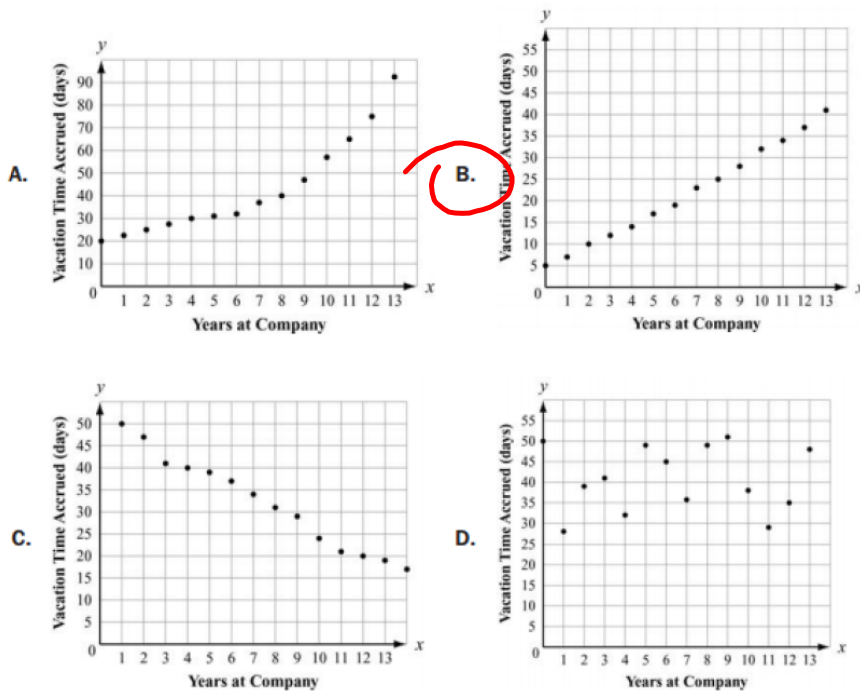


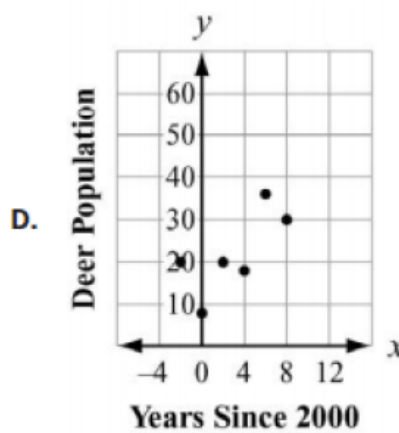
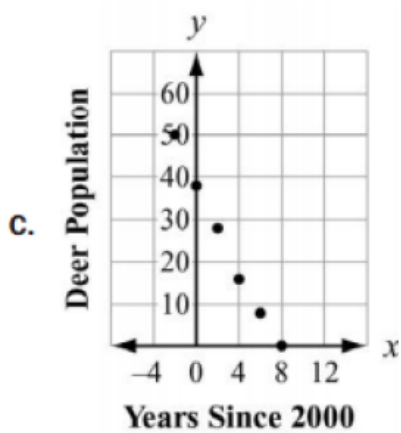
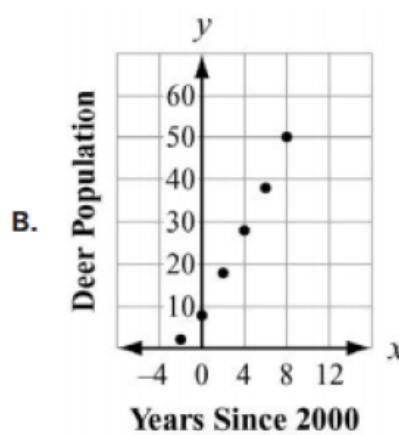
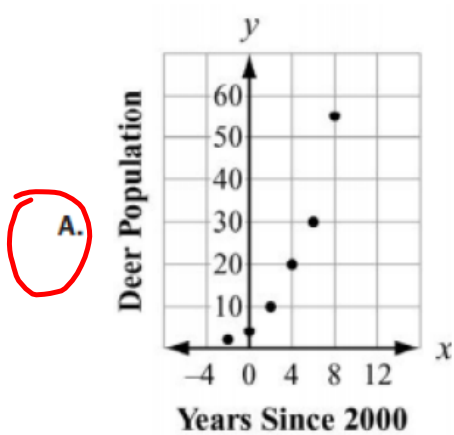
★ UNIT 5: COMPARING AND CONTRASTING FUNCTIONS ★

