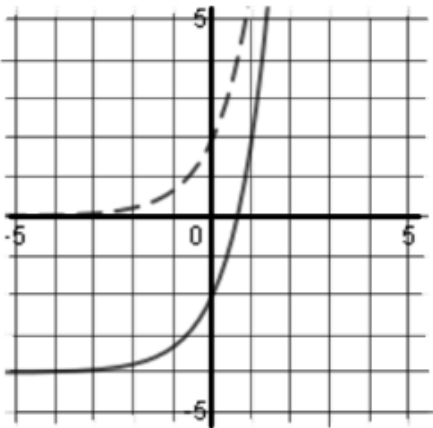


- a. $x^2 - x - 6 = 0$
- b. $x^2 - x + 6 = 0$
- c. $x^2 + x - 6 = 0$
- d. $x^2 + x + 6 = 0$

Unit 5: Functions & Their Graphs Part 2

7. The graphs of $2(3)^x$ and $2(3)^x + k$ are graphed below. What is the value of k ?

(F.BF.3)



- a. -4
b. -2
c. 2
d. 4
8. Suppose that the equation $V = 20x^2 - 363.2x + 2500$ represents the value of a car from 1962 – 2000. What year did the car have the least value? ($x = 0$ in 1962) **(F.IF.7)**
- a. 1969
b. 1971
c. 1975
d. 1999

9. The table below shows the results of an experiment with plants that used two different types of fertilizers, Type A and Type B. The heights of the plants were measured weekly.

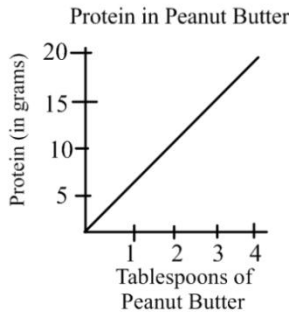
Time (in weeks)	Type A (in centimeters)	Type B (in centimeters)
0	1	1
1	3	2
2	5	4
3	7	8
4	9	16
5	11	32

Which statement **best** describes the results? **(F.IF.6 & F.LE.1)**

- a. The plants with fertilizers Type A and Type B both increased at a constant rate.
- b. The plant with Type A fertilizer increased exponentially
- c. The plant with Type B fertilizer increased a constant rate.
- d. The plant with Type B fertilizer increased exponentially.

Unit 5: Functions & Their Graphs Part 2

10. The graph shows the number of grams of protein in different amounts of peanut butter. The slope of the line is $\frac{5}{1}$. Which statement best describes the meaning of the slope? **(F.IF.6)**



- There are 5 tablespoons of peanut butter in 1 serving.
 - There is 1 gram of protein in every 5 tablespoons of peanut butter.
 - There are 5 grams of protein in every 1 tablespoon of peanut butter.
 - There are 5 tablespoons of peanut butter for every 5 grams of protein.
11. Alyssa compared the y-intercept of the graph of the function $f(x) = -2x - 5$ to the y-intercept of the graph of a linear function that includes the points below.

x	g(x)
-8	2
-6	3
-4	4
-2	5

What is the difference when the y-intercept of $f(x)$ is subtracted from the y-intercept of $g(x)$. **(F.IF.9)**

⊖	/	/	/	/	/
.
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

12. What is the smallest positive integer for x , so that the value of $f(x) = 200(2^x)$ is greater than the value of $g(x) = 500x + 400$? **(F.LE.3)**

⊖	/	/	/	/	/
.
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

13. The cost to mail a box of textbooks can be modeled by the function $f(x) = 1.75x + 5.25$, where x is the number of books mailed. What does the y-intercept of the function represent? **(F.IF.4)**
14. John collected following data on the number of new movies produced in different years.
- 595 movies were produced in 2005
 - 895 movies were produced in 2010

What is the average rate for new movies between 2005 and 2010? Use correct units. **(F.IF.6)**

15. The sequence below shows a list of numbers. Use this sequence to write a NEXT NOW equation. **(F.BF.2)**

5, 9, 13, 17, 21, ...

Is this sequence geometric or arithmetic?
How do you know?

