MATH 23B 2010 WORKSHEETS

1. Numbers, sets and functions

1.1. **Inequalities.** This worksheet deals with the rigorous mathematics of inequalities. Work in small groups to do these problems, following the methods that I will teach you and write out the answers or present them to the class. You do not get grades on these.

1.1.1. Find the set of all real numbers x so that

$$x^2 - 7x + 10 < 0$$

Hint: First solve the equation $x^2 - 7x + 10 = 0$.

1.1.2. Find the set of all positive real numbers so that

$$\left|\frac{x-4}{x}\right| \leq 2$$

Hint: first get rid of the absolute value signs.

1.1.3. The first positivity axiom says:

P1 *The sum of two positive numbers is positive.*

Use this to prove the *transitivity* property of inequalities which says:

If $a > b$ and $b > c$ then $a > c$.

1.1.4. Given that x, y are real numbers whose product is $xy = 10$ and $x > 5$, prove that $y < 2$.

Date: January 20, 2010.