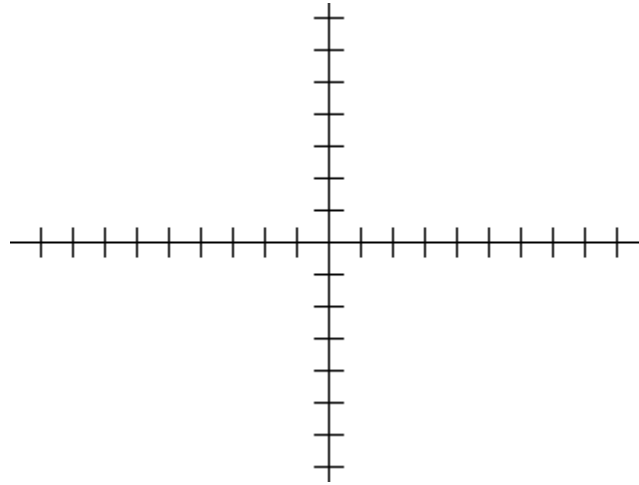


Final Exam

Answer each question to the best of your ability. Show all of your work.

1. Solve: $x^2 + 6x + 5 = 0$. (5 points)

2. Graph the function $f(x) = x^2 + 6x + 4$. (10 points)



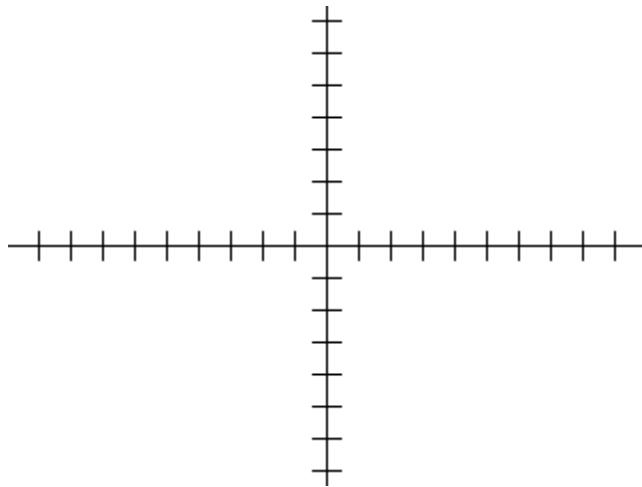
3. Given $f(x) = 4|x| - 1$
 $g(x) = x^2 - 4$, find $(f \circ g)(x)$. (5 points)

4. Solve: $x^2 - 3x \geq 4$. Write the solution set in set or interval notation. Verify that at least one solution from your interval satisfies the inequality. (10 points)

5. Simplify $\frac{6 - \frac{5}{k}}{1 + \frac{5}{k}}$. (10 points)

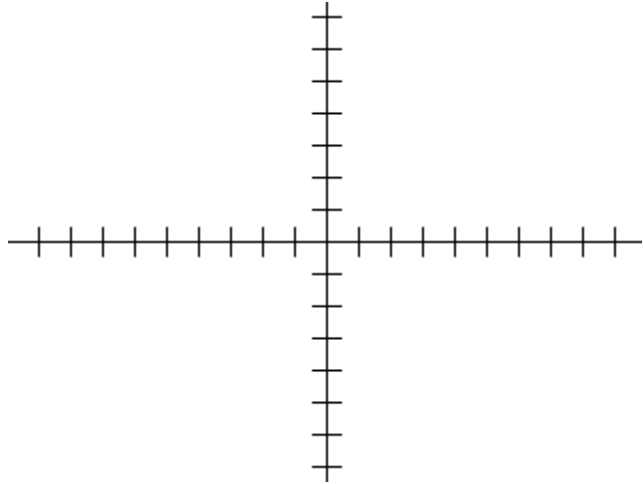
6. Solve: $\frac{x}{x+2} + \frac{1}{x} + 3 = \frac{2}{x^2+2}$. (10 points)

7. a) Graph the line $5x - 3y = 5$. (4 points)
b) Find the equation of a line parallel to $5x - 3y = 5$ through the point $(3, 3)$. Graph this line with the graph of (a). (8 points)
c) Find the equation of a line perpendicular to $5x - 3y = 5$ through the point $(-3, 0)$. Graph this line with the graph of (a) and (b). (8 points)
Label each line with its equation.

