

DO NOT TURN THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO

- ❖ Write your name below on the space provided.
- ❖ This test has a total of 5 pages.
- ❖ Work the problem in the space provided. If you need more space, write on the back of the test.
- ❖ To insure maximum credit, show your work. In general, full credit will not be given for unsupported answers.
- ❖ Draw a sun on this page for some credit.
- ❖ Look only at your test. Don't give the impression that you are cheating.
- ❖ Be sure to write neatly. If I cannot read what was written, do not expect the problem to be graded.
- ❖ If you finish early, go over the test again.

Good luck!

Number	Maximum	Score
1	3	
2	8	
3	EC 2	
4	3	
5	5	
6	4	
7	20	
8	6	
9	6	
10	18	
11	2	
12	2	
13	20	
Total	100/102	

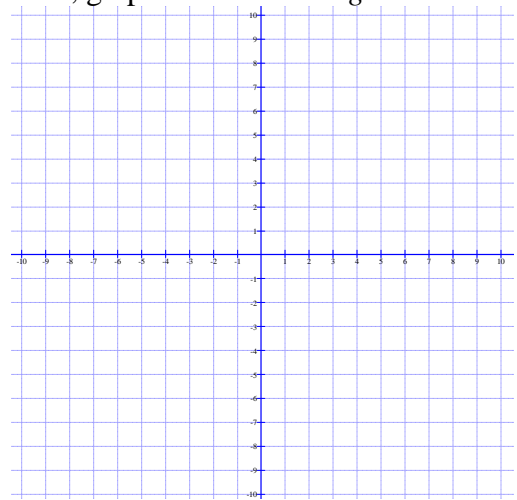
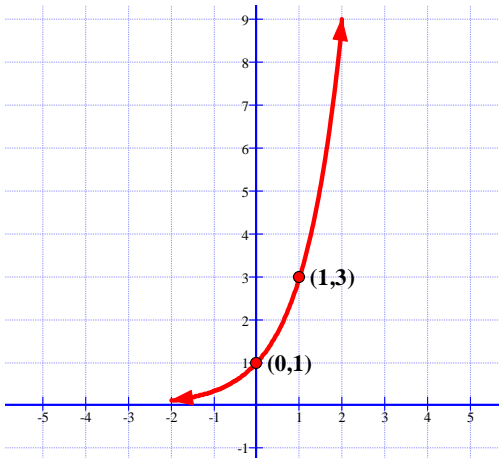
Name _____

1) (3 points each) Find the inverse of the following functions:

a) $\{(8,4), (0,7), (12,9), (6,6)\}$

b) $f(x) = \frac{2}{x-3}$

2) (8 points) Graph $g(x) = 2 \cdot 3^{x+4} - 2$ by transforming the given function $y = 3^x$. Be sure to move and label the given points and asymptotes. On the same axis, graph the inverse of g .



3) Extra credit (2 points) What was the inverse function graphed in #2? As a hint, remember what the inverse of an exponential function is.

4) (3 points) Write as one logarithm $9\log_4 x + 5\log_4 y - 10\log_4 z$:

5) (5 points) Given that $\ln x = 5$, $\ln y = 10$, and $\ln z = -5$, find the exact value for $\ln \sqrt[5]{\frac{x^4 y}{z^5}}$:

6) (2 points each) Finish the explanation of the given equations. **Do not solve the equations.**

a) $5^{4x-7} = 125$ is a one-to-one exponential equation because...

b) $\log_{17}(2x+8) = 16$ is not a one-to-one logarithmic equation because...

7) (5 points each) Solve for the variable. Be sure to find the exact value.

a) $8^{2x-1} = 16^{x+4}$

b) $10e^{4x+1} = 13$

c) $\log_2(x+1) - \log_2(x+2) = \log_2 8$

d) $\ln(3x+4) + 3 = 12$

8) (6 points) At a conference, when it was revealed that the Xbox One would not allow you to share games with friends, the number of Xbox owners began to decay exponentially. Using

$P(t) = P_0 e^{-kt}$ where P is in **millions** of Xbox customers and t is the number of hours since the beginning of the conference, determine the exact value for the decay rate k if there were 2.37 million customers in the beginning of the event and 5 hours later, there are only 1 million customers left.



University studies have shown that the PS4 is totes cooler than the Xbox One.

9) (2 points part *a*, 4 points part *b*) Consider the following problem.

At a college production of Much Ado about Math, 400 tickets were sold. The ticket prices were \$8, \$10, and \$12, and the total income from the ticket sales was \$3700. How many tickets of each type were sold if the combined number of \$8 and \$10 tickets sold was 7 times the number of \$12 tickets sold?

a) Name and define variables:

b) Set up the system but **do not solve it**.

10) (9 points each) Solve the following system using the method listed:

a) Elimination:

$$\begin{cases} x - 4y + 2z = -4 \\ 4x - 15y + 8z = 2 \\ -2x + 9y - 10z = 8 \end{cases}$$

b) Gauss-Jordan Method:

11) (2 points) Verify that you made absolutely sure that your answer to 10a is the same as in 10b by signing your name here _____ . You will not receive the credit if the work does not support the same answer.

12) (2 points) Short answer: Why are logarithms necessary?

13) (10 points each) Decompose into partial fractions:

a) $\frac{x+10}{x^2-4x-12}$

b) $\frac{x^2+2x+7}{(x^2+2)(x+1)}$