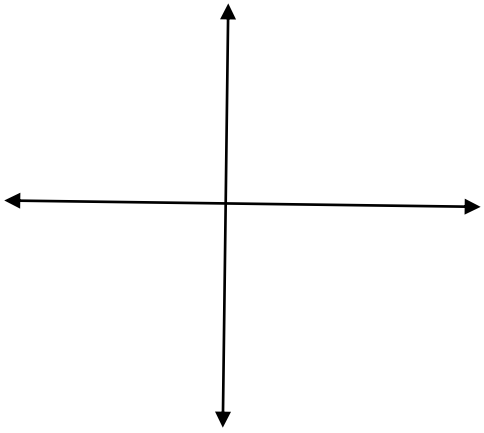
MATH-1320 Name _____
Exam 3
Fall 2016 Rocket Number _____

INSTRUCTIONS: You must show enough work to justify your answer on **ALL** problems. Correct answers with no work (or inconsistent work) shown **will not** receive full credit. **All answers are to be exact; no decimal approximations.** You are **NOT** allowed to use any electronic device for this exam.

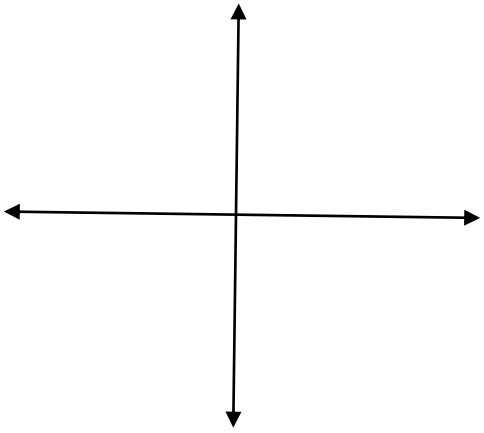
1. Sketch the graph of the following functions. Label number(s) on the *x*-axis and/or *y*-axis to help identify your sketch. Then state the domain and range of the function in interval notation. (14 pts.)

a. $f(x) = 4e^{-x} - 9$



Domain _____ Range _____

b. $y = -\frac{2}{3}\log(x - 2) + 5$



Domain _____ Range _____

2. Use the properties of logarithms to write the following as a sum and/or difference of logarithms. All variables represent positive numbers. (7 pts.) **Put a box around your answer.**

$$\ln \frac{x^2 \sqrt[5]{2x - 7}}{(x - 8)^3 (5x^4 + 11)}$$

3. Write $\log_4 x + 5\log_4 (x^2 - 16) - \frac{3}{2}\log_4 (9x + 8)$ as a single logarithm. (6 pts.) **Put a box around your answer.**

4. Use the change of basis formula to write $\log_5 85$ in terms of base 10. (3 pts.)

Answer _____

5. Solve the following equations.

a. $27^{x-5} = \frac{1}{81}$ (6 pts.)

Answer _____

b. $2^{4x+3} = 7$ (7 pts.)

Answer _____

c. $\log_6 x = 2 - \log_6 (x - 9)$ (9 pts.)

Answer _____

6. A citrus fruit grower purchased 30 orange trees and 20 lemon trees for $340. The next week the grower bought 25 orange trees and 35 lemon trees for $430. What is the cost of each tree? Set up a system of equations to solve this problem. Don't forget to identify your variables. (6 pts.) **Do NOT solve the system. Put a box around your answer.**

7. Solve the following systems of equations by the indicated method.

a. $\begin{aligned} 3x - 8y &= -3 \\ x - 7y &= 12 \end{aligned}$ using the substitution method (7 pts.)

Answer _____

b. $\begin{aligned} 4x - 3y &= 18 \\ 5x - 6y &= 24 \end{aligned}$ using the addition method (6 pts.)

Answer _____

c. $\begin{aligned} x^2 + y^2 &= 12 \\ (x-3)^2 + y^2 &= 33 \end{aligned}$ using the any method (9 pts.)

Answer _____

8. Solve the following system of equations using Gaussian elimination. (12 pts.)

$$\begin{aligned} x + 6y - 2z &= 2 \\ 4x - 3y + 5z &= -14 \\ -2x - 9y + 3z &= -2 \end{aligned}$$

Answer _____

9. Determine the solution for the system represented by each augmented matrix. (10 pts.)

a. $\left[\begin{array}{ccc|c} 1 & -4 & 2 & -8 \\ 0 & 1 & 3 & 5 \\ 0 & 0 & 0 & 0 \end{array}\right]$

Answer _____

b. $\left[\begin{array}{ccc|c} 1 & 6 & -3 & 8 \\ 0 & 1 & 2 & -4 \\ 0 & 0 & 0 & 1 \end{array}\right]$

Answer _____