Section 1: Please complete the following problems and turn them in at the beginning of class on Friday.

Problem 1: Disprove the statement: If $a, b \in \mathbb{R}$, then $\log\left(\frac{a}{b}\right) = \log(a) - \log(b)$.

Problem 2: Prove or disprove the following statement: If $x \in \mathbb{R}$, then $\frac{x^2 + x - 2}{x^2 - 4x + 3} = \frac{x + 2}{x - 3}$.

Problem 3: Disprove the following statement by providing a counterexample: If $x \in \mathbb{R}$, then $1 + \cot^2(x) = \csc^2(x)$.

Problem 4: Prove that there is no largest positive rational number.

Problem 5: Prove that $\sqrt{5}$ is irrational. (You may assume the following statement: Let $p \in \mathbb{Z}$. If $5 \mid p^2$ then $5 \mid p$.)

Problem 6: Prove that $x^5 - x^3 + x - 10 = 0$ has a real solution.

Problem 7: Prove that every nonempty set of negative integers has a largest element.

Problem 8: 6.4 (1) from our book.

Section 2: Your quiz on Friday will be taken from the problems in this section.

5.2, 5.10, 5.16, 5.48, 6.8

Section 3: These are extra practice problems.

5.1, 5.9, 5.20, 5.21, 6.5