Name __SINGLETON__   Date_____

Unit 5: Exponential Functions Unit Review- INACTIVE

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1. Which graph models an exponential decay function?

A.

B.

C. (circled)

D.

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2. The function $f(x) = 9(4)^x$ was replaced with $f(x) = 9(4)^x + k$, resulting in the graph below. What is the value of k?

-3

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3. Which of the following functions represents an exponential [growth] with a (12%) rate of change where A represents the initial value and x represents the time in years?

A. $y = A(0.12)^x$ B. $y = A(0.88)^x$
C. $y = A(1.12)^x$ (circled)   D. $y = A(1.88)^x$

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4. What would be the 9th term in the sequence
$$120, 60, 30, ...$$

$a_1 = 120$
$r = 1/2$

$a_n = a_1 (r)^{n-1}$

$a_9 = 120(1/2)^{9-1}$

$$\boxed{a_9 = \frac{15}{32}}$$

$120, 60, 30, 15, \frac{15}{2},$
$\frac{15}{4}, \frac{15}{8}, \frac{15}{16}, \boxed{\frac{15}{32}},$

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5. Which scenario is best modeled by an exponential function?

A. The number of students in Drivers Ed that began the class with x students and 2% of the original students dropped out of the class each month. *% remains constant b/c it's from original amount*

Same → # of people each month

B. The amount of tax paid when selling x dollars of Carolina Panthers merchandise at a rate of 7.25% *Tax is directly related to amount spent → doesn't change*

C. The total cost of a room at a famous Las Vegas hotel if the cost was x dollars and the cost increased 3% each year. (circled)

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6. Determine the type of function the table below represents and write the equation for the function.

x	0	1	2	3	4	5
f(x)	8	15	22	29	36	43

(+7 between each)

Part A: What type of function is represented?

Linear

Part B: What is the equation for this function?

$$y = 7x + 8$$

Unit 5: Exponential Functions Unit Review- ACTIVE

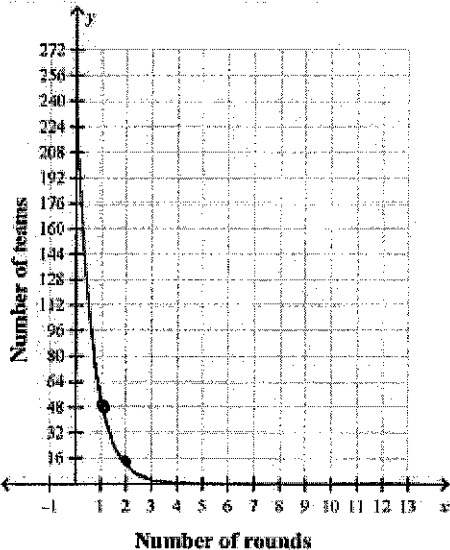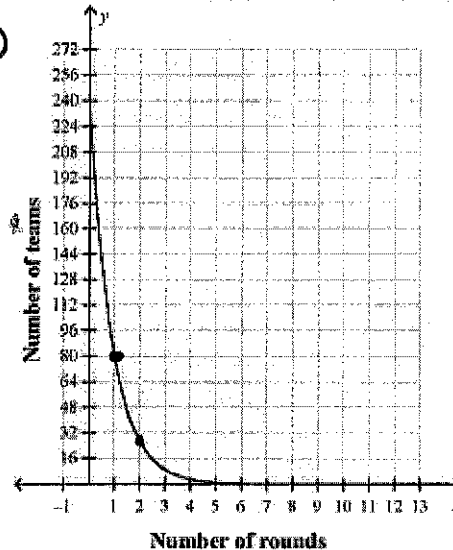| 1. What is the y-intercept of the graph of	2. The rule for a geometric sequence is
$f(x) = \dfrac{1}{10}(5)^x - 3?$ $\dfrac{-29}{10}$	$a_n = 150\left(\dfrac{1}{3}\right)^{n-1}$ What is the seventh term in the sequence? TWO $\dfrac{50}{243} = \boxed{\dfrac{25}{132}}$