**A) Unit 5: Construct and Compare Linear, Quadratic, and Exponential Models and Solve Problems**

1. Which scatter plot BEST represents a model of linear growth?



2. Which scatter plot BEST represents a model of exponential growth?



3. Which table represents an exponential function?

A. 

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

B. 

x	0	1	2	3	4
y	22	44	66	88	110

C. 

x	0	1	2	3	4
y	5	13	21	29	37

**D.**

x	0	1	2	3	4
y	3	9	27	81	243

4. A table of values is shown for  $f(x)$  and  $g(x)$ .

x	$f(x)$	x	$g(x)$
0	0	0	-2
1	1	1	-1
2	4	2	1
3	9	3	5
4	16	4	13
5	25	5	29

Which statement compares the graphs of  $f(x)$  and  $g(x)$  over the interval  $[0, 5]$ ?

- A. The graph of  $f(x)$  always exceeds the graph of  $g(x)$  over the interval  $[0, 5]$ .
- B. The graph of  $g(x)$  always exceeds the graph of  $f(x)$  over the interval  $[0, 5]$ .
- C. The graph of  $g(x)$  exceeds the graph of  $f(x)$  over the interval  $[0, 4]$ , the graphs intersect at a point between 4 and 5, and then the graph of  $f(x)$  exceeds the graph of  $g(x)$ .
- D.** The graph of  $f(x)$  exceeds the graph of  $g(x)$  over the interval  $[0, 4]$ , the graphs intersect at a point between 4 and 5, and then the graph of  $g(x)$  exceeds the graph of  $f(x)$ .

5. Which statement is true about the graphs of exponential functions?

- A. The graphs of exponential functions never exceed the graphs of linear and quadratic functions.
- B. The graphs of exponential functions always exceed the graphs of linear and quadratic functions.
- C. The graphs of exponential functions eventually exceed the graphs of linear and quadratic functions.
- D. The graphs of exponential functions eventually exceed the graphs of linear functions but not quadratic functions.

6. Which statement BEST describes the comparison of the function values for  $f(x)$  and  $g(x)$ ?

L

x	$f(x)$	$g(x)$
0	0	-10
1	2	-9
2	4	-6
3	6	-1
4	8	6

Quadratic

- A. The values of  $f(x)$  will always exceed the values of  $g(x)$ .
- B. The values of  $g(x)$  will always exceed the values of  $f(x)$ .
- C. The values of  $f(x)$  exceed the values of  $g(x)$  over the interval  $[0, 5]$ .
- D. The values of  $g(x)$  begin to exceed the values of  $f(x)$  within the interval  $[4, 5]$ .

**B) Unit 5: Interpret Expressions for Functions in Terms of the Situation They Model**

1. If the parent function is  $f(x) = mx + b$ , what is the value of the parameter  $m$  for the line passing through the points  $(-2, 7)$  and  $(4, 3)$ ?

A.  $-9$

B.  $-\frac{3}{2}$

C.  $-2$

D.  $-\frac{2}{3}$

$x_1 \ y_1 \ x_2 \ y_2$

$$\frac{y_2 - y_1}{x_2 - x_1}$$

2. Consider this function for cell duplication. The cells duplicate every minute.

$$f(x) = 75(2)^x$$

Describe the parameters of this function.

