

MATH 1314

Section 2.7

Non-Linear Inequalities

In this section, we will examine how to solve inequalities involving (1) quadratic functions, and (2) rational functions.

In these examples, we will use a method known as the Number Line Test.

Solving a Quadratic Inequality

- Rewrite the inequality as an equation (with an equal sign).
- Solve as done before.
- Test an x -value between the two solutions by plugging into the original inequality.
 - If you get a true statement, your solution is between the two solutions.
 - If you get a false statement, your solution is outside the two solutions.

Try this: $x^2 - x > 6$

Now, try this: $x^2 - x - 2 \leq 0$

Solving a Rational Inequality

- Set the denominator equal to zero and solve.
- Set the numerator equal to zero and solve.
- Plot these points on a number line (denominator is always open dot).
- Use test points between these values to determine the solution set.

Try this: $\frac{x+3}{x-1} > 0$

Now try this: $\frac{x-5}{x+8} \geq 0$

Now, a tough one: $\frac{5}{x+2} + \frac{1}{x} \geq 0$

$$x^2 + x - 12 < 0$$

$$\frac{x+8}{x-2} > 0$$

$$\frac{x+2}{x-1} + 5 \leq 0$$