**Rational Functions**

A rational function is in the form where g(x) and h(x) are polynomial functions.

Ex) , ,

The denominator of a rational function cannot equal zero or the function becomes undefined as dividing by zero is heinous.

The domain of a rational function is the set of all real numbers, except those which are zeroes of the denominator.

Ex using the functions above)

0} , ,

(The denominator is always positive)

Graphing Rational Functions

1. y-intercept: like all functions, the y-intercept occurs when x = 0 (unless x = 0 causes the function to become undefined)
2. x-intercepts: occur when y = 0, to get these, we find the zeroes of the numerator function.
3. Vertical asymptotes: These are breaks in the graph of a rational function is undefined. These occur at the zeroes of the denominator function.
4. Horizontal asymptotes:

Rules:

Given that the numerator and denominator are polynomials in x of degree n and m respectively (the degree of the numerator function is n and the degree of the denominator function is m), there are rules to follow.

a) if n < m, the horizontal asymptote is at y = 0

b) if n = m, the horizontal asymptote is

c) if n > m, this is when we step in the realm of black magic. to find the equation of the asymptote, we divide the denominator into the numerator and throw away the remainder.

http://www.purplemath.com/modules/asymnote.htm

Above is a good website showing the different horizontal asymptotes with concrete examples in the form of graphs.

**Homework**

- 2.1.3 HOME ACTIVITY: Rational Functions and their Essential Characteristics: Day 1

- Graphing Rational Functions