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May 13, 2004

Score (200 possible) _____

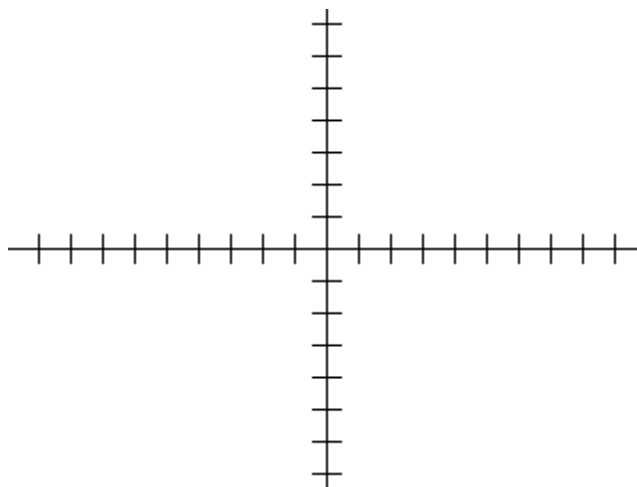
Final Exam

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

1. Solve: $\frac{2}{p+3} = \frac{5}{p-1} + \frac{1}{p^2+2p-3}$. (10 points)

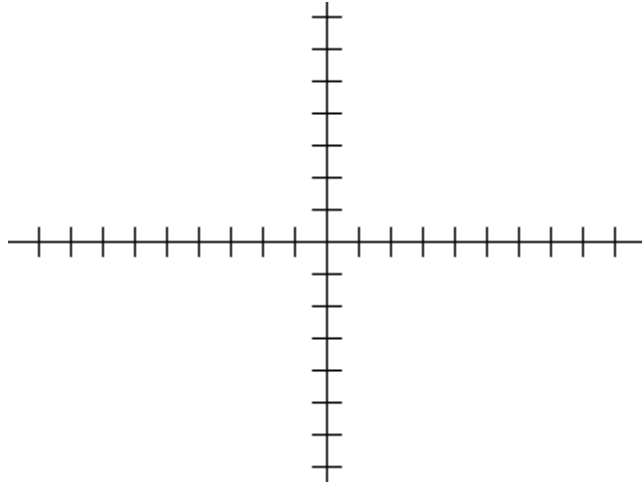
2. Solve: $\log_2 3x + \log_2 3 = \log_2 (2x+15)$ for x. (10 points)

3. a) Graph the line $2x - 2y = 1$. (4 points)
b) Find the equation of a line parallel to $2x - 2y = 1$ through the point (5, 1).
Graph this line with the graph of (a). (8 points)
c) Find the equation of a line perpendicular to $2x - 2y = 1$ through the point (-3, 0).
Graph this line with the graph of (a) and (b). (8 points)
Label each line with its equation.

