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. The last page is a formula sheet. Feel free to tear that page off. It does not have to be returned.
❖ 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.
❖ Look only at your test. Don't give the impression that you are cheating.
❖ Give the turkey on the last page a name for something extra.
❖ Be sure to write neatly and in pencil. 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!

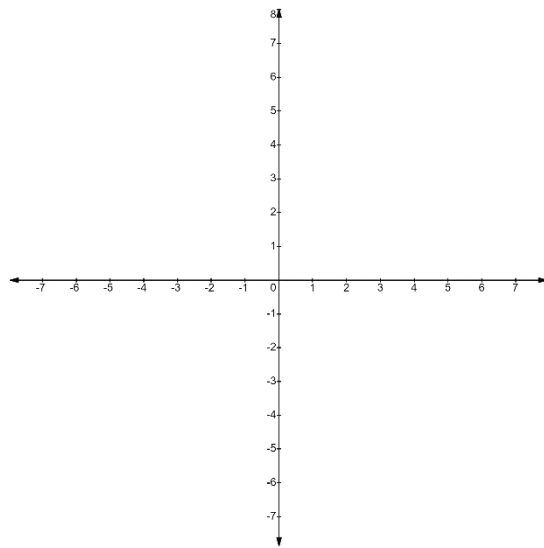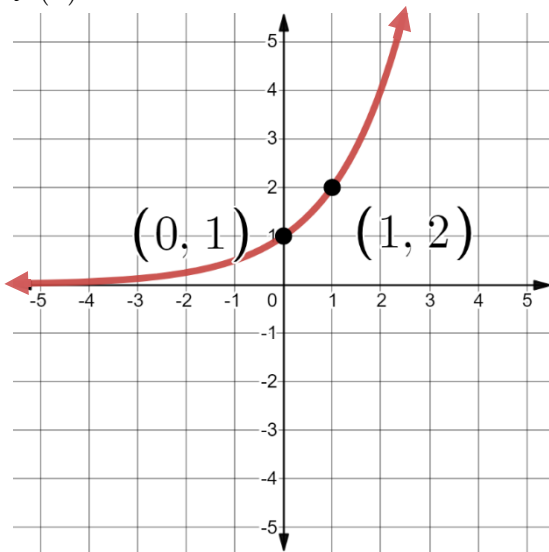| Number	Maximum	Score
1	6	
2	3	
3	3	
4	3	
5	4	
6	4	
7	9	
8	20	
9	8	
10	1	
11	18	
12	1	
13	8	
14	12	
Total	100	

Name _____

Circle Final Answers

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

a) $\{(6,-2),(-5,8),(0,-9),(16,1)\}$
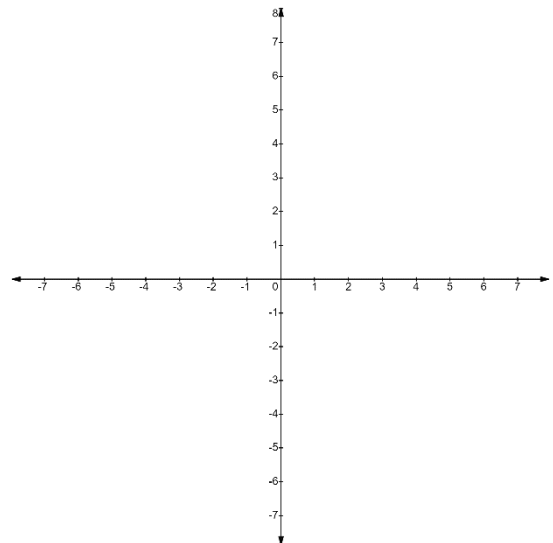
b) $f(x)=\dfrac{x+7}{x-5}$

2) (3 points) Using the graph of $y=2^{x}$ shown on the left, sketch the graph of the function $f(x)=4\cdot2^{x-3}-5$. Be sure to label the transformed given points and asymptote:

3) (3 points) Algebraically find the inverse of the function $f(x)=4\cdot2^{x-3}-5$:

4) (3 points) Sketch a graph of the inverse of the function $f(x)=4\cdot2^{x-3}-5$ Be sure to label the transformed given points and asymptote. *Hint, use your answer from #2 and remember the relationship between the graph of a function and the graph of its inverse.*

5) (4 points) Write the expression as one logarithm: $5\log x + 9\log y - \dfrac{1}{3}\log z$

6) (4 points) Given that $\log_a x = 3$, $\log_a y = -4$, and $\log_a z = 5$, find the value of $\log_a \sqrt{\dfrac{x^3 y^5}{z^2}}$:

7) (3 points each) Simplify completely:

a) $\log_{25}(5x)$

b) $\ln\left(\dfrac{e^9}{x^2}\right)$

c) $\ln e^{-5} + \log_2 8$

8) (5 points each) Solve for the variable.

a) $4^{3x+7} = 64$

b) $5^{3x-2} = 35$

c) $\ln(4x-7) - \ln(x-2) = \ln(5)$

d) $\log_2(5x+15) - \log_2(x+2) = 3$

9) (4 points each) The video "Shelter Cat Plans World Domination" started to go viral last month. At 8 am, when the video was posted, there were 300 views. At noon, there 15,000 views. Assume that the number of views is growing exponential and use the formula $P(t) = P_0 e^{kt}$ where P is the number of views and t is the number of hours past 8 am.

a) Determine the **exact** value for the growth rate k.

b) How many hours past 8 am will there will 350,000 views? Round your answer to one decimal place.

10) (1 measly point) Fill in the blank: John Jacob Jingleheimer Schmidt, a foreign exchange student from Norway, is in your math class. (Yes, in the future, you'll be teaching math—kudos: me.) He asks one day for you to pronounce $\ln 12$ for him. You reply "Gladly, it's pronounced _____"

11) (9 points each) Solve the system $\begin{cases} x - 7y + 5z = 3 \\ -3x - y + 3z = 25 \\ 4x - 2y + 3z = 6 \end{cases}$ using the methods listed below. Be sure to show all necessary work where appropriate. Write answer as an ordered triple:

a) Elimination Method:

b) Gauss-Jordan Method:

12) (1 point) Verify that you made absolutely sure that your answer to 11a is the same as in 11b by signing your name here _____. You will not receive the credit if the work does not support the same answer.

13) For the following problem:

In a certain country people own a total of about 353 million fish, cats, and dogs as pets. The number of fish owned is 7 million more than the total number of cats and dogs owned, and 16 million more cats are owned than dogs. How many of each type of pet do people in this country own?

a) (3 points) Name and define your variables for this problem:

b) (5 points) Set up **BUT DO NOT SOLVE** a system of equations for this problem:

14) (6 points each) Decompose into partial fractions. Be sure to show the system you are using to solve for the necessary letters.

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

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