3.6 Polynomial and Rational Inequalities

Polynomial Inequalities:

After putting the inequality into 'standard' form (by comparing $f(x)$ to 0), use the zeroes of the polynomial to divide the $x$-axis into subintervals. Check the value of the function for a sample point in each subinterval.

example: Solve the inequality $(x - 2)^2(x + 5) \geq 0$

example: Solve the inequality $2x^3 < 15x - x^2$

Rational Inequalities:

After putting the inequality into 'standard' form (by comparing $R(x)$ to 0), use the zeroes of the numerator and denominator to divide the $x$-axis into subintervals. Check the value of the function for a sample point in each subinterval. Note that boundary values of $x$ that come from zeroes of the denominator are not allowed in the solution set.

example: Solve the inequality $R(x) = \frac{4x^2 - 24x + 36}{x^2 - x - 12} \geq 0$

example: Solve the inequality $\frac{(x-1)^2}{(x-4)^2} \leq 1$

Note: There is a summary of the steps for graphing both polynomial and rational inequalities at the end of the section.