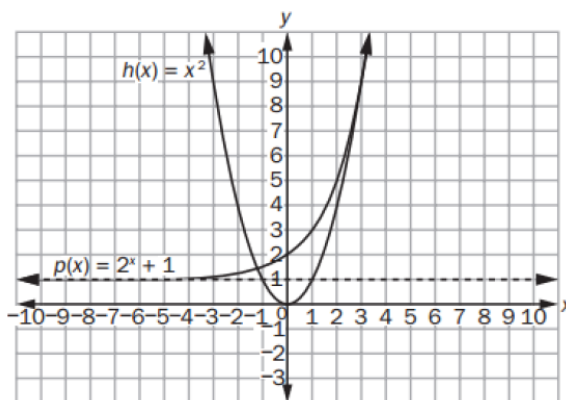
$75 =$  initial # of cells.

$a$   
y-intercept  
initial value

$2$  is the growth rate  
cells are doubling every minute.  
 $b$  — rate of change or growth rate.

**C) Unit 5: Build New Functions from Existing Functions**

1. Look at the graph of the functions  $h(x)$  and  $p(x)$ .



2. Look at the functions  $f(x)$  and  $g(x)$ .

$$f(x) = x^2$$

$$g(x) = 2^x + 3$$

Which transformation of  $f(x)$  makes  $f(x) < g(x)$ ?

- A.  $f(-x)$
- B.  $-f(x)$**
- C.  $\frac{1}{2}f(x)$
- D.  $2f(x)$

Which transformations of  $h(x)$  and  $p(x)$  translate each function so both pass through the point  $(0, 1)$ ?

- A.  $h(x - 1) = (x - 1)^2$  and  $p(x + 1) = 2^{(x+1)} + 1$
- B.  $h(x + 1) = (x + 1)^2$  and  $p(x - 1) = 2^{(x-1)} + 1$
- C.  $h(x) - 1 = x^2 - 1$  and  $p(x) + 1 = (2^x + 1) + 1$
- D.  $h(x) + 1 = x^2 + 1$  and  $p(x) - 1 = (2^x + 1) - 1$**

**D) Unit 5: Understand the Concept of a Function and Use Function Notation**

1. Which function is modeled in this table?

x	f(x)
1	8
2	40
3	200
4	1,000

A.  $f(x) = x + 7$

B.  $f(x) = 5x + 8$

C.  $f(x) = (8)^x$

D.  $f(x) = \frac{8}{5} (5)^x$

$$r = \frac{40}{8} = 5$$

2. If  $f(12) = 4(12) - 20$ , which function gives  $f(x)$ ?

A.  $f(x) = 4x^2 - 20$

B.  $f(x) = 4^x - 20$

C.  $f(x) = 4x - 20$

D.  $f(x) = 4x^2 + 12x - 20$

3. Which function has a range of  $f(x) \leq \frac{3}{4}$ ?

A.  $f(x) = \frac{3}{4}x + 5$

B.  $f(x) = -x^2 + \frac{3}{4}$

C.  $f(x) = x^2 - \frac{3}{4}$

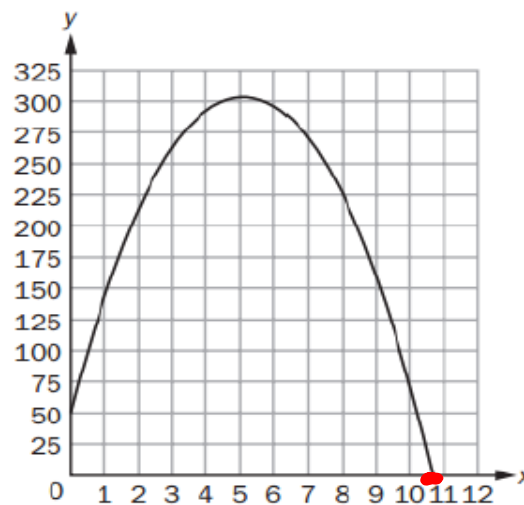
D.  $f(x) = \frac{3}{4} - 5x$

**E) Unit 5: Interpret Functions That Arise in Applications in Terms of the Context**

1. A sample of 1,000 bacteria becomes infected with a virus. Each day, one-fourth of the bacteria sample dies due to the virus. A biologist studying the bacteria models the population of the bacteria with the function  $P(t) = 1,000(0.75)^t$ , where  $t$  is the time, in days.