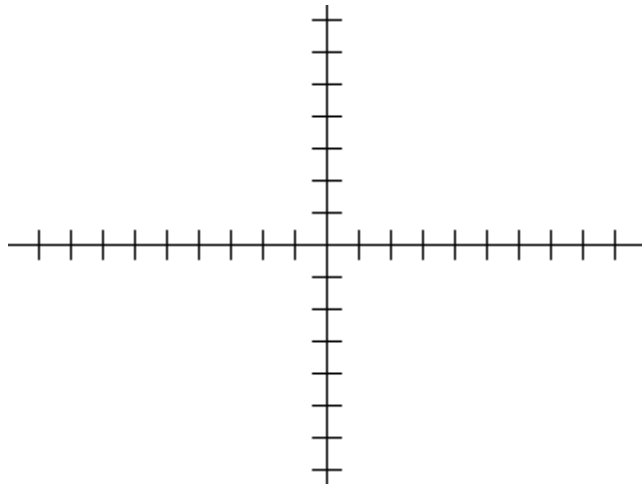


4. Simplify, identify, and graph each of the following relations. (15 points each)

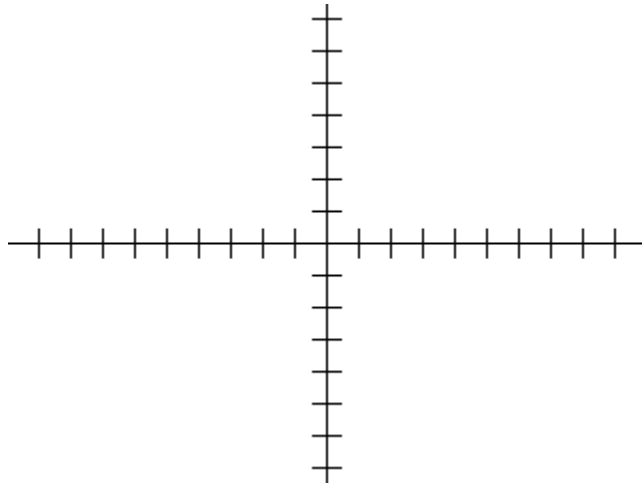
a. $x^2 + 2x + y^2 - 6y + 14 = 0$



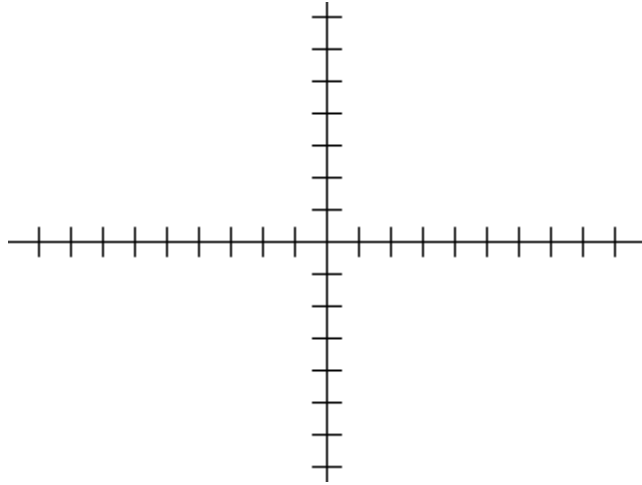
b. $y = \sqrt{x-4} + 2$



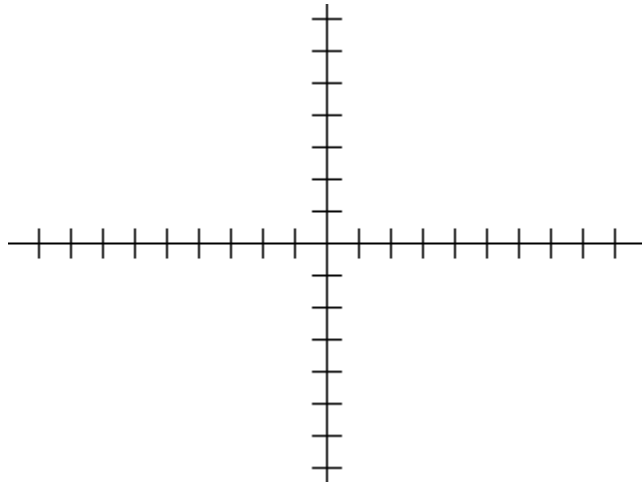
c. $y = \frac{x^2 - x - 2}{x^2 - x - 12} \cdot \frac{x^2 + 3x}{x^2 - 2x}$



5. Graph the function $f(x) = \begin{cases} -2 & \text{for } x \leq 0 \\ x-2 & \text{for } x > 0 \end{cases}$. (10 points)



6. Find the inverse of the function $f(x) = x^3 - 2$. Graph the function and its inverse on the axes provided. (15 points)



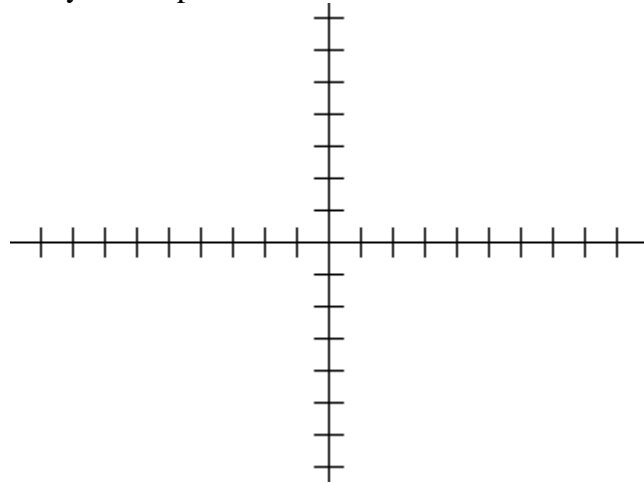
7. Solve: $x^2 + x \geq 12$. Write the solution set in set or interval notation. Verify that at least one solution from your interval satisfies the inequality. (10 points)
8. Solve: $x^2 - 5x + 4 = 0$. (5 points)
9. Solve $A = \frac{1}{2}(B + b)h$ for B . (5 points)
10. Simplify $\frac{4 - 3i}{4 + 3i}$ and write in standard notation. (5 points)
11. Given $f(x) = 2x^2 - 3$, $g(x) = x - 4$, find $(f \circ g)(x)$. (5 points)
12. Solve $\ln(5 + 4x) - \ln(3 + x) = \ln 3$ for x . (10 points)
13. Solve $\left(\frac{1}{2}\right)^{x+1} = 8^{x-1}$ (15 points)

14. Given the function $f(x) = x^4 - 10x^2 + 9$

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

b. Use synthetic division to find $f(-2)$ and $f(2)$ (10 points)

c. Graph the function. (15 points)
Hint: let each dash on the y-axis represent 3 units.



Extra Credit: (10 points maximum)

Assume the length of each side of the cube pictured is 1 foot. How far is it from point A to point B?

