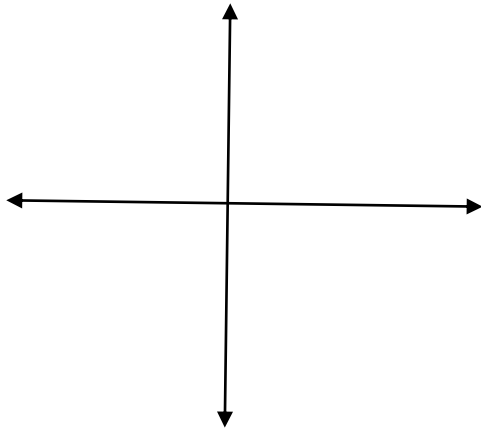


INSTRUCTIONS: You must show enough work to justify your answer on **ALL** problems. Correct answers with no work (or inconsistent work) shown **will not** receive full credit. **All answers are to be exact; no decimal approximations.** You are **NOT** allowed to use any electronic device for this exam.

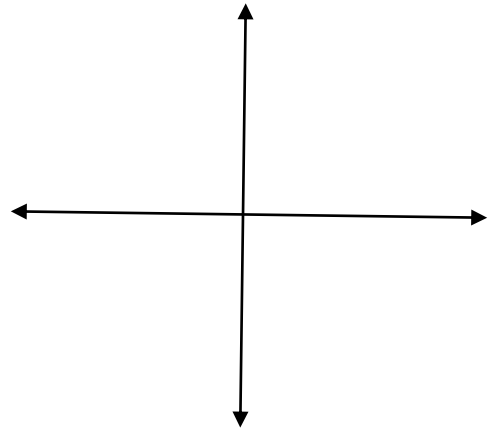
1. Sketch the graph of the following functions. Label **at most** three number(s) on the x -axis and/or y -axis to help identify your sketch. Then state the domain and range of the function in interval notation. (14 pts.)

a. $f(x) = 2e^{-x} + 5$



Domain _____ Range _____

b. $y = 3 \log(x - 4) - 2$



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.**

$$\log_5 \frac{x^3 \sqrt[5]{4x-7}}{(x^2+9)(2x+5)^6}$$

3. Write $\ln x - 4 \ln(8x^3 + 27) - \frac{3}{2} \ln(x - 12)$ as a single logarithm. (6 pts.) **Put a box around your answer.**

4. Use the change of basis formula to write $\log_3 75$ in terms of base 10. (3 pts.)

Answer _____

5. Solve the following equations.

a. $16^{7-3x} = \frac{1}{64}$ (6 pts.)

Answer _____

b. $3^{4x+11} = 15$ (7 pts.)

Answer _____

c. $\log_2 x = 4 - \log_2 (x - 6)$ (8 pts.)

Answer _____

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

a.
$$\begin{aligned} 6x - 3y &= 16 \\ 9x + 4y &= -10 \end{aligned}$$
 using the addition method (6 pts.)

Answer _____

b.
$$\begin{aligned} x + 5y &= 13 \\ 3x - 10y &= -36 \end{aligned}$$
 using the substitution method (7 pts.)

Answer _____

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

Answer _____

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

a.
$$\left[\begin{array}{ccc|c} 3 & -4 & 2 & 11 \\ 0 & 1 & -5 & -8 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

b.
$$\left[\begin{array}{ccc|c} 1 & 6 & -8 & -2 \\ 0 & 1 & -6 & 18 \\ 0 & 0 & 0 & 5 \end{array} \right]$$

Answer _____

Answer _____

8. Solve the following system of equations using Gaussian elimination. Indicate your row operations. (12 pts.)

$$\begin{aligned} x - 3y + 7z &= 4 \\ 2x - 4y + 3z &= -8 \\ -3x + 5y - 6z &= 6 \end{aligned}$$

Answer _____