These notes cover examples from the lecture on § 3.5 - Quadratic inequalities, and § 4.4 - Rational Inequalities, as well as some extra examples. These cover the most important types you are likely to see. It is strongly recommended that you work more problems similar to these in order to get good at these types of problems as they are very likely to show up on quizzes and tests.

1. § 3.5 - Quadratic Inequalities

Note: Remember to always write your answers in interval notation.

Example 1. Solve \( x^2 - 4x - 12 \leq 0 \)

Example 2. Solve \( 2x^2 < x + 10 \)

Example 3. Solve \( x^2 + x > 12 \)

Example 4. Solve \( -x^2 - x + 6 < 0 \)

2. § 4.4 - Rational Inequalities

Note: Remember to always write your answers in interval notation. Also, remember that when moving the parts of the expression, ONLY use addition and subtraction.

Example 5. Solve \( \frac{4x + 5}{x + 2} \geq 3 \)

Example 6. Solve \( \frac{x + 2}{x - 4} \geq 1 \)

Example 7. Solve \( \frac{5}{x - 3} > \frac{3}{x + 1} \)

Example 8. Solve \( \frac{(x + 3)(x - 5)}{3(x - 1)} > 0 \)

Example 9. Solve \( \frac{x^2 + 4x - 45}{x + 1} \leq 0 \)