Algebra 2 Horizontal Asymptotes Exploration Sec 9-3 Spring 2019

The end-behavior of some rational functions is a Horizontal Asymptote. A HA is 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.

<A>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 as X gets larger and larger, both positive and negative. This value is the Horizontal Asymptote, if there is one.

c) Leave these values of X in the table for each of the equations in part d, just change the equation and go back to the table.

X	Y
100	
1000	
100000	
−100	
−1000	
−100000	

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

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

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

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

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

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

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

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

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

<B>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?

<C>Predict the Horizontal Asymptote for eachif any, of the rational functions below.

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

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

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