Introduction to Rational Expressions

A rational expression is a fraction (p/q) where p and q are polynomials.

Ex. $\frac{3}{x}, \frac{2y}{y+1}, \frac{7c+1}{c^2-1}$ are all rational expressions

Evaluation of Rational Expressions

As with polynomials the value of a rational expression is dependent upon the value chosen for the variable.

Ex. Evaluate $\frac{x+2}{x-1}$ for x = -1, x = 2, and x = 1

x = -1 gives us $\frac{-1+2}{-1-1} = \frac{1}{-2} = -\frac{1}{2}$

x = 2 gives us $\frac{2+2}{2-1} = \frac{4}{1} = 4$

x = 1 gives us $\frac{1+2}{1-1} = \frac{3}{0}$ which implies there is no solution

It is important to realize the denominator (bottom) of a fraction can not equal to zero. Zero in the denominator of a fraction causes the fraction to be undefined.

Ex. For what value of x is $\frac{x-5}{3x+1}$ undefined?

For a rational expression to be undefined, the denominator must be equal to zero therefore we set 3x + 1 = 0 and get x = - $\frac{1}{3}$. Thus we cannot substitute - $\frac{1}{3}$ into the fraction $\frac{x-5}{3x+1}$