Unit 6: Connecting Algebra & Geometry through Coordinates

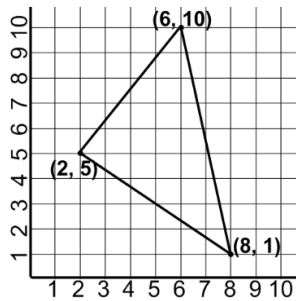
1. A line segment has endpoints A(3, 2) and B(5, 4). The point K is the midpoint of segment AB. What is the equation of the line that is perpendicular to segment AB through point K? **(G.GPE.5 & G.GPE.6)**

- a. $y = -x + 7$
- b. $y = x + 7$
- c. $y = -x - 7$
- d. $y = x + (-7)$

2. The volume of a sphere is 1,600 cubic centimeters. What is the approximate length of the diameter? **(Volume of a sphere = $\frac{4}{3}\pi r^3$) (G.GMD.3)**

- a. 4.3
- b. 7.3
- c. 14.5
- d. 28.5

3. Which term best describes the triangle shown? **(G.GPE.4)**



- a. Equilateral
- b. Isosceles
- c. Right
- d. Scalene

4. At the airport, the new runway will be parallel to a nearby highway. On the scale drawing of the airport, the equation that represents the highway is $6y = 8x - 11$. Which equation could represent the new runway? **(G.GPE.5)**

- a. $9y = 12x + 5$
- b. $9x = 12y + 8$
- c. $12y = -9x + 2$
- d. $12x = -9y + 4$

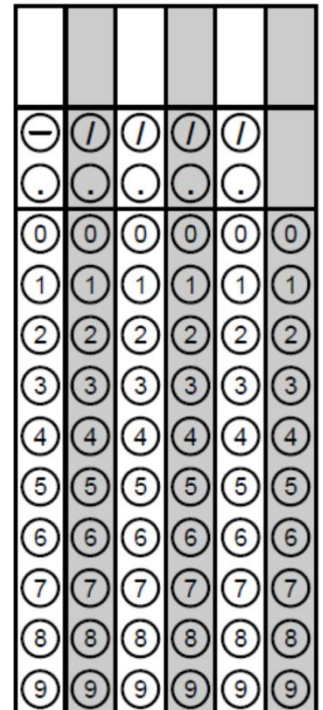
5. A quadrilateral has vertices located at (-3, -5), (4, 2), (4, 1) and (2, -1). Which of the following best describes the figure? **(G.GPE.6)**

- a. Rhombus
- b. Rectangle
- c. Trapezoid
- d. Square

6. Define parallel lines. **(G.CO.1)**

- a. Two lines in a plane that intersect.
- b. Two lines in a plane that do not intersect.
- c. Two lines in a plane that intersect at a 90 degree angle.
- d. Two lines that never end.

7. A quadrilateral has vertices at (-8, 0), (-4, -4), (0, 8) and (4, 4). What is the area of the quadrilateral? **(G.GPE.7)**



Unit 6: Connecting Algebra & Geometry through Coordinates

8. The volume of a cone can be found using the formula $V = \frac{1}{3}Bh$, where B is the area of the base of the cone and h is the height. A cone has a volume of 262 cubic inches and a height of 10 inches. What is the approximate length of the radius of the cone rounded to the nearest inch?

(G.GMD.3)

−	/	/	/	/	
.	
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

11. A triangle has vertices of (1, 2), (3, 1) and (-2, -1). What is the perimeter of the triangle, round to the nearest unit?

(G.GPE.7)

−	/	/	/	/	
.	
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

9. Prove that the point (6, 8) lies on the circle with a center of (3, 4) and a radius of 5.

(G.GPE.4)

10. On a map, Luis' house is located at (-7, 6) and Melvin's house is at (4, -5). What are the coordinates of Raquel's home if she lives exactly halfway between Luis and Melvin? **(G.GPE.6)**

Answer Key

Unit 0: Linear Equations and Proportions		
1	C	A.REI.1
2	B	A.CED.4
3	No, the student needs to switch the inequality symbol after dividing by -5 on both sides. The answer should read $x > -12/5$	A.REI.3
4	a.) $P = 6r - 20$ b.) \$70	A.CED.2
5	a.) Multiply by A on both sides to get $AP = F$. Next, divide by P on both sides to isolate A. The answer is $A = F/P$ b.) $A = 2$	A.CED.4
6	Samantha solved the equation incorrectly. She should have subtracted 11 on both sides instead of adding 11. The answer is $x = 4$	A.REI.3
7	16.6666666 seconds (about 16.7 seconds)	A.CED.1
8	8 Toys	A.CED.1
Unit 1: Functions & Their Graphs Part 1		
1.	D	F.BF.2
2.	B	F.IF.5
3.	C	F.IF.2
4.	B	F.IF.1
5.	C	F.IF.3
6.	D	F.IF.1
7.	D	F.IF.6