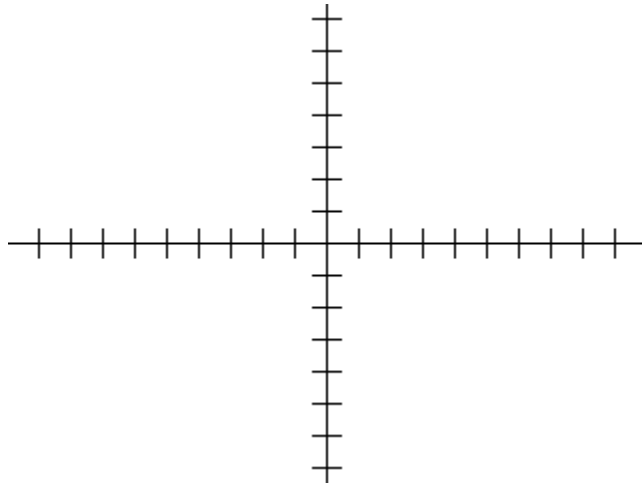


8. Sketch each of the following relations. (15 points each)

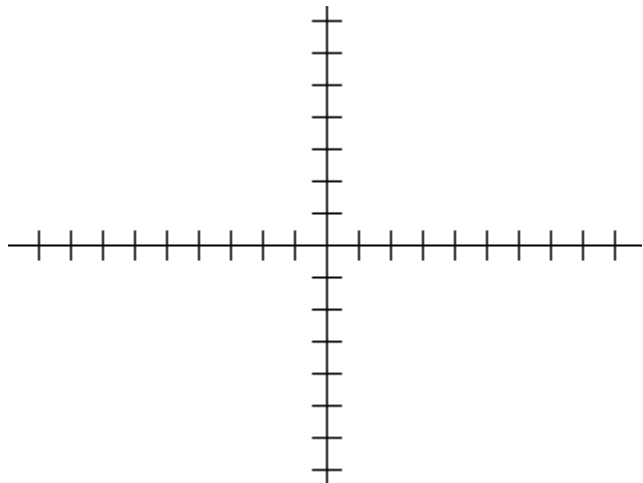
a. $(x-3)^3 - 2 = 0$



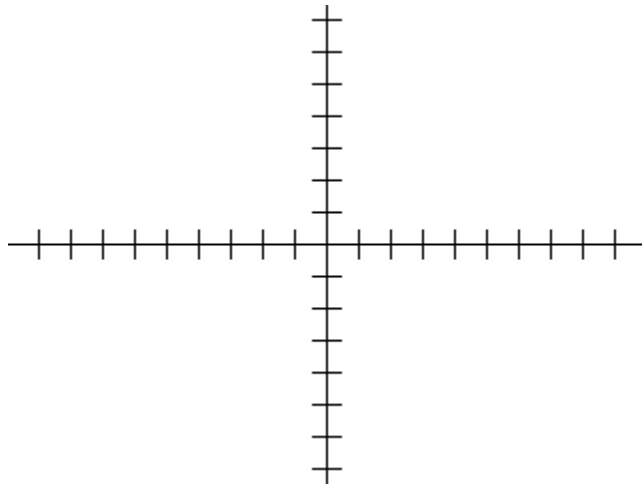
b. $y = |x+1| - 1$



c. $y = \begin{cases} 2x+3 & \text{if } x \leq -1 \\ x+1 & \text{if } x > -1 \end{cases}$



9. Find the inverse of the function $f(x) = \sqrt[3]{x-1}$. Graph the function and its inverse on the axes provided. (15 points)



10. Solve $\log 2x + \log 3 = \log(x-1)$ for x . (10 points)

11. Solve $4^{x+3} = 5^{2-x}$ (15 points)

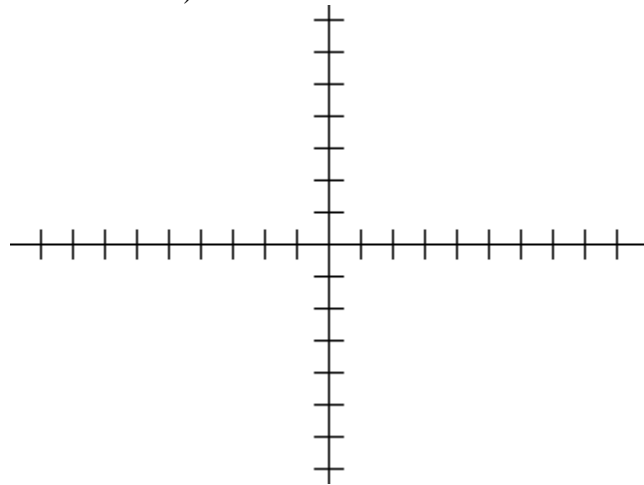
12. Solve: $\log_6 4x + \log_6(x-3) = \log_6 12$ for x . (10 points)

13. Given the function $f(x) = x^4 + 2x^3 - 4x^2 - 8x$

a. Find all of the factors of the function. (10 points)
(Hint: what are the possible zeros?)

b. Use synthetic division to find $f(-1)$ and $f(1)$ (10 points)

c. Graph the function. (15 points)
(let each graph mark denote 2 units)



Extra Credit: (10 points maximum)

Explain how the following pictures provide a proof for the Pythagorean Theorem.

