MATH-1320
Exam 3
Fall 2022

Name _____

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.

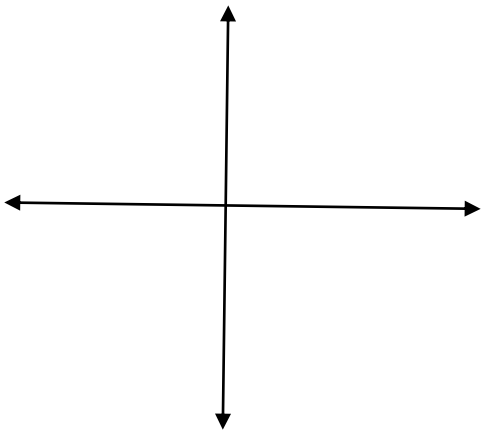
1. Sketch the graph of the following functions. Label number(s) on the *x*-axis and/or *y*-axis to help identify your sketch. Then state the domain and range of the function in interval notation. (14 pts.)

a. $g(x) = 2\left(\frac{7}{3}\right)^{x-4} - 5$

Domain _____ Range _____

Horizontal Shift _____

Vertical Shift _____

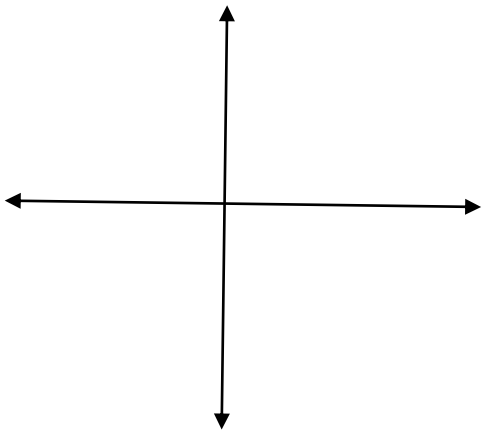


b. $y = \frac{5}{8}\log_{1/2}(x+3)$

Domain _____ Range _____

Horizontal Shift _____

Vertical Shift _____



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.**

$$\ln \frac{x^3\sqrt[4]{8-5x}}{(x+9)(3x^4-7)^6}$$

3. Write $\log_5 x - 2\log_5 (x^3 - 27) + \frac{2}{3}\log_5 (4x + 11)$ as a single logarithm. (6 pts.) **Put a box around your answer.**

4. Use the change of basis formula to write $\log_6 58$ in terms of base 10. (3 pts.)

Answer _____

5. Solve the following equations.

a. $8^{x-6} = \frac{1}{16}$ (6 pts.)

Answer _____

b. $5^{7-4x} = 9$ (7 pts.)

Answer _____

c. $\log_{2/3} x = 2 + \log_{2/3}(x - 8)$ (9 pts.)

Answer _____

6. A fruit grower purchased 20 apple trees and 40 orange trees for $480. The next week the grower bought 25 apple trees and 15 orange trees for $250. 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. $\begin{aligned} 5x - 4y &= 22 \\ 3x - y &= 2 \end{aligned}$ using the substitution method (7 pts.)

Answer _____

b. $\begin{aligned} 4x - 3y &= -22 \\ 7x - 9y &= -41 \end{aligned}$ using the addition method (6 pts.)

Answer _____

c. $\begin{aligned} x^2 - 2y^2 &= -29 \\ x^2 + (y-5)^2 &= 4 \end{aligned}$ using the any method (9 pts.)

Answer _____

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

$$\begin{aligned} x + 3y - 4z &= 15 \\ -4x - 9y + 8z &= -32 \\ 3x - 6y + z &= -14 \end{aligned}$$

Answer _____

9. Solve $\frac{8 - x}{6x + 17} \geq 0$. Write your answer using interval notation. (8 pts.)

Answer _____