NCM3 Name [illegible]

Unit 2B - Exponential Functions Review Period ______ Date ________

You need to know and be able to do the following	Things to remember	Practice Problems	
Solve exponential equations.	***Rewrite the bases so they are the same!*** Once the bases are equal the exponents must be equal. Set the exponents equal and solve!	Solve each exponential equation: 1) $4^{2x+1} = 8^{2x}$ $(2^2)^{2x+1} = (2^3)^{2x}$ $2^{4x+2} = 2^{6x}$ $4x+2 = 6x$ $2 = 2x$ $1 = x$	2) $25^{x-1} = \left(\frac{1}{5}\right)^{1-3x}$ $(5^2)^{x-1} = (5^{-1})^{1-3x}$ $5^{2x-2} = 5^{-1+3x}$ $2x-2 = -1+3x$ $-1 = x$
Write an exponential equation in log form & a log equation in exponential form.	The most important thing to remember is ***'a log is just a power'*** It makes logs less intimidating☺ $log_2 8 = 3$ *What is the exponent needed on 2 to get the result 8?*	Write the exponential equation as a log equation: 3) $3^0 = 1$ $\log_3 1 = 0$ Write the log equation as an exponential equation: 5) $\log_{27} 3 = \frac{1}{3}$ $27^{1/3} = 3$	Write the exponential equation as a log equation: 4) $\left(\frac{1}{3}\right)^{-3} = 27$ $\log_{\frac{1}{3}} 27 = -3$ Write the log equation as an exponential equation: 6) $\log_5 \frac{1}{25} = -2$ $5^{-2} = \frac{1}{25}$
Evaluate logs.	Rewrite each term in exponential form and determine the power!	Evaluate: 7) $\log_3 27 + \log_2 16 = 3 + 4 = 7$ 8) $5 \cdot \log 1 - 2 \cdot \log 10 = 5(0) - 2(1) = -2$ 9) $\log_4 2 = 1/2$	

NCM3

Unit 2B - Exponential Functions Review

Name Key

Period ___ Date ___

Solve exponential equations.	Isolate the exponential and rewrite as a logarithm (or take the log of both sides).	Solve the equation. Round your answer to the nearest hundredth. 10) $\frac{\cancel{2}(3)^x}{\cancel{2}} = \frac{28}{2}$ $3^x = 14$ $\log_3 14 = x$ $2.40 = x$ 11) $18^{x+2} + \cancel{2} = 53$ $-2 \quad -2$ $18^{x+2} = 51$ $\log_{18} 51 = x+2$ $1.36... = x+2 \quad -.64 = x$ 12) $2^{7x} - \cancel{1} = 58$ $+1 \quad +1$ $2^{7x} = 59$ $\log_2 59 = 7x$ $5.88... = 7x$ $.84 = x$

NCM3 Name Key
Unit 2B - Exponential Functions Review Period ______ Date __________

Use transformations to translate exponential growth/decay and the inverses.

Analyze the graph.

x	y
-2	3/4
-1	3/2
0	3
1	6
2	12

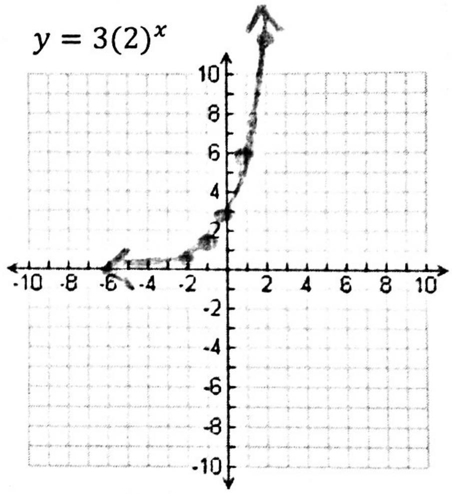
Remember to determine the inverse of a graph . . . switch the x and y coordinates and plot the new coordinates.

Because the x and y coordinates are switched look carefully at how this effects the analysis!

x	y
-2	1
-1	-1
0	-2
1	$-2\frac{1}{2}$
2	$-2\frac{3}{4}$

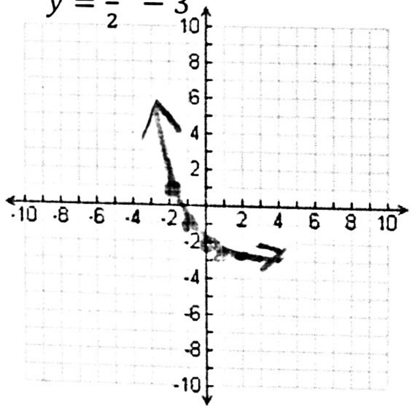
Graph each of the following and answer the questions:

13) $y = 3(2)^x$



Domain: $(-\infty, \infty)$ Range: $(0, \infty)$
y-intercept: $(0, 3)$
Asymptote: $y = 0$
Growth or Decay? Growth $(b > 1)$
Initial Value: 3
Growth/Decay Factor: 2
Growth rate: 100%

14) $y = \frac{1}{2}^x - 3$



Domain: $(-\infty, \infty)$ Range: $(-3, \infty)$
y-intercept: $(0, -2)$
Asymptote: $y = -3$
Growth or Decay? Decay $(b < 1)$
Initial Value: 1 $\left(\frac{1}{2}^x = 1 \cdot \frac{1}{2}^x\right)$
Growth/Decay Factor: $\frac{1}{2}$
Decay rate: 50%

NCM3 Name Key
Unit 2B - Exponential Functions Review Period ___ Date ___

15. Piper has $1000 that she'd like to invest for the next 5 years. The bank offers 3 savings accounts:

I. Interest is 6% compounded annually
II. Interest is 5% compounded semiannually
III. Interest is 5% compounded quarterly

$A = P(1+\frac{r}{n})^{nt}$

Fill in the following table and find the account balance after 5 years.

	Option I: 6% compounded annually	Option II: 5% compounded semiannually	Option III: 5% compounded quarterly
Work/equation used:	$A=1000(1+\frac{.06}{1})^{1\cdot5}$	$A=1000(1+\frac{.05}{2})^{2\cdot5}$	$A=1000(1+\frac{.05}{4})^{4\cdot5}$
Account balance after 5 years =	$1338.23	$1280.08	$1282.04

Using the option that yields the most money after 5 years, how long would it take for the $1000 to double?

Option 1

$\frac{2000}{1000} = \frac{1000(1+\frac{.06}{1})^{1t}}{1000}$

$2 = (1.06)^t$

$\log_{1.06} 2 = t$ 11.90 years $= t$

16) You buy a car for $31,500. The value of the car decreases by 12.5% each year. Write a model to give the value of the car after *t* years. Estimate when the car will have a value of $12,000.

.125

model: $y = 31{,}500(.875)^t$

When value of $12,000: $\frac{12{,}000}{31{,}500} = \frac{\cancel{31{,}500}(.875)^t}{\cancel{31{,}500}}$

$.3809... = .875^t$

$\log_{.875} .3809... = t$

$7.23 \text{ yrs} = t$