# Alg 2    Horizontal Asymptotes Exploration    Fall 2019

Horizontal Asymptotes are the end behavior of some rational functions. They are the value that y approaches when bigger and bigger positive and negative values of x are substituted into the function. They are the the horizontal lines that some rational functions get closer and closer to as the graph moves farther and farther to the left and right.

For each function from part d below do the following:

a)  One at a time, enter each equation from part d into $Y_1$.

b)  Enter the following values for X in the TABLE. Note what the value of Y approaches. This value is the Horizontal Asymptote.

c)  Leave these values of X in the table for each of the equations in part d.

| X | Y |
|---|---|
| 100 | |
| 1000 | |
| 100000 | |
| −100 | |
| −1000 | |
| −100000 | |

d)  State the equation of the horizontal asymptote, if any.

1. $y = \dfrac{x-6}{x+5}$    HA:

2. $y = \dfrac{3x+1}{x+4}$    HA:

3. $y = \dfrac{8x^2+x-6}{2x^2-21}$    HA:

4. $y = \dfrac{4x+9x}{x^2-3}$    HA:

5. $y = \dfrac{x^2-13}{x^3+7}$    HA:

6. $y = \dfrac{x-5}{2x^3+3}$    HA:

7. $y = \dfrac{5x^2-4}{x+3}$    HA:

8. $y = \dfrac{-2x^3+5x-8}{x^2+3x-1}$    HA:

WITHOUT using a table or a graph how could you tell from the equation what the horizontal asymptote is or if it even has one?

Predict the Horizontal Asymptote for each if any, of the rational functions below.

a. $y = \dfrac{10x+7}{5x-3}$

b. $y = \dfrac{6x^2-5}{2x+3}$

c. $y = \dfrac{12x-11}{3x^2-1}$