What is the range of this function in this context?

- A. any real number such that  $t \geq 0$
  - B. any whole number such that  $t \geq 0$
  - C. any real number such that  $0 \leq P(t) \leq 1,000$
  - D. any whole number such that  $0 < P(t) \leq 1,000$
2. The graph shows the height,  $y$ , in meters, of a rocket above sea level in terms of the time,  $t$ , in seconds, since it was launched. The rocket landed at sea level.



What does the  $x$ -intercept represent in this situation?

- A. the height from which the rocket was launched
- B. the time it took the rocket to return to the ground
- C. the total distance the rocket flew while it was in flight
- D. the time it took the rocket to reach the highest point in its flight



★ UNIT 6: DESCRIBING DATA ★

**A) Unit 6: Summarize, Represent, and Interpret Data on a Single Count or Measurable Variable**

1. This table shows the average low temperature, in °F, recorded in Macon, GA, and Charlotte, NC, over a six-day period.

Day	1	2	3	4	5	6
Temperature in Macon, GA (°F)	71	72	66	69	71	73
Temperature in Charlotte, NC (°F)	69	64	68	74	71	75

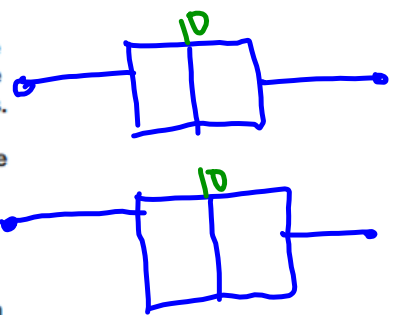
<p style="text-align: center; color: green;">Macon</p> <p><math>\bar{x}</math>: 70.3</p> <p>Med: 71</p> <p>Q1: 69</p> <p>Q3: 72</p> <p>IQR: 3</p>	<p style="text-align: center; color: green;">Charlotte</p> <p><math>\bar{x}</math>: 70.2</p> <p>Med: 70</p> <p>Q1: 68</p> <p>Q3: 74</p> <p>IQR: 6</p>
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Which conclusion can be drawn from the data?

- A. The interquartile range of the temperatures is the same for both cities.
- B. The lower quartile for the temperatures in Macon is less than the lower quartile for the temperatures in Charlotte.
- C. The mean and median temperatures in Macon were higher than the mean and median temperatures in Charlotte.
- D. The upper quartile for the temperatures in Charlotte was less than the upper quartile for the temperatures in Macon.

2. A school was having a coat drive for a local shelter. A teacher determined the median number of coats collected per class and the interquartile range of the number of coats collected per class for the freshmen and for the sophomores.

- The freshmen collected a median number of coats per class of 10, and the interquartile range was 6.
- The sophomores collected a median number of coats per class of 10, and the interquartile range was 4.



Which range of numbers includes the third quartile of coats collected for both freshmen and sophomore classes?

- A. 4 to 14
- B. 6 to 14
- C. 10 to 16
- D. 12 to 15

3. A reading teacher recorded the number of pages read in an hour by each of her students. The numbers are shown below.

44, 49, 39, 43, 50, 44, 45, 49, 51

$$Q_1 = 43.5$$

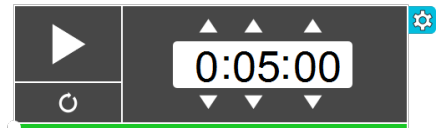
$$\text{Med} = 45$$

$$\text{Max} = 51$$

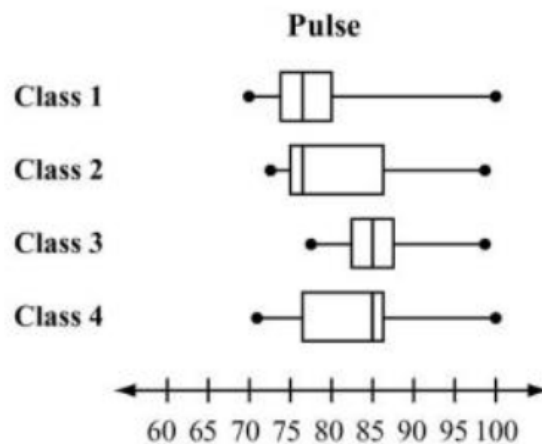
$$\text{min} = 39$$

For this data, which summary statistic is NOT correct?

