

Name: \_\_\_\_\_

Date: \_\_\_\_\_

EXPONENTS, EXPONENTS, AND MORE EXPONENTS – REVIEW SHEET!

Part I Questions:

$9-3=6$

1. The expression  $\frac{1}{2} \cdot \frac{x^9}{x^3}$  can be simplified to

$\frac{5}{10} = \frac{1}{2} x^6$

- (1)  $2x^6$
- (3)  $2x^3$

(2)  $\frac{1}{2}x^6$

(4)  $\frac{1}{2}x^3$

2. Which of the following is equivalent to  $2^{-3}$ ?

(1) -6

(3) -8

$2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

(2)  $\frac{1}{6}$

(4)  $\frac{1}{8}$

3. If  $f(x) = 10(2)^x$  then which of the following represents the value of  $f(0)$ ?

(1) 1

(3) 10

$10 \cdot 2^x$

(2) 0

(4) 20

$10 \cdot 2^0$

$10 \cdot 1 = 10$

4. Which of the following is the equation of an increasing exponential function?

(1)  $y = 4(0.75)^x$

(3)  $y = 5x - 2$

LINEAR

the "x" is an exponent

(2)  $y = 7\left(\frac{3}{2}\right)^x$

(4)  $y = 4x^2$

5. If Jordan had his hourly salary increase from \$9.25 per hour to \$10.75 per hour, which of the following is closest to the percent increase in Jordan's salary?

(1) 8%

(3) 16%

$\frac{(\text{change}) \text{ difference}}{\text{initial}} \times 100$

(2) 14%

(4) 19%

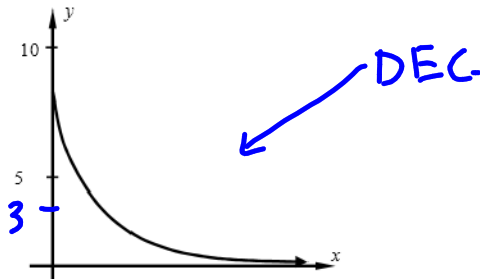
$$\begin{array}{r} 10.75 \\ - 9.25 \\ \hline 1.50 \end{array}$$

Change →

$\frac{1.50}{9.25} = .16 \Rightarrow 16\%$

6. Which of the following could be the equation of the exponential function shown below?

- (1)  $y = 3(0.9)^x$
- (2)  $y = 7(1.2)^x$  INC.
- (3)  $y = 8(0.5)^x$
- (4)  $y = 4(2.5)^x$  INC.



7. The population of Ketcham High School has been decreasing by 5% per year. If its population is currently 2,600 students, which of the following is closest to its population two years from now?

- (1) 2,340
- (2) 2,347
- (3) 2,470
- (4) 2,590

$$y = a(b)^x$$

$$y = 2600(1 - .05)^2$$

$$y = 2600(.95)^2 = 2346.5$$

2347

8. A population of bacteria is increasing at a rate of 7.5% per hour. If there were originally 275 bacteria, which of the following equations models the population of bacteria  $h$ -hours after the original 275 bacteria were measured?

- (1)  $P = 275(7.5)^h$
- (2)  $P = 7.5(275)^h$
- (3)  $P = 1.075h + 275$
- (4)  $P = 275(1.075)^h$

$$275(1.075)^h$$

→  
→

9. A radioactive material has a mass given by  $m(t) = 126(0.84)^t$ , where the mass is in grams and the time,  $t$ , is in years. Which of the following gives the average rate of change of the mass over the interval  $2 \leq t \leq 5$  years?

- (1) -12.1 grams per year
- (2) -36.2 grams per year
- (3) 18.3 grams per year
- (4) 28.9 grams per year

decreasing

$$\frac{\Delta y}{\Delta x} = \frac{52.695 - 88.906}{5 - 2}$$

$$= \frac{-36.211}{3}$$

$$= -12.07 \approx -12.1$$

x values

X	Y1			
-3	212.59			
-2	178.57			
-1	150			
0	126			
1	105.84			
2	88.906			
3	74.681			
4	62.732			
5	52.695			
6	44.264			
7	37.181			

X=7

Free Response Questions:

10. Simplify the following expression. Write it in two ways, one with the use of negative exponents and one with the use of a fraction (that doesn't have negative exponents).

$$\frac{x^5}{x^9}$$

11. Simplify the following expression.

product  $\rightarrow \frac{(3x^3)^2}{(6x)(2x)} = \frac{3x^3 \cdot 3x^3}{12x^2} = \frac{9x^6}{4x^2} = \frac{3}{4}x^4$

12. An object's speed can be modeled with the equation  $S = 24(1.06)^t$  where  $S$  represents its speed in miles per hour and  $t$  represents the amount of time that has passed, in seconds. Give an interpretation of the parameters 24 and 1.06 from the equation.

$24 \rightarrow$  y-intercept  
 $1.06 \rightarrow$  6% growth rate (factor)  
 Bigger than 1  $\rightarrow$   
 What is it?  
 What does it represent?

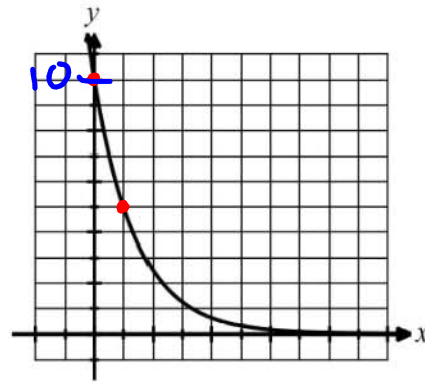
13. An exponential function,  $f$ , is shown in the table below. Determine an equation for it in  $f(x) = a(b)^x$  form.

$x$	0	1	2	3
$f(x)$	13	39	117	351

14. Max deposits money into a savings account that earns 3.5% interest applied annually. If Max initially deposits \$450 into the account, how much money does the account hold after 5-years if Max does not deposit or withdraw any additional money? Show how you arrived at your answer.

15. Determine the equation of the exponential function shown graphed below. Explain how you arrived at your answer.

$y = a(b)^x$   
 ☆ (0, 10) times  $y = 10(\frac{1}{2})^x$   
 ☆ (1, 5) what?  
 (2, 2.5)  
 (3, 1.25)



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NORMAL FLOAT AUTO REAL RADIAN MP
ExpRes
y=a*b^x
a=10
b=.5
    
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$\frac{10x}{10} = \frac{5}{10}$   
 $x = \frac{5}{10}$

16. A function passes through the points (0, 8) and (1, 24).

(a) Write the equation of a linear function that passes through these two points and write the equation of an exponential function that passes through these two points.

$x = \frac{1}{2}$

Linear,  $y = mx + b$   
 $y = 16x + 8$   
 ↑  
 difference between 24 and 8  
 $\frac{\Delta y}{\Delta x} = \frac{16}{1}$

Exponential,  $y = a(b)^x$   
 $y = 8(3)^x$

(b) How much greater is the exponential function's value at  $x = 5$  than the linear function's value? Show how you arrived at your answer.