

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.
- ❖ Look only at your test. Don't give me the impression that you are cheating.
- ❖ Draw a cat on this page for something extra.
- ❖ Be sure to write neatly. If I cannot read what was written, do not expect the problem to be graded. A pencil must be used on all tests. Otherwise, the test will not be graded.
- ❖ If you finish early, go over the test again.

Good luck!

Number	Maximum	Score
1	6	
2	3	
3	4	
4	4	
5	2	
6	9	
7	25	
8	5	
9	1	
10	20	
11	1	
12	6	
13	14	
Total	100	

Name _____

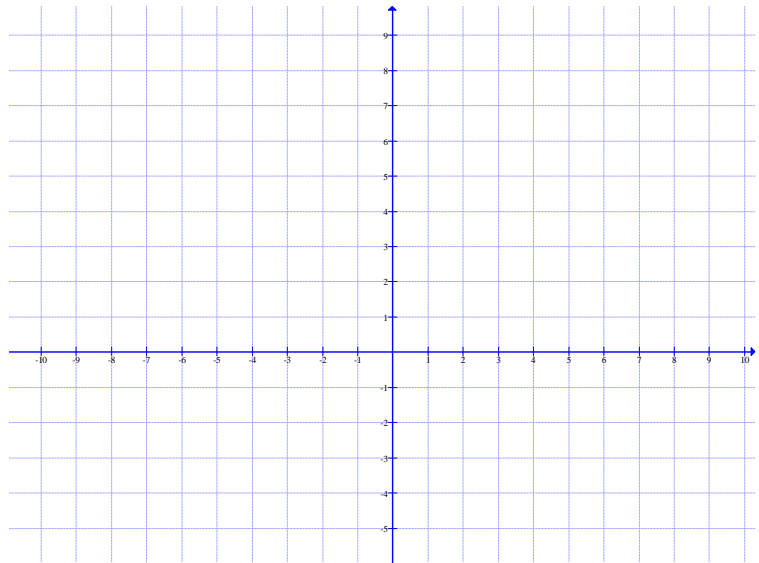
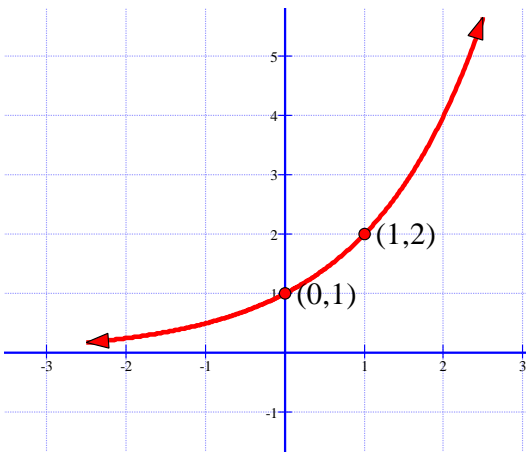
Circle Final Answers

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

a) $\{(6, -2), (-5, 8), (0, -9), (16, 1)\}$

b) $f(x) = \frac{x+7}{x-5}$

2) (3 points) Sketch the graph of the function $f(x) = 4 \cdot 2^{x-3} - 2$. Be sure to label the transformed given points and asymptote:



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

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

5) (2 points) Short answer: Why are logarithms necessary?

6) (3 points each) Simplify completely:

a) $\log_{25}(5x)$ b) $\ln\left(\frac{e^9}{x^2}\right)$ c) $\log_2 25 \times \log_5 8$

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

e) $e^x - 1 = 2e^{-x}$

8) The video “My Cat Powers Up His Attacks” started to go viral last year. At 8 am, when the video was posted, there were 300 views. At noon, there 12,000 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) (5 points) Determine the exact value for the growth rate k . b) Extra Credit: During the exact time in hour:minute:second format when there was 60,000 views.



9) (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 $\log_4 12$ for him. You reply "Gladly, it's pronounced _____"

10) (10 points each) Solve the system
$$\begin{cases} x + 2y + 3z = 4 \\ -2x - 3y - 6z = -3 \\ 3x + 6y + 10z = 6 \end{cases}$$
 using the methods listed below. Be

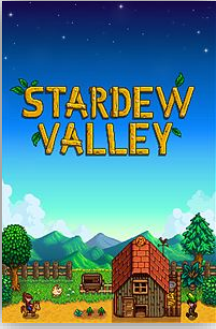
sure to show all necessary work where appropriate. Write answer as an ordered triple:

a) Elimination Method:

b) Gauss-Jordan Method:

11) (1 point) 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) (6 points) **Set up BUT DO NOT SOLVE** the system associated with the following. **Be sure to name and define your variables:**



Play this game if you enjoy losing countless hours of your life in front of the TV.

It is rumored that next year, Nintendo will release an updated version of the Nintendo Switch and Mike is strongly considering buying one, despite already having a plethora of games to play. He also has a problem of buying more than one copy of the same game. At Target, Mike orders 2 copies of *Zelda*, 4 copies of *Super Mario Odyssey*, and 2 copies of *Stardew Valley* and spends \$350.44. At Best Buy, Mike orders 4 copies of *Zelda*, 5 copies of *Super Mario Odyssey*, and 1 copy of *Stardew Valley* and spends \$495.44. The price for one copy of *Stardew Valley* is half of the other two games combined. Assume the prices for each game does not change depending on where the game was purchase. How much does each game cost?

- 13) (7 points each) Decompose into partial fractions:

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

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