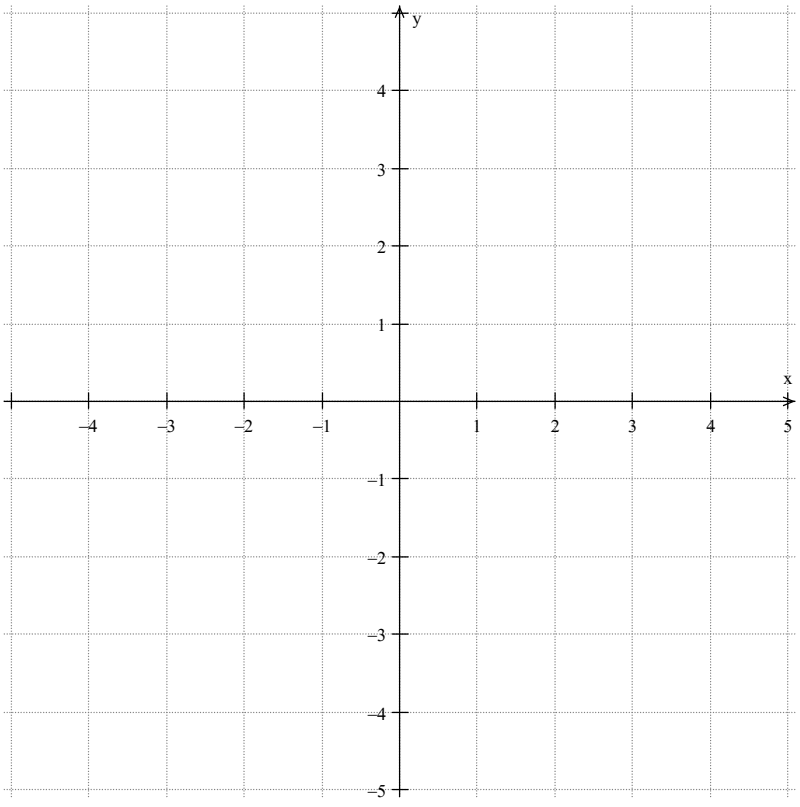
GRAPHING A RATIONAL FUNCTION AND FINDING ITS ASYMPTOTES

Consider the function $y = \dfrac{2x-5}{x+1}$.

Fill in the table of $y-$values for each of the $x-$values, and plot the corresponding points on the graph paper.

$x =$	$y =$	(x, y)
–5		
–4		
–3		
–2		
–1		
0		
1		
2		
3		
4		
5		



Which x – value did not have a corresponding y – value ? Why not ?

_____

Choose 4 x – values (2 greater than, 2 less than) that are very close to the answer of the previous question. Fill in the table of y – values for each of those x – values, and add the corresponding points to the graph paper.

$x =$	$y =$	(x, y)

The points you plotted show that the graph of the function has a feature you have not seen in the linear and quadratic functions you graphed in earlier algebra classes. That feature is called a **vertical asymptote**.

A vertical asymptote is a vertical line where, as the graph gets closer and closer to the x – value of the line, the y – values

_____

because

_____

_____

So, in order to find the vertical asymptote, you need to

_____

_____

Now, look at the $y-$values on the far left and far right sides of the graph.
The $y-$values are getting closer and closer to the value _____
as the $x-$values

_____

To see why this happens,
fill in the table of $y-$values (approximately) for each of the following $x-$values.

$x =$	$y =$
100	
1000	
–100	
–1000	

The values you found show that the graph of the function has another feature you have not seen in the linear and quadratic functions you graphed in earlier algebra classes. That feature is called a **horizontal asymptote**.

A horizontal asymptote is a horizontal line where, as the $x-$values of the graph

_____

the $y-$values

_____

In order to find the horizontal asymptote, you need to

_____

_____

Find the vertical and horizontal asymptotes of the graphs of

$$y = \frac{4+3x}{5-2x} \qquad y = \frac{7x+9}{8+6x}$$