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

Problem 1: Prove that if $x$ is an even integer then $x^2 + x - 7$ is odd.

Problem 2: Prove that if $a$ and $c$ are odd integers, then $ab + bc$ is even for every integer $b$.

Problem 3: Please answer the following questions.

1. State the definition of a limit. [That is, the $\epsilon$-definition of $\lim_{n \to \infty} a_n = L$.]

2. Prove by the definition that $\lim_{n \to \infty} \frac{3n^2}{5n^2 + 1} = \frac{3}{5}$.

Problem 4: Let $x \in \mathbb{Z}$. Prove that if $x^3 - 1$ is odd, then $x$ is even.

Problem 5: 3.24 from our book.

Problem 6: 3.30 from our book.

Problem 7: Suppose $\lim_{n \to \infty} a_n = L$ and $\lim_{n \to \infty} b_n = M$. Prove by the definition that $\lim_{n \to \infty} (a_n + b_n) = L + M$.

Problem 8: 4.2 from our book.

Problem 9: Prove that if $a$ is an integer such that $a \equiv 1 \pmod{5}$, then $a^2 \equiv 1 \pmod{5}$.

Problem 10: Let $a \in \mathbb{Z}$. Prove that $a^3 \equiv a \pmod{3}$.

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

3.8, 3.12, 3.18, 3.30, 4.2, 4.6, 4.14, 4.18

Section 3: These are extra practice problems.

3.9, 3.14, 3.21, 3.26, 3.31, 4.3, 4.5, 4.15