

Name _____

Date _____

Advanced Algebra

Assignment #4 : www.washburngulliford.weebly.com

Unit 3- Exponential, Power, and Logarithmic Functions:

Students should come into this unit with

- a) Knowledge of how to use the rules for calculating with exponents accurately
- b) Knowledge of how to solve simple growth and decay problems
- c) How to write exponential equations from tables and graphs

LT: I can simplify exponents using exponent rules. **Home work: You need to study your exponent rules. These can be found on page 246. (See the "Blue" and "Green" assignment)**

Re-write the following expressions without using a negative exponent or a decimal point.

1) 5^{-3}

$\frac{1}{5^3}$ or $\frac{1}{125}$

2) $(2 \times 3)^0$

1

Anything to zero power is 1

3) $(5x^2)^3$

$5^3 x^6$ or $125x^6$

4) $3^{1/4} * 3^{3/4}$

$3^{1/4}$ or 3^1 or 3

5) $4^{1/3} * 16^{1/3}$

$64^{1/3}$ or 4

"SAME exponent
Multiply base
Keep exponent"

6) $20^{1/4} * (4/5)^{1/4}$

$\frac{20}{1} \cdot \frac{4}{5} = 16^{1/4}$ (2)

SAME exponent
Multiply base
Keep exponent

7) $2^3 * 2^5$

2^8

8) $(-3)^2 * (-3)^1$

-3^3 or -27

9) $(1/2)^2 * (1/2)^{-2}$

$(\frac{1}{2})^0$ or 1

10) $3 * (2/3)^3 * (3/2)^2$

$\frac{3}{1} \cdot \frac{8}{27} \cdot \frac{9}{4} = \frac{6}{1}$ or 6

11) $3 * (2/3)^3 * (3/2)^2$

SAME AS #10

12) $x^4 * x^{-2}$

x^2

13) $3y^2 * y^2$

$3y^4$

14) $(4^3)^2$

4^6

15) $(6^2)^{-2}$

6^{-4} or $\frac{1}{6^4}$

Assignment #4

I can solve exponential equations:

1) $28 + 2^x = 692$ $2^x = 664$ $x = \log_2 664$ $x = 6$

2) $\frac{3^x}{45} = 95$ $3^x = 4275$ $x = \log_3 4275$ 7.61

3) $100 + \frac{18^{2x-3}}{4} = 652$ $18^{2x-3} = 2208$
 $2x-3 = \log_{18} 2208$ $x = 2.3$

4) $5^{(3x-2)} = \frac{1}{625}$
 $3x-2 = \log_5 \left(\frac{1}{625}\right)$ $x = -4$

5) $-285 + 3(6^x) = 1962$ $6^x = 749$
 $x = \log_6 749$ $x = 3.69$

6) $\frac{6^x}{32} = 716$ $6^x = 22912$ $x = \log_6 22912$ $x = 5.603$

LT: I can use exponential equations to model real life situations. Write an equation and use Log function to solve. Please show your work.

- 1) The car that Jason bought is expected to depreciate 18% each year. Jason paid \$17,500 for his car. How much would his car be worth 3 years after he bought it?

$y = 17,500 (.82)^x$ $17,500 (.82)^3$ $\$9,648.94$

- 2) Sally made a deposit in the bank of \$1,200. She will earn 8% annual interest. She leaves it in the bank making no other withdrawals or deposits. How much will her account be worth in 5 years?

$y = 1,200 (1 + .08)^x$ $y = 1,200 (1 + .08)^5$ $\$1,763.19$

- 3) James deposits \$500 into an account that pays 6.75% annual interest. How long will it take for his money to double?

$y = 500 (1 + .0675)^x$ $\$1,000 = 500 (1 + .0675)^x$ $2 = 1.0675^x$
 $x = \log_{1.0675} 2$ $x = 10.6116$

- 4) Amilia took out a loan for \$12,000. The APR on the loan is 7% compounded monthly. She makes no payments on this loan because they offered her this option. After how long will the balance on the loan be \$14,000? (It's probably a good idea for her to get paying on the loan!)

$y = 12,000 \left(1 + \frac{.07}{12}\right)^x$ $14,000 = 12,000 \left(1 + \frac{.07}{12}\right)^x$ $1.16667 = 1.0058333^x$
 $x = \log_{1.0058333} 1.16667$ $x = 26 \text{ Months}$

- 5) Ben received \$500. He decided that he would place it into an account that earns interest. The account he deposited the money into earns 8.5% compounded quarterly. After how long will the account be worth \$4,200?

$y = 500 \left(1 + \frac{.085}{4}\right)^x$ $4,200 = 500 \left(1 + \frac{.085}{4}\right)^x$ $8.4 = 1.02125^x$
 $x = \log_{1.02125} 8.4$
 $x = 101 \text{ quarters or } 25 \text{ years}$