- A. The minimum is 39.  
 B. The lower quartile is 44.  
 C. The median is 45.  
 D. The maximum is 51.



4. A science teacher recorded the pulse of each of the students in her classes after the students had climbed a set of stairs. She displayed the results, by class, using the box plots shown.



Which class generally had the highest pulse after climbing the stairs?

- A. Class 1  
 B. Class 2  
 C. Class 3  
 D. Class 4

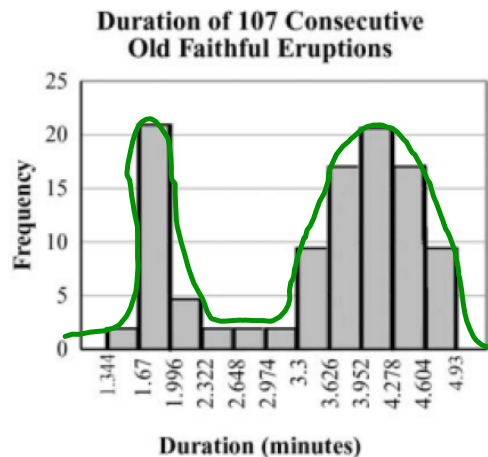
5. Peter went bowling, Monday to Friday, two weeks in a row. He only bowled one game each time he went. He kept track of his scores below.

Week 1: 70, 70, 70, 73, 75

Week 2: 72, 64, 73, 73, 75

What is the BEST explanation for why Peter's Week 2 mean score was lower than his Week 1 mean score?

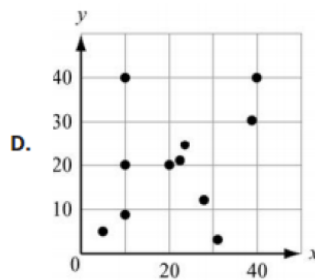
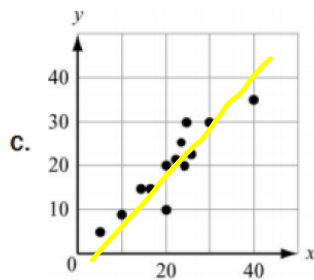
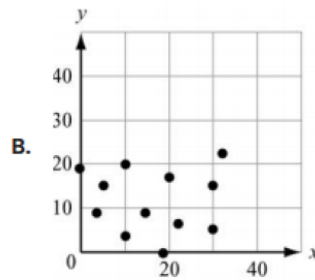
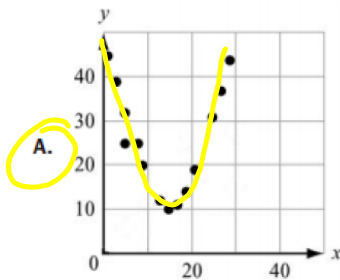
- A. Peter received the same score three times in Week 1.  
 B. Peter had one very low score in Week 2.  
 C. Peter did not beat his high score from Week 1 in Week 2.  
 D. Peter had one very high score in Week 1.
6. This histogram shows the frequency distribution of duration times for 107 consecutive eruptions of the Old Faithful geyser. The duration of an eruption is the length of time, in minutes, from the beginning of the spewing of water until it stops. What is the BEST description for the distribution?



