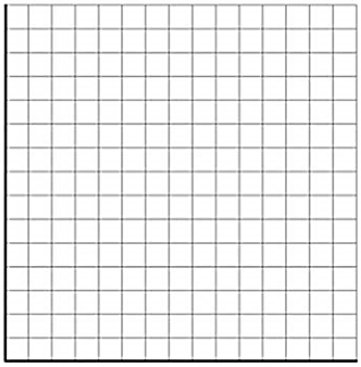
Name: _____ Block: _____

1. The swans on Elsworth Pond have been increasing in number each year. Felix has been keeping track, and so far he has counted 2, 4, 7, 17, and 33 swans each year for the past 5 years.

a. Make a scatter plot of the swan populations.



b. What type of model would be a better fit, linear or exponential? Explain your answer.

c. How many swans should Felix expect next year if the trend continues? Explain your answer.

2. Alice finds that her flower bulbs multiply each year. She started with just 24 tulip plants. After one year she had 72 plants. Two years later she had 120.

Year	0	1	2	3	4
Flower Bulbs	24	72	120	168	216

a. Find a linear function to model the growth of Alice's bulbs.

b. Suppose Alice discovers she counted wrong the second year and she actually had 216 tulip plants. She realizes the growth is not linear because the rate of change was not the same. She must use an exponential model for the growth of her tulip bulbs. Find the exponential function to model the growth.

3. Katherine has heard that you can estimate the outside temperature from the number of times a cricket chirps. It turns out that the warmer it is outside, the more a cricket will chirp. She has these three pieces of information:

- A cricket chirps 76 times a minute at 56° (76, 56).
- A cricket chirps 212 times per minute at 90° (212, 90).
- The relationship is linear. Estimate the function

4. This table shows that the value of $f(x) = 5x^2 + 4$ is greater than the value of $g(x) = 2^x$ over the interval [0, 8].

x	$f(x)$	$g(x)$
0	$5(0)^2 + 4 = 4$	$2^0 = 1$
2	$5(2)^2 + 4 = 24$	$2^2 = 4$
4	$5(4)^2 + 4 = 84$	$2^4 = 16$
6	$5(6)^2 + 4 = 184$	$2^6 = 64$
8	$5(8)^2 + 4 = 324$	$2^8 = 256$

As x increases, will the value of f(x) always be greater than the value of g(x)? Explain how you know.

5. Given the sequence 7, 10, 13, 16, . . .

a. Does it appear to be linear or exponential?

b. Determine a function to describe the sequence.

c. What would the 20th term of the sequence be?

6. A manufacturer keeps track of her monthly costs by using a "cost function" that assigns a total cost for a given number of manufactured items, x. The function is $C(x) = 5{,}000 + 1.3x$.

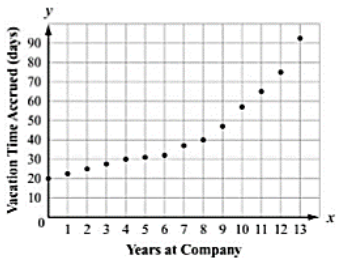
a. What is the reasonable domain of the function?

b. What is the cost of 2,000 items?

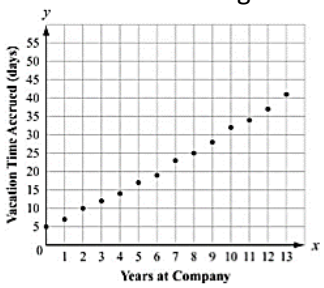
1. Which scatter plot BEST represents a model of linear growth?

1. _____

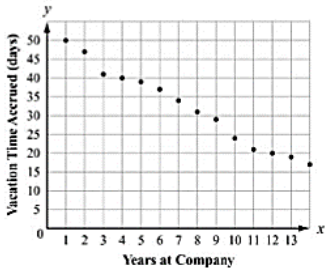
A.



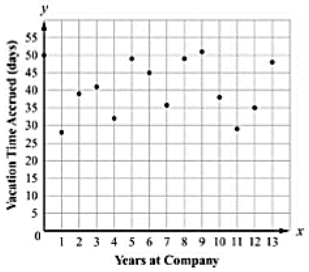
B.



C.



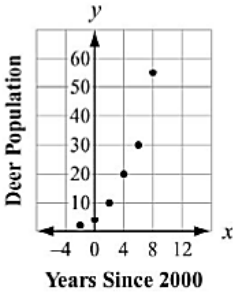
D.



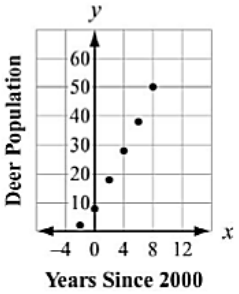
2. Which scatter plot BEST represents a model of exponential growth?

2. _____

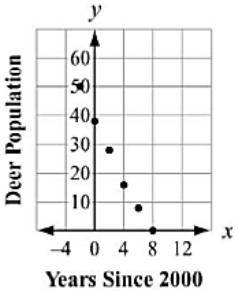
A.



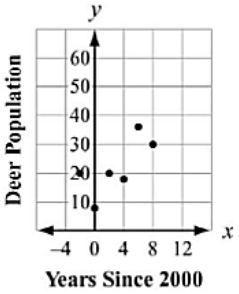
B.



C.



D.



3. Which table represents an exponential function?

3. _____

A.

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

B.

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

C.

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

D.

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

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

x	f(x)
0	0
1	1
2	4
3	9
4	16
5	25

x	g(x)
0	–2
1	–1
2	1
3	5
4	13
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).

4. _____

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.

5. _____

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

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].

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

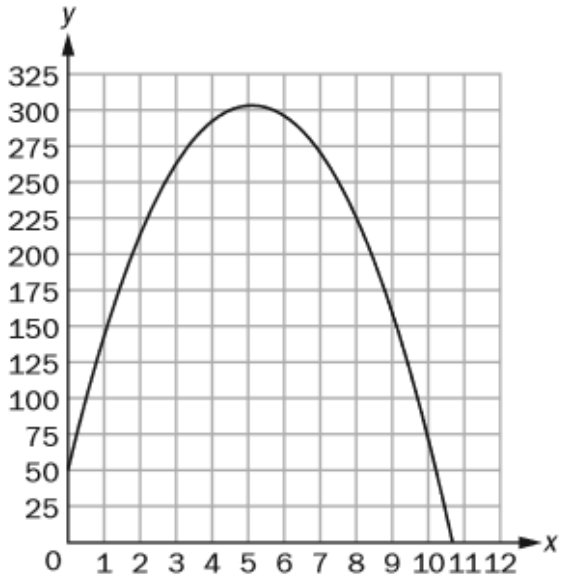
6. _____

7. Which function is modeled in this table?

A . $f(x) = x + 7$
B . $f(x) = 5x + 8$
C . $f(x) = (8)^x$
D . $f(x) = \frac{8}{5}(5)^x$

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

7. _____

8. If $f(12) = 4(12) - 20$, which function gives f(x)? A . $f(x) = 4x^2 - 20$ B . $f(x) = 4x - 20$ C . $f(x) = 4x - 12$ D . $f(x) = 4x^2 + 12x - 20$	8. _____
9. 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 ≥ 0 B . any whole number such that t ≥ 0 C . any real number such that 0 ≤ P(t) ≤ 1,000 D . any whole number such that 0 ≤ P(t) ≤ 1,0000	9. _____
10. 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	10. _____