

Name _____

UNIT 6 EXPONENTS STUDY GUIDE



Simplify completely.

$$1. x^{10} \cdot x \cdot y^2 \cdot y^9 \cdot x$$
$$x^{12} y^{11}$$

$$2. (5x)^2 \cdot y^4 \cdot x^4$$
$$5^2 x^2 \cdot y^4 \cdot x^4$$
$$25 x^6 y^4$$

$$3. \frac{1}{x^4} \cdot x^3$$
$$\frac{1}{x}$$

$$4. \frac{2x^{10}y}{8x^9}$$
$$\frac{1xy}{4}$$

$$5. \frac{15x^4y^{10}}{3x^{14}y^{13}}$$
$$\frac{5}{x^{10}y^3}$$

$$6. \frac{x^{-3}}{x^{-7}y^{-5}}$$
$$\frac{x^7y^5}{x^3} \cdot \frac{x^4y^5}{1}$$

$$7. \frac{x^4y^{-10}}{x^{-8}y^6}$$
$$\frac{x^4 \cdot x^8}{y^{10} \cdot y^6}$$
$$\frac{x^{12}}{y^{16}}$$

$$8. \left(\frac{x^{10}}{9x^3} \right)^{-4}$$
$$\frac{x^{-40}}{9^{-4}x^{-12}} = \frac{9^4 x^{12}}{x^{40}} = \frac{9^4}{x^{28}}$$

$$9. \frac{3xy}{2} \cdot \frac{x^6y^8}{2}$$
$$\frac{3x^7y^9}{4}$$

$$10. \frac{-6x^{-1} \cdot x^{-4}y^3}{x^{-1}y^{-4} \cdot 1}$$
$$\frac{-6xy^4}{x} \cdot \frac{y^3}{x^4}$$
$$\frac{-6xy^7}{xx^4} = \frac{-6xy^7}{x^5}$$
$$= \frac{-6y^7}{x^4}$$

Label the following as growth or decay.

11. $y = \left(\frac{1}{5}\right)^x$

Decay

12. $y = \left(\frac{6}{5}\right)^x$

Growth

13. $y = (1.45)^x$

Growth

14. $y = \left(\frac{1}{5}\right)^{-x}$

$\left(\frac{5}{1}\right)^x$ Growth

Decide whether the table models an exponential or linear model. Write the equation.

15.

x	-2	-1	0	1	2
y	10	12	14	16	18

+2 +2 +2 +2

Linear

$y = 2x + 14$

16.

x	-2	-1	0	1	2
y	4	12	36	108	324

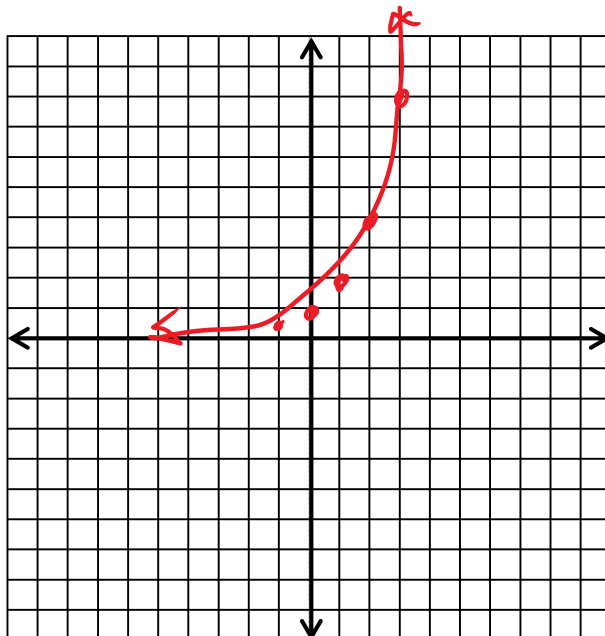
x3 x3 x3 x3

Exponential

$y = 36(3)^x$

17. Graph the exponential function: $y = (2)^x$

X	Y
-2	$2^{-2} = \frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2
2	4
3	8



Domain: $(-\infty, \infty)$

Range: $(0, \infty)$

End Behavior:

As $x \rightarrow -\infty \rightarrow y \rightarrow 0$
 As $x \rightarrow \infty \rightarrow y \rightarrow \infty$

18. In 1995, the population of a city was 30,000 people. Then each year the population increased by 5%. Write an exponential growth model to represent this situation in 2004. Then evaluate the model to see where the population would be.



a) EQUATION: $y = 30,000(1 + 0.05)^9$

b) ANSWER: $46539.85 \approx 46,539$ people

c) What would the population be in the year 2015? _____

19. You buy a used truck for \$13,000. It depreciates at the rate of 14% per year. Find the value of the truck after 8 years and evaluate the model.



a) EQUATION: $y = 13,000(1 - 0.14)^8$

b) ANSWER: $\$3889.83$

c) How much would the truck be worth if its initial value was \$17,000? $\$5,086.70$

$$17000(1 - 0.14)^8$$

Did you correct and check on mrsberenson.weebly.com?

Go back and study your notes, homework, and class activities!

Come in for extra help tomorrow morning in 104!