3. A basketball tournament starts out with 243 teams. ~~One~~ third of the teams are eliminated after each round. What is the graph of the equation?
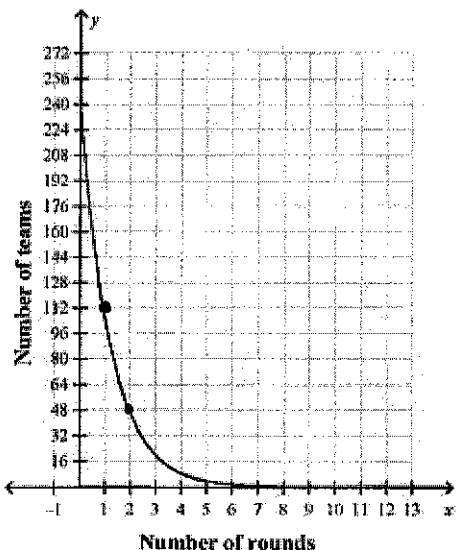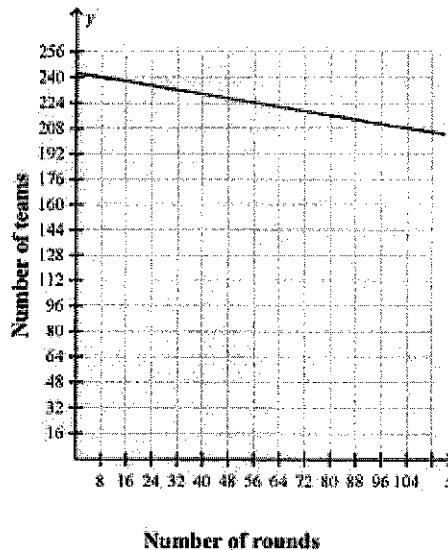

a.

Number of teams / Number of rounds

c. (circled)

Number of teams / Number of rounds

b.

Number of teams / Number of rounds

d.

Number of teams / Number of rounds

5. Which function shows exponential decay?	6. Amy wrote the following sequence of numbers
	-2, 1, 4, 7, 10

A. $f(x) = 2.3(-0.2)^x$ B. $f(x) = 2.3(1.2)^x$
 C. $f(x) = 2.3(1.8)^x$ (D.) $f(x) = 2.3(0.8)^x$
	What expression was used to form the sequence when *n* is the term number?
	
	    A. 3n + 2 B. 3n - 2
	    (C.) 3n - 5 D. 3n + 5

7. What equation correctly models the relationship between hours passed, h, and the number of molecules present, m, as shown in the table?

Hours Passed	Number of Molecules
0	4
1	16
2	64
3	256
4	1024

$$y = 4(4)^x$$

8. Often times a tweet will be tweeted and then retweeted with the possible number of retweets growing exponentially. Sarina modeled this with the function $f(x)=4(3)^x$ where x represents the number of intervals in which the tweet was retweeted. Which statement about her function is true?

A. A tweet can be retweeted a maximum of 4 times.
B. There were 3 original tweets.
C. There are 4 times 3 or 12 retweets at each level.
D. At each interval, the number of retweets triples

9. The number of blades of grass y that remain after m minutes of mowing a lawn can be modeled by the equation $y = 10{,}530(0.85)^m$ What is the rate of decrease of this scenario?

15%

10. After a dose of flea medicine, the number of fleas decreases. If the equation $y = 450\left(\frac{2}{3}\right)^x$ models this situation, what value represents the original number of fleas?

450

11. Elizabeth invested $4,500 in an account that is compounded annually and pays an interest of 2.3% each year. By what factor is the investment increasing every year?

1.023

12. A car depreciates at a rate of 13% each year. If the original cost of the car was $42,000, what is the approximate value of the car at the end of 4 years?

$$Y = 42000(.87)^4$$

$24,061.70

13. A stock loses half its value every week. If the stock was worth $160 starting out, what is it worth after 5 weeks at this rate of decline?

$$y = 160(.5)^5$$

$5.00

14. On the day that Marshall opened a money market account, he put in $100. If the value of the account doubles every year, how much would the account be worth in 15 years?

$$y = 100(2)^{15}$$

$3,276,800

15. The equation $y = 300(1.07)^x$ models the value of a limited edition watch after x years. Which statement is true about the value of the watch?

A. The value of the watch is decreasing by $300 each year.
B. The value of the watch is decreasing by 7% each year.
C. The value of the watch is growing by $300 each year.
D. The value of the watch is growing by 7% each year.

