Example

$$g(x)=\frac{x^{2}-9}{x^{2}-4}$$

a) find the domain

b) Identify the horizontal asymptote

c) Identify the vertical asymptote

d) x and y intercepts

Justify your response

use a graphing calculator to verify your results

a) $x^2-4\neq 0$

$x^2\neq 4$

$x\neq \pm 2$

$\{x\in\mathbb{R} \mid x\neq 2, x\neq -2\}$

b) Horiz. Asy. (Deg. num = Deg. denom)

$y=1$

c) Verti asy (your zeros)

$x=-2$, $x=2$

d) x-int ($y=0$)

$0=x^2-9$

$9=x^2$

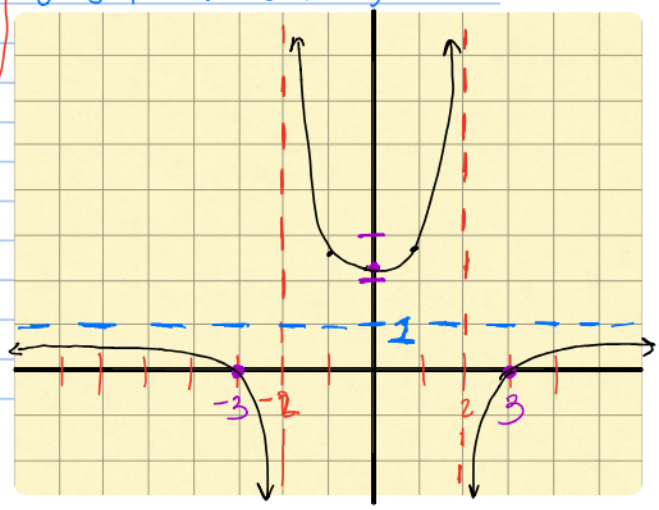
$\pm 3=x$

$(3,0), (-3,0)$

y-int ($x=0$)

$y=\frac{0-9}{0-4}=9/4$ $(0, 9/4)$ → 2.20

x	y
−1	8/3
1	8/3



Think Pair Share

1. What does the table of values look like at a vertical asymptote?

2. What does the table of values look like at a horizontal asymptote?

Example

$$h(x)=\frac{3x^2}{x^2-4}$$

a) find the domain

b) Identify the horizontal asymptote

c) Identify the vertical asymptote

d) x and y intercepts

Justify your response

use a graphing calculator to verify your results

$x^2-4\neq 0$

$x^2\neq 4$

$x\neq \pm 2$

a) $\{x \in \mathbb{R} \mid x\neq 2, x\neq -2\}$

b) Horizonal Asy. (Deg num. = Deg. Deno)

$y=\frac{3}{1}=3$

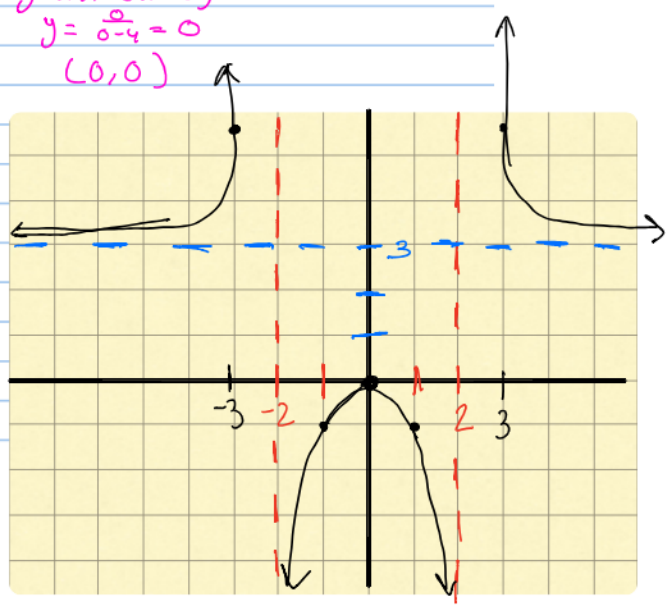
c) Vertical Asy. (zeros)

$x=2$, $x=-2$

d) x-int ($y=0$): $0=3x^2$, $0=x$, $(0,0)$

y-int ($x=0$): $y=\frac{0}{0-4}=0$, $(0,0)$

x	y
−3	$29/5=5.8$
−1	$\frac{3}{-3}=-1$
+1	−1
3	$29/5$



Checkpoint Graph the function.

2. $y = \dfrac{3x^2}{x^2 - 16}$

Example

$h(x) = \dfrac{2}{x-3} + \dfrac{5}{1} \rightarrow \dfrac{2+5(x-3)}{x-3} = \dfrac{5x-13}{x-3}$ (5x−15)

a) find the domain

$x - 3 \neq 0$

$x \neq 3$

a) $\{x \in \mathbb{R} \mid x \neq 3\}$

b) Identify the horizontal asymptote

b) Hori. Asy.

$y = \frac{5}{1} = 5$

c) Identify the vertical asymptote

c) Ver. Asy

$x = 3$

d) x and y intercepts

d) x-int ($y=0$)

$0 = \frac{5x-13}{x-3}$

$0 = 5x - 13$

$x = \frac{13}{5}$

$(\frac{13}{5}, 0)$

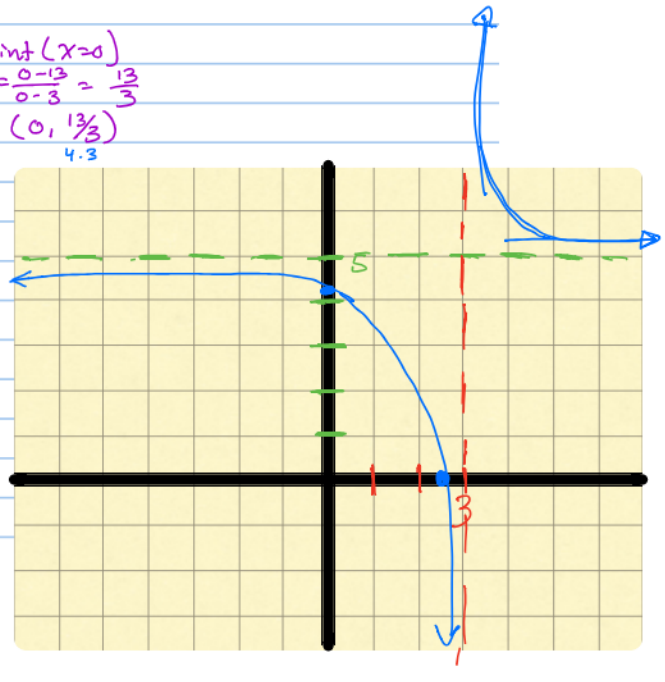
2.6

y-int ($x=0$)

$y = \frac{0-13}{0-3} = \frac{13}{3}$

$(0, \frac{13}{3})$

4.3

Justify your response

use a graphing calculator to verify your results