Exam 2 Algebra & Trig 3/19/2003

Each problem is worth 10 points. For full credit provide complete justification for your answers.

1.Write an equation for the line through the point (-3,2) with a slope of 2/3.

2. What are the slope, x-intercept, and y-intercept of the line with equation $-3x + 2y = 15$?

3. What are the center and radius of the circle with equation $x^2 + y^2 - 4x + 12x = -36$?

4. Factor the function $f(x) = 2x^3 - 7x^2 - 7x + 30$ completely.

5. If $f(x) = x^2$, $g(x) = x + 5$, and $p(x) = 5x^3 - 2x$, find:

   (a) $f(3) =$

   (b) $f \circ g(-1) =$

   (c) $p(x + h) =$

6. Write one possible formula for a rational function with vertical asymptotes at $x = -4$ and $x = 5$, a horizontal asymptote at $y = 3$, and an x-intercept at $x = 3$.

7. Find all roots, real and complex, of the polynomial $3x^4 + x^3 + 4x^2 - 4x$.

8. Decompose $\dfrac{3x+31}{x^2+2x-15}$ into partial fractions.

9. Polly is a Precalc student at Enormous State University, and she's having some trouble with functions. She says "I just so totally don't get all this stuff about graphing functions. There's all these problems where they show you this graph, and then they add or subtract or put a minus on it or something, and you're supposed to say what the new graph would be like, and I totally hate them. There was this one on our quiz, and we were supposed to move it around a couple different ways, and the grader wrote that I did it in the wrong order and gave me no points, and then the professor wouldn't help me during office hours because he said I was stupid and should already know it. I cried for like an hour!"

   Explain to Polly as clearly as possible how the order in which transformations are applied to a function can affect the graph, and how to tell in which order they should be done.

10. Find all real solutions to the equation $x + \sqrt{6x} = 2x^2$.

Extra Credit (5 points possible): Find all points on the graph of $y = x^2$ that are 5 units away from the point (5,0).