16. The Canton family wants to begin saving for a college fund. They initially deposit $75 into the account and it will grow at a rate of 14% annually. How much will the Canton family have saved after 18 years?

$$y = 75(1.14)^{18}$$

$793.14

17. The table below shows the results of an experiment with flowering trees using two different types of fertilizers, Type A and Type B. The number of blooms were measured weekly.

Expo.   Lin.

Time (weeks)	Type A	Type B
0	2).3	4)+5
1	6).3	9)+5
2	18).3	14)+5
3	54).3	19)+5
4	162	24)+5

Which statement **best** describes the results?

A. Both trees treated with fertilizers Type A or Type B increased exponentially.
B. The tree with Type A fertilizer increased at a constant rate.
C. The tree with Type B fertilizer increased at a constant rate.
D. The tree with Type B fertilizer increased exponentially.

18. A town's population increases at a rate of 1.2% every year. The current population is 6,800 people. What equation models this scenario?

A. $y = 6,800(1.12)^x$

B. $y = 6,800(1.012)^x$

C. $y = 6,800(0.012)^x$

D. $y = 6,800(0.12)^x$

19. Which of the following statements is true about the functions $f(x)$ and $g(x)$ shown below?
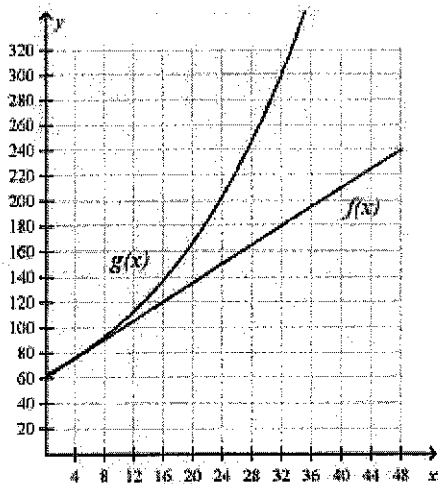
A. The rate of change of the function $g(x)$ is always greater than the rate of change of the function $f(x)$
B. The rate of change of the function $g(x)$ will eventually be greater than the rate of change of the function $f(x)$
C. The rate of change of the function $g(x)$ is never greater than the rate of change of the function $f(x)$
D. The rate of change of an exponential function cannot be determined.

20. Given the exponential function graphed below, which linear function has the same y-intercept?
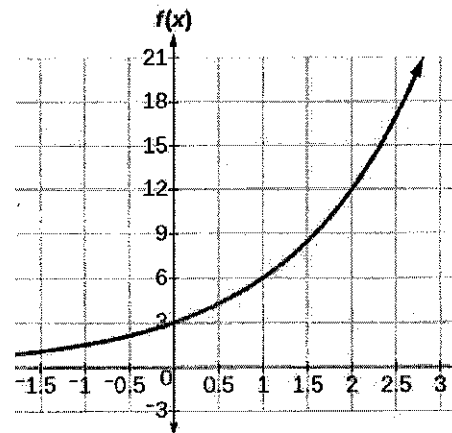
A. $2x + y = -12$ $y = -2x - 12$

B. $2x + 4y = 12$ $y = -\frac{1}{2}x + 3$

C. $x = 3$

D. $2x - 4y = 12$ $y = \frac{1}{2}x - 3$

21. Given $f(x) = 2,500 (0.78)^x$ identify the decay factor. $.78$	22. Each year the local recreation center sponsors a basketball free throw tournament. Play starts with 156 participants. During each round, a quarter of the players are eliminated. Write an exponential equation to describe this situation. $y = 156 \left(\frac{3}{4}\right)^x$

23. If $y = 57(1.18)^x$, what is the percent rate of change of y for each unit of x?

18%

24. Every ten years the census counts how many people live in each town.

- The 2000 census showed that 2,000 lived in Mint Hill and 8,000 lived in Matthews

- The population in Mint Hill is predicted to triple every ten years
- The Population in Matthews is predicted to increase by 1000 every ten years

what is the first census year that Mint Hill will have a larger population than Matthews?

$y = 2,000(3)^x$ $y = 1000x + 5000$

	MH	M
2000	2000	8000
2010	6,000	9000
2020	18,000	10,000
2030	54,000	11,000

2020