

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.
- ❖ 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	20	
10	2	
11	5	
12	4	
13	9	
14	1	
Total	100	

Name _____

**Circle Final Answers
Calculator-Free Exam**



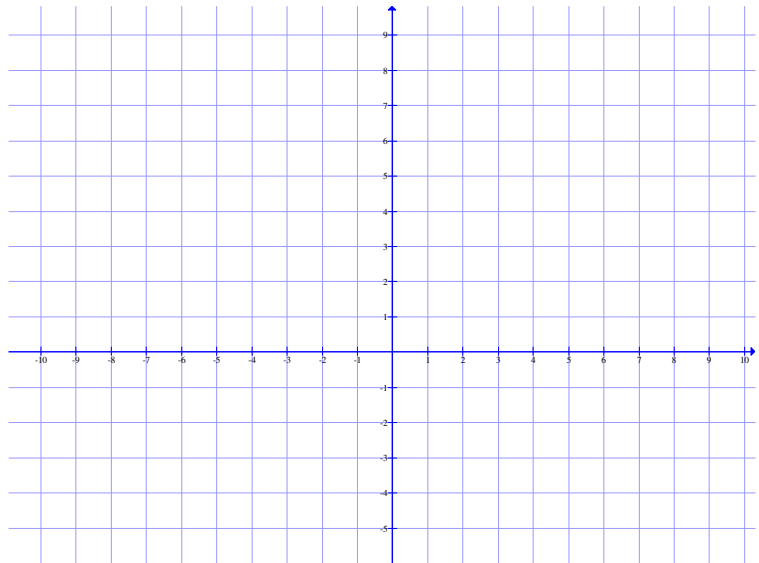
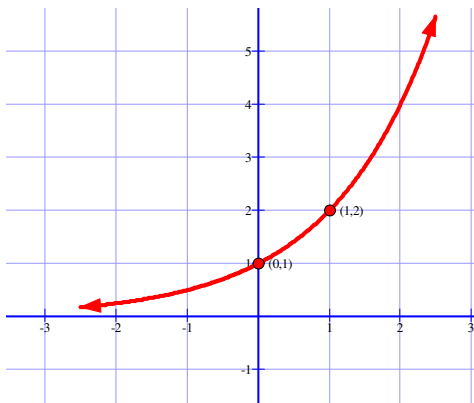
It's going to be okay!

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

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

b) $f(x) = \frac{x+7}{x-4}$

2) (3 points) Sketch the graph of the function $f(x) = 4 \cdot 2^{x+1} - 3$. 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) $\ln(4x-7) - \ln(x-2) = \ln(4)$

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

e) $2e^x - 9 = -4e^{-x}$

8) (5 points) At a press conference, Microsoft announced they were dropping the price of the Xbox One to make it more competitive this holiday season. PlayStation fans quickly responded with “TROLLOL” and the number of laughing fans has been increasing exponentially, beginning with 12.4 million fans. Using $P(t) = P_0 e^{kt}$ where P is in **millions** and t is the number of days since the announcement, determine the exact value for the growth rate k if after 6 days, there were 23.8 million people fans laughing.

9) (10 points each) Solve the system $\begin{cases} x + 2y + 3z = 1 \\ -2x - 3y - 6z = -3 \\ 3x + 6y + 10z = 6 \end{cases}$ 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:

10) (2 points) Verify that you made absolutely sure that your answer to 9a is the same as in 9b by signing your name here _____. You will not receive the credit if the work does not support the same answer.



WHERE'S THE GIRL?

- 11) (6 points) **Set up but do not solve** the system associated with the following. **Be sure to name and define your variables:**



"Geez, Batman. I'm right here in the game *Detroit*."

At a recent conference, Sony unveiled three new games: *Detroit*, *Dreams*, and *Horizon Zero Dawn*. Unable to resist preordering multiple copies of each game for himself and his friends, Mike goes wild during an online-shopping binge. At Target, Mike orders 3 copies of *Detroit*, 4 copies of *Dreams*, and 2 copies of *Horizon Zero Dawn* and spends \$150.44. At Best Buy, Mike orders 4 copies of *Detroit*, 5 copies of *Dreams*, and 1 copy of *Horizon Zero Dawn* and spends \$195.44. The price for one copy of *Detroit* 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?

- 12) (2 points) Short answer. Do not provide an example as your answer:

- a) What properties must be true about the matrices A and B in order to find their sum or difference? b) What property must be true about the matrices A and B in order to find their product?

- 13) (3 points each) For the given matrices, find the following or explain why they do not exist:

$$A = \begin{bmatrix} 4 & 2 & 0 \\ 1 & -3 & 5 \end{bmatrix}$$

$$B = \begin{bmatrix} 6 & 2 & -1 \\ 9 & 0 & 3 \end{bmatrix}$$

$$C = \begin{bmatrix} 4 & -2 \\ 0 & 1 \end{bmatrix}$$

- a) $3A - 5B$ b) $7B + C$ c) CB

- 14) (1 measly point) Fill in the blank: John Jacob Jingleheimer Schmidt, a foreign exchange student from Finland, is in your math class. (Yes, in the future, you'll be teaching math—kudos: me.) He asks one day for you to pronounce $\log_6 5$ for him. You reply "Gladly, it's pronounced _____"