MAT 121-G81 Test 2 – Fall, 2013 Name_____
100 Points Covers Chapter 2 NO GRAPHING CALCULATORS!!!

1. (5 pts) Find an equation of the line through the points (-1, 2) and (3, 5).

2. (5 pts) Sketch the graph of the line whose equation you found in #1, above. Show *x*-and *y*-intercepts.

3. (5 pts) Is the linear function in #s 1 and 2 increasing or decreasing?

4. Suppose *y* varies jointly as *x* and the square of *z* and inversely as the square root of *w*.
   a. (5 pts) Write an equation representing the relationship.

   b. (5 pts) Suppose $y = 24$ when $x = 1$, $z = 2$ and $w = 4$. What, then, is y when $x = 2$, $z = 3$ and $w = 4$?

5. Compute the discriminant for each of the following quadratic and tell me the nature of solutions, specifically, how many distinct solutions there are and whether they're real or non-real. *Do not solve the equations.* I'll throw a couple extra points of bonus your way if you distinguish between rational and irrational solutions.
   a. (5 pts) $x^2 - 6x - 19 = 0$

   b. (5 pts) $9x^2 - 30x + 53 = 0$

   c. (5 pts) $6x^2 - 25x + 14 = 0$

6. Solve by any method, but *show all work*!!!
   a. (5 pts) $x^2 - 6x - 19 = 0$

   b. (5 pts) $9x^2 - 30x + 53 = 0$

   c. (5 pts) $6x^2 - 25x + 14 = 0$

7. (5 pts) Solve $x^2 - 6x - 55 = 0$ by completing the square.

8. (10 pts) Complete the square for $f(x) = x^2 - 6x - 55$, and re-write it in the form $f(x) = a(x-h)^2 + k$. This is very similar to what you just did in #7, but you're manipulating an expression, rather than solving an equation, here. Use your work to sketch a graph of $f(x)$ that includes vertex, *x*- and *y*-intercepts, labeled as ordered pairs. I refuse to count tickmarks on the *x*- or *y*-axis.

9. (5 pts) Based on your work on #8, state the domain and range of $f(x)$.

10. (5 pts) State intervals of increase and decrease for $f(x)$ from #s 8 and 9.

11. (10 pts) Well, you've done so much with $f(x) = x^2 - 6x - 55$, now I want you to solve the inequality $3x^2 + 2x - 20 \le 2x^2 + 8x + 35$. That was a hint, by the way.

12. (5 pts) Solve $|7x + 6| > 11$. Give your answer in set-builder *and* interval notation.

Bonus Now, tell me what the domain of $g(x) = \sqrt{-x^2 + 6x + 55}$ is.