Math 1050 ~ College Algebra
13 Graphing Rational Functions

Learning Objectives

* Graph irreducible rational functions with denominators of degree greater than one and numerators having the same or a lesser degree.

In our toolkit of functions, we have two rational functions.

Ex 1: Sketch these using transformations of the toolkit function.

a) \( g(x) = \frac{4}{x+1} - 2 \)

b) \( f(x) = \frac{1}{(x-2)^2} + 3 \)

Not all rational functions can be put in this form. It is helpful to follow the steps in the previous lesson to get a graph of a rational function.

1. Determine the domain and plot vertical asymptotes.
2. Find and plot the x- and y- intercepts.
3. Determine and plot the end-behavior asymptotes.
4. Use a sign-line and the value of other points to complete the graph.
Ex 2: For each of these, determine the x and y-intercepts, vertical and horizontal asymptotes and sketch a graph.

a) \( f(x) = \frac{3}{1-x} \)  
b) \( g(x) = \frac{3-x}{x^2+4} \)  
c) \( h(x) = \frac{2x^2-5x-3}{x^2+x-2} \)

Ex 3: Analyze and graph.

\[ f(x) = \frac{(x-4)(x-2)^2}{(x+3)^2(x-1)} \]