The graph of Direct Variation is a Line passing through the Origin

What does the graph of Inverse Variation look like?

Using your seat number as the variation constant,
graph YOUR Inverse Variation equation in a Standard Window.

1. How would you describe the graph of Inverse Variation?

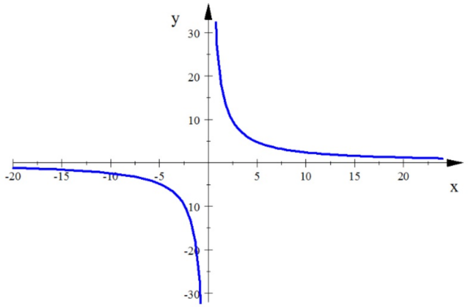
Two curved parts diagonally opposite each other

Compare your graph with at least 3 others.

2. What do the graphs have in common?
   - There are no x or y intercepts
   - Graphs are in the 1st and 3rd Quadrants.
   - Graphs are curves

3. How are the graphs different?
   - The larger the value of k, the further from the origin the graph is
   - The smaller the value of k, the closer to the origin the graph is

The graph of Inverse Variation is called: a Hyperbola

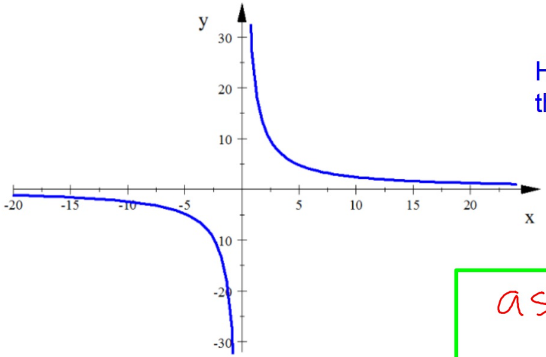


$y = \frac{24}{x}$ $x \neq 0$

Why is there two parts to this graph?

since $x \neq 0$ it creates a break in the graph

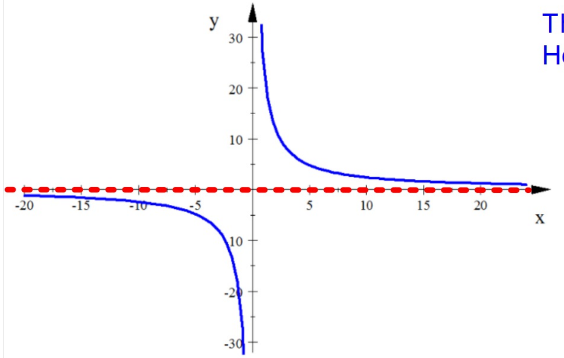
Each part of this graph is referred to as a BRANCH



How would you describe the end-behavior of this graph?

as $x \to -\infty$, $y \to 0$

as $x \to \infty$, $y \to 0$

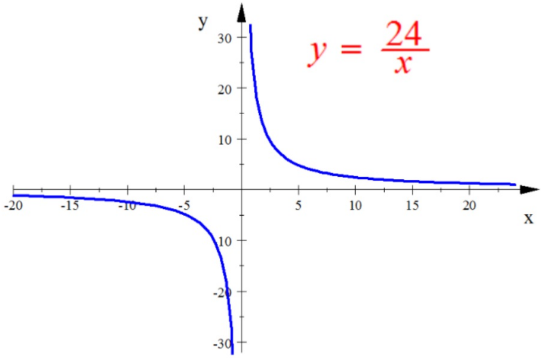


This graph has a Horizontal Asymptote of $y = 0$

What is an Asymptote?

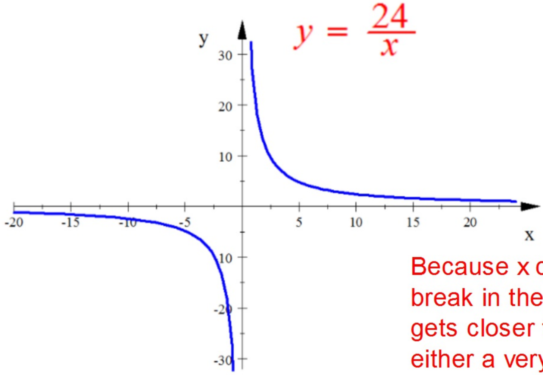
A line a graph approaches the further from the origin you are, but it never quite gets to the line.

Horizontal Asymptotes are the graphs END-BEHAVIOR



Why does this graph have $y = 0$ as a Horizontal Asymptote?

Because the value of y will continue to approach zero for larger pos & neg values for x but it will never equal zero.



What other asymptote does this graph have?

Why does it have a Vertical Asymptote at $x=0$?

Because x can never be zero there is a break in the graph at that spot. When x gets closer to zero the value of y becomes either a very large positive or very large negative number. This makes the graph go up or down very fast on either side of the vertical asymptote as x gets closer to zero.

$y = \frac{k}{X}$ is an example of a Rational Equation

The ratio of two polynomials

Example of another Rational Equation:

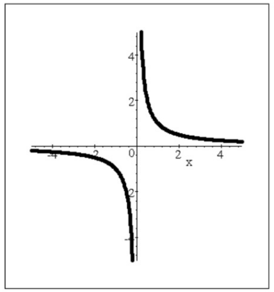
$$y = \frac{x^2 + 2x - 15}{5x^3 - 8x^2 + 3x - 1}$$

$y = \frac{k}{X}$ Is also referred to as:

The Reciprocal Family of Functions

The Parent Function: $y = \frac{1}{X}$

Graph this function in a Standard Window.



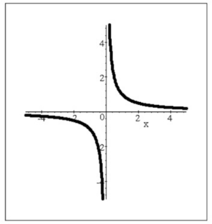
The graph of $y = \frac{1}{x}$

Vertical Asymptote

the y-axis
EQ: $x=0$

Horizontal Asymptote

the x-axis
EQ: $y=0$



The graph of $y = \frac{1}{x}$

Describe the location of the two branches of the Parent Function.

Quadrants I and III (relative to the asymptotes)

Leave Y_1 as the parent Reciprocal Function $y = \frac{1}{x}$

In Y_2 graph $y = \frac{k}{x}$ for different values of k.

What does the value of k do to the graph of $y = \frac{1}{x}$?

$$y = \frac{k}{x}$$

k is pos:

Branches are in the 1st and 3rd Quadrants

k is neg:

Branches are in the 2nd and 4th Quadrants

k is large:

Branches are further from the origin

k is small:

Branches are closer to the origin