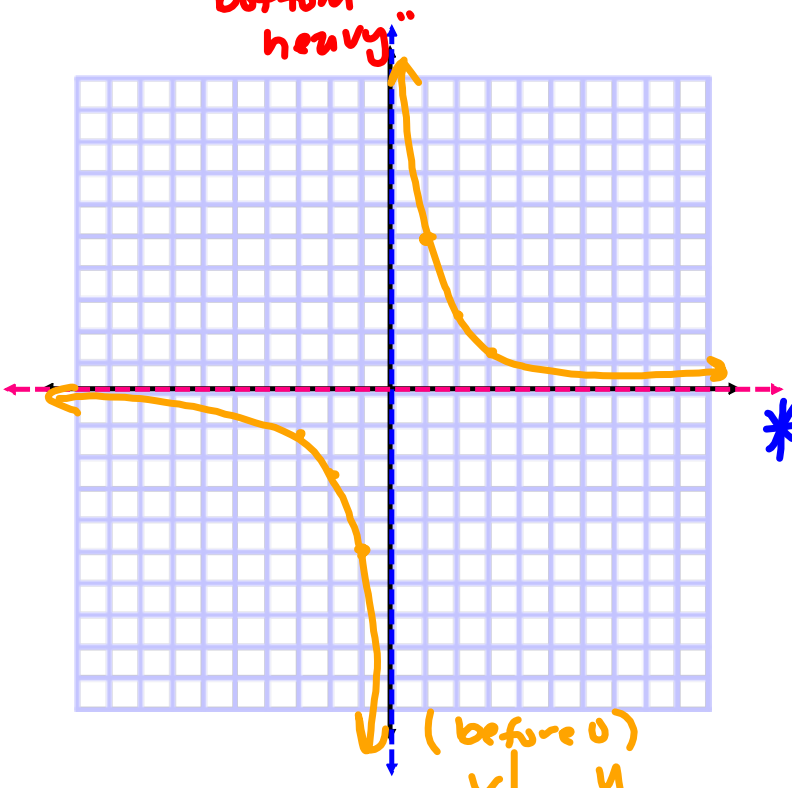
9.2-9.3 Part 2 Graphing a Rational Function

1. Find the vertical and horizontal asymptotes, if any.
   Graph with dashed lines.
2. Find the x- and y-intercepts, if any.
   Plot the points.
3. Use an x-y table to find additional points (3) on each side of the vertical asymptote(s). Plot the points.
4. Sketch the curves through the points.

Example: $y = \frac{5}{x}$

"bottom heavy"



Holes: none

VA: $x = 0$

HA: $y = 0$

* no intercepts
(because the asymptotes are on the axis)

$$2\overline{)5}\quad 2\tfrac{1}{2},\ -4,\ 1$$

(before 0)

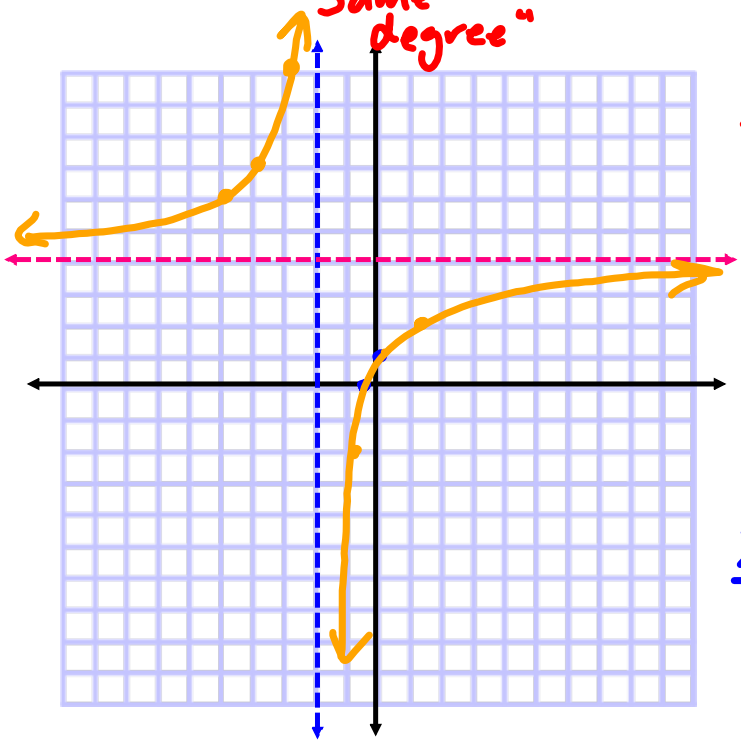
x	y
-3	$\frac{5}{-3} = -1\frac{2}{3}$
-2	$\frac{5}{-2} = -2\frac{1}{2}$
-1	$\frac{5}{-1} = -5$

(after 0)

x	y
1	$\frac{5}{1} = 5$
2	$\frac{5}{2} = 2\frac{1}{2}$
3	$\frac{5}{3} = 1\frac{2}{3}$

Example: $y = f(x) = \frac{4x^1+2}{x^1+2} = \frac{2(2x+1)}{x+2}$

"same degree"



Holes: none

VA: $x+2=0$, $-2 \quad -2$, $x=-2$

HA: $y = \frac{4}{1} = 4$

x-int: $(y=0)$ $0 = \frac{2(2x+1)}{x+2} \cdot (x+2)$

$\frac{0}{2} = \frac{2(2x+1)}{2}$

$0 = 2x+1$, $-1 \quad -1$

$\frac{-1}{2} = \frac{2x}{2}$

$x = -\frac{1}{2}$

y-int: $(x=0)$ $y = \frac{2(2\cdot0+1)}{0+2} = \frac{2(0+1)}{2} = \frac{2(1)}{2}$

$y = \frac{2}{2} = 1$

(before -2)

x	y
-5	$\frac{2(2\cdot-5+1)}{-5+2} = \frac{-18}{-3} = 6$
-4	$\frac{2(2\cdot-4+1)}{-4+2} = \frac{-14}{-2} = 7$
-3	$\frac{2(2\cdot-3+1)}{-3+2} = \frac{-10}{-1} = 10$

(after -2)

x	y
-1	$\frac{2(2\cdot-1+1)}{-1+2} = \frac{-2}{1} = -2$
0	1
1	$\frac{2(2\cdot1+1)}{1+2} = \frac{6}{3} = 2$

Attachments

Graph Rational Functions.doc