

Name: _____

Date: _____

EXPONENTS, EXPONENTS, AND MORE EXPONENTS – REVIEW SHEET!

Part I Questions:

1. The expression $\frac{5x^9}{10x^3}$ can be simplified to

$\frac{5}{10} = \frac{1}{2}$ $\frac{x^9}{x^3} = x^{9-3}$

$x^2 \cdot x^8$
 x^{10}

(1) $2x^6$

(3) $2x^3$

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

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

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

$= x^6$

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

(1) -6

(3) -8

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

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

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

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

(1) 1

(3) 10

(2) 0

(4) 20

Product

$10 \cdot 2^x$

$10 \cdot 2^0$

$10 \cdot 1 = 10$

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

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

(3) $y = 5x - 2$

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

(4) $y = 4x^2$

less than 1
↓
DEC

$y = a(b)^x$

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%

(2) 14%

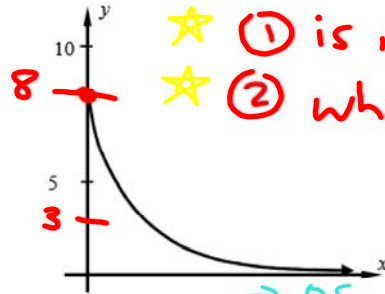
(4) 19%

$\frac{\text{change}}{\text{original}} = \frac{1.50}{9.25}$

$= .162$
 \rightarrow
 16%

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

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



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
- $2600(1-.05)^2$
 $2600(.95)^2$

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) $P = 275(1.075)^h$**
- 1.075

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~~

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).

$$\frac{x^5}{x^9} = x^{-4}$$

$$= \frac{1}{x^4}$$

aside

11. Simplify the following expression.

$$\frac{x^3}{x^3} = x^0$$

$$= 1$$

$$\frac{(3x^3)^2}{(6x)(2x)} = \frac{3x^3 \cdot 3x^3}{12x^2}$$

$$= \frac{9x^6}{12x^2} = \frac{3}{4}x^4$$

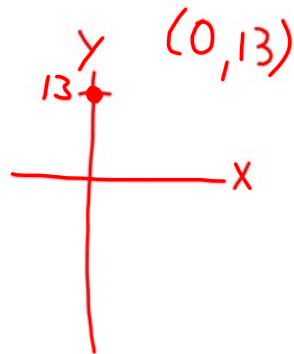
12. An object's speed can be modeled with the equation $S = 24(1.06)^t$, where S represents its speed in miles per hour and t represents the amount of time that has passed, in seconds. Give an interpretation of the parameters 24 and 1.06 from the equation.

24 → y-intercept 1.06 ⇒ 6%

1.06 → increasing (growth of 6%)

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



$y = a(b)^x$

Annotations: $x \cdot 3$ (between 0 and 1), $x \cdot 3$ (between 1 and 2), $x \cdot 3$ (between 2 and 3)

$$y = 13(3)^x$$

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.

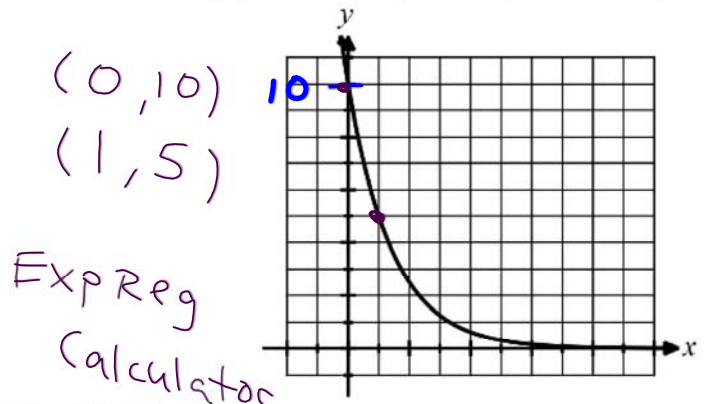
$$y = a(b)^x \quad y = 450(1 + .035)^5$$

$$450(1.035)^5 = \$534.46$$

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

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

$$y = 10\left(\frac{1}{2}\right)^x$$



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.

Linear, $y = mx + b$

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

- (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.