Math 115 Carter Test 1 Fall 2008

Do not write on this test. Do not write your name on the inside of your blue books. Do all your work on the inside of your blue books. Write neat complete solutions to each of the problems below. Indicate your answers clearly, and in case there is a difference between your scratch work and your written solution, call my attention to the written solution. Do not erase scratch work unless you are certain that it is wrong. Each problem is worth 8 points. There are a total of 104 points possible.

A sprig of Cilantro added to tomato sauce can add an interesting flavor; I don't recommend it with ice cream. Good luck.

1. Solve the inequality:

$$0 \leq (x-2)(x+3).$$

2. Complete the squares, determine the center and radius and sketch the graph of the circle that is determined by the equation:

$$x^2 + 4x + y^2 + 6y + 9 = 0.$$

3. Determine the domain of the function:

$$f(x) = \sqrt{2x-6}$$

4. Determine the equation of the line that passes through the points $(-2, 1)$ and $(4, 7)$.

5. Use the technique of shifting a graph to sketch the graph of

$$y = (x-3)^2 - 4;$$

be sure to indicate the y-intercept, the vertex, and the x-intercepts.

6. Determine the equation of the parabola that has vertex $(1, -5)$ and y-intercept $(0, -3)$.

7. Complete the square and sketch the graph of

$$y = 2x^2 - 6x - 5$$

8. Solve the inequality:

$$3 \leq |4x - 10|$$

9. Determine the equation of the inverse function of the function

$$f(x) = \frac{2x-3}{x+1}$$

10. Determine the compositions $f \circ g$ and $g \circ f$ of the functions

$$f(x) = \sqrt{x} + x \quad g(x) = \frac{2-x}{x+1}.$$

11. Sketch the graph of the function

$$f(x) = (x+3)(x-1)(x-2).$$

12. Determine that $x = 1$ is a root of the cubic function

$$f(x) = x^3 - 2x^2 - x + 3.$$

What are the other two roots?

13. Sketch the graph of the function

$$f(x) = \frac{x}{x^2 - 4}.$$