Math 461 F **Spring 2011**
Homework 1 **Drew Armstrong**

Reading.
Chapter 1

Book Problems.
Exercise Set 1.1: 5, 6, 8, 16, 17

Additional Problems.

A.1. Show that $(\sqrt{3}\pm 1)^3 = 6\sqrt{3}\pm 10$. Use this to solve Exercise 1.1.1.

A.2. Let r and s be the two roots (solutions) of the quadratic equation

$$x^2 + px + q = 0.$$

Find a formula for $(r-s)^2$ in terms of the coefficients p, q. This quantity is called the discriminant of the equation. When are the two roots equal?

A.3. Consider the following diagram from Descartes' *La Géométrie* (1637). Prove that the distances MQ and MR are solutions to the quadratic equation $y^2 = ay - b^2$. Hint: Put M at the origin of a Cartesian (x, y)-plane. In this case what is the equation of the circle?