Answer Key

8.	C	F.IF.7
9.	2	F.IF.9
10.	6000	F.IF.6
11.	<p>a.) Both gyms have a monthly fee as well as an initial charge. The initial charge for Big's Gym is less than the initial charge for Little's Gym. The monthly charge for Big's is more than the monthly charge for Little's.</p> <p>b.) Big Gym's graph will be steeper than Little's</p>	F.IF.4 & F.IF.2
12.	<p>a.) 40 triangles to complete 10 stages</p> <p>b.) Next = Now + 4</p>	F.IF.2
13.	<p>Domain: $[0, 21]$ or $0 \leq x \leq 21$</p> <p>Range: $[0, 600]$ or $0 \leq y \leq 600$</p>	F.IF.5
14.	C	F.IF.6
15.	<p>a.) 18, 24, 30, 36</p> <p>b.) $f(x) = 6x + 6$</p> <p>c.) 9 weeks</p>	F.LE.1
Unit 2: Systems of Equations and Inequalities		
1.	6 and 5 or -6 and -5	A.REI.5
2.	C	A.REI.12
3.	D	A.REI.12
4.	B	A.REI.12 & A.CED.3
5.	40	A.REI.11
6.	294	A.REI.11
7.	Answers will vary. Possible answers: (-3, -2) and (-5, 0)	A.REI.12

Answer Key

8.	Answers will vary. Possible answer: $y = 2x + 1$ and $4x - 2y = -2$. I know there are infinitely many solutions because the lines coincide and will overlap forever.	A.REI.11
9.	a.) $x + y \leq 10$ and $20x + 10y \leq 100$ b.) No, if Paul buys 6 flagpoles and 5 flags he exceeds the 10 total he can buy. This also exceeds the \$100 he has to spend.	A.CED.3 & A.REI.12
10.	$-6x + 9$ will be substituted into the 2 nd equation	A.REI.6
Unit 3: Descriptive Statistics		
1.	D	S.ID.3
2.	D	S.ID.5
3.	C	S.ID.2
4.	B	S.ID.6
5.	A	S.ID.2
6.	A	S.ID.2
7.	C	S.ID.3
8.	A	S.ID.6
9.	A	S.ID.7
10.	C	S.ID.6
11.	D	S.ID.7
12.	D	S.ID.6
13.	C	S.ID.6
14.	A	S.ID.9
15.	a. True because 4% of 50 is 2 men. b. True, because 10 men and 6 women prefer sports	S.ID.5

Answer Key

	<p>for a difference of 4.</p> <p>c. True, 36% of men and women prefer dance. The other categories are 32% each.</p> <p>d. False, 32% of 50 is 16 not 18.</p>	
16.	<p>a.) Median is \$54,000</p> <p>b.) $Q_1 = 42,000$ and $Q_3 = 72,000$</p> <p>c.) draw box & whisker plot: min = 28,000, $Q_1 = 42,000$, Median = 54,000, $Q_3 = 72,000$, Max = 125,000</p>	S.ID.1
17.	<p>a.) True, it decreased from 288.13 to 264</p> <p>b.) False, it increased from 625 to 660</p> <p>c.) False, it increased from 169 to 216.5</p> <p>d.) True, it increased from 187.45 to 189.44</p>	S.ID.3
Unit 4: Equations and Expressions		
1.	B	A.CED.1
2.	A	A.CED.2
3.	D	N.RN.1
4.	D	A.REI.4 & A.SSE.2
5.	D	A.CED.4
6.	D	A.CED.2
7.	C	A.CED.2
8.	C	N.RN.1
9.	B	A.CED.3
10.	D	A.APR.1

Answer Key

11.	2 seconds	A.SSE.3 & A.REI.4
12.	1 mile/hour	N.Q.1
13.	16 years old	A.CED.1
14.	7 cm	A.APR.1 & A.CED.1
15.	10	A.CED.1
16.	It is not accurate because the measurements of the dimension of the tabletop are only as precise as the nearest tenth of a foot. Precision cannot be increased through calculations.	N.Q.3
17.	$x^2 - 4x - 12$	A.CED.2
Unit 5: Functions and Their Graphs Part 2		
1.	B	F.BF.1
2.	B	F.IF.5
3.	A	F.BF.3
4.	A	F.IF.8
5.	A	F.BF.2
6.	C	F.IF.4 & F.IF.8
7.	A	F.BF.3
8.	B	F.IF.7
9.	D	F.IF.6 & F.LE.1
10.	C	F.IF.6

Answer Key

11.	11	F.IF.9
12.	4	F.LE.3
13.	The base shipping rate without any textbooks	F.IF.4
14.	60 movies per year	F.IF.6
15.	NEXT = NOW + 4 This is an arithmetic sequence because the common difference is 4	F.BF.2
Unit 6: Connecting Algebra & Geometry through Coordinates		
1.	A	G.GPE.5 & G.GPE.6
2.	C	G.GMD.3
3.	D	G.GPE.4
4.	A	G.GPE.5
5.	C	G.GPE.6
6.	B	G.CO.1
7.	64	G.GPE.7
8.	5	G.GMD.3
9.	If the point lies on the circle, the distance from the center to that point will be equal to 5 because the radius is 5.	G.GPE.4
10.	(-1.5, 0.5)	G.GPE.6
11.	12 units	G.GPE.7