- A. bimodal  
 B. uniform  
 C. multiple outlier  
 D. skewed to the right

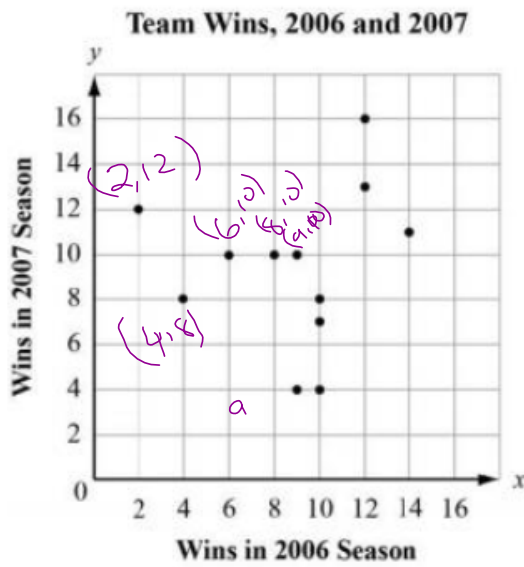
**B) Unit 6: Summarize, Represent, and Interpret Data on Two Categorical and Quantitative Variables**

1. Which graph MOST clearly displays a set of data for which a quadratic function is the model of best fit?



2. This graph plots the number of wins in the 2006 season and in the 2007 season for a sample of professional football teams.

$q = 0.122$   
 $b = 8.3$



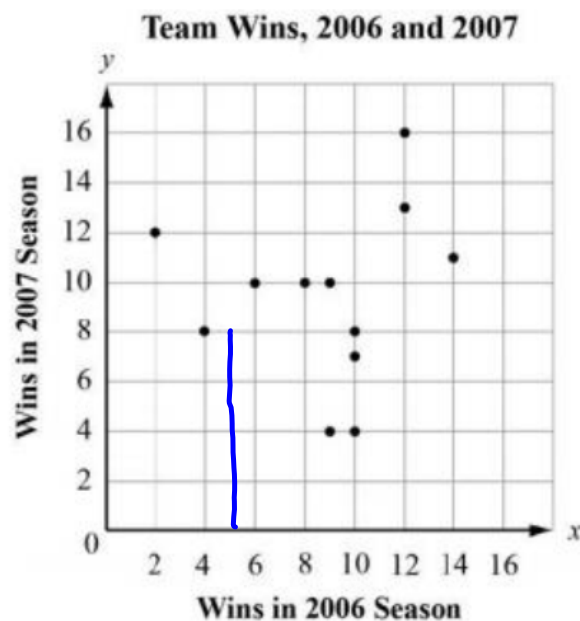
2
4
6
8
9
9
10
10
12
12
13
16
17
18
21

Which equation BEST represents a line that matches the trend of the data?

- A.  $y = x + 2$
- B.  $y = x + 7$
- C.  $y = \frac{3}{5}x + 1$
- D.  $y = \frac{3}{5}x + 5$

C) Unit 6: Interpret Linear Models

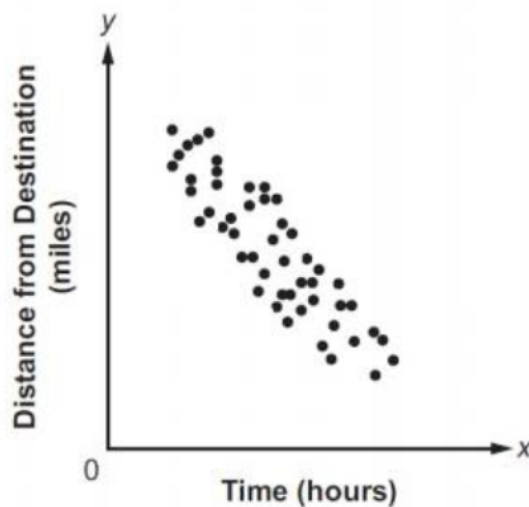
1. This graph plots the number of wins in the 2006 season and in the 2007 season for a sample of professional football teams.



Based on the regression model, what is the predicted number of 2007 wins for a team that won 5 games in 2006?

- A. 4
- B. 7
- C. 8**
- D. 12

2. Which BEST describes the correlation of the two variables shown in the scatter plot?



- A. weak positive
- B. strong positive
- C. weak negative
- D. strong negative

3. Which of these statements is an example of causation?

- A. When the weather becomes warmer, more meat is purchased at the supermarket.
- B. More people go to the mall when students go back to school.
- C. The greater the number of new television shows, the fewer the number of moviegoers.
- D. After operating costs are paid at a toy shop, as more toys are sold, more money is made.