

Pre Calculus Honors Review Sections 2.6 & 2.7

Find each and sketch the rational function.

How do you find?

Domain: Find the x values that make a funct. undefined

Discontinuity: Hole(s): x -values for factor that reduce

Vertical Asymptote (VA): x value that make the denominator zero.

Horizontal Asymptote (HA): crosses? look at degree of the num. & den. if larger in the den then we could have a slant asym.

y-int: Substitute 0 for all x 's and solve for y .

x-int: Substitute 0 for the y 's and solve for x .

SA: If the numerator degree is larger than the denominator degree, use long division.

Describe the end behavior:

As $x \rightarrow \#^+$ $f(x) \rightarrow$ where the func. is pointing from this # on the right

As $x \rightarrow \#^-$ $f(x) \rightarrow$ where the func. is pointing from this # on the left

1. $f(x) = \frac{-2}{x-1}$

Domain: $\{x \in \mathbb{R} \mid x \neq 1\}$

Discontinuity: NO
Hole(s): none

VA: $x=1$

HA: $y=0$
crosses? NO

y-int: $(0, 2)$

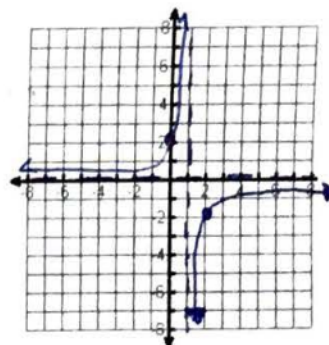
x-int: none

SA: none

Describe the end behavior:

$x \rightarrow 1^+$ $f(x) \rightarrow -\infty$

$x \rightarrow 1^-$ $f(x) \rightarrow +\infty$



$$\frac{x}{2} \Big| \frac{y}{-2} = \frac{-2}{1} = -2$$

2.

$$y = \frac{x^2 + 2x - 3}{x-1} = \frac{(x-1)(x+3)}{x-1} = x+3$$

Domain: $\{x \in \mathbb{R} \mid x \neq 1\}$

Discontinuity: yes

Hole(s): $x=1$

VA: none

HA: none
crosses? NO

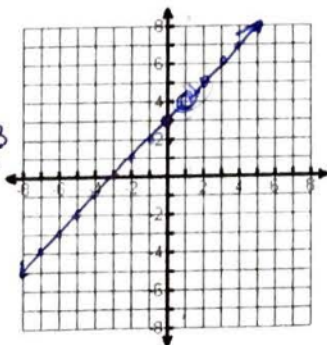
y-int: $(0, 3)$

x-int: $y=0; (-3, 0)$

SA: none

Describe the end behavior

As $x \rightarrow 1$ $f(x) \rightarrow 4$



3.

$$y = \frac{x^2 - 4x + 4}{x^2 - 4} = \frac{(x-2)(x-2)}{(x-2)(x+2)} = \frac{x-2}{x+2}$$

Domain: $\{x \in \mathbb{R} \mid x \neq \pm 2\}$

Discontinuity: yes

Hole(s): $x=2$

VA: $x=-2$

HA: $y=1$
crosses? NO

y-int: $(0, -1)$

x-int: $(2, 0)$

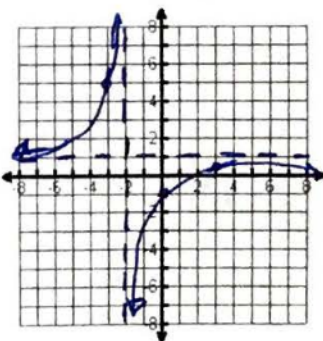
SA: none

Describe the end behavior:

As $x \rightarrow -2^+$ $f(x) \rightarrow -\infty$

As $x \rightarrow -2^-$ $f(x) \rightarrow +\infty$

As $x \rightarrow 2$ $f(x) \rightarrow 0$



$$\frac{x}{-3} \Big| \frac{y}{-3+2} = \frac{-1}{-1} = 1$$

x+3

4.

$$y = \frac{x^2 + 5x + 6}{x + 1}$$

$$= \frac{(x+3)(x+2)}{(x+1)}$$

Domain: $\{x \in \mathbb{R} \mid x \neq -1\}$
 Discontinuity: NO

Hole(s): none

VA: $x = -1$

HA: none
 crosses? NO

y-int: $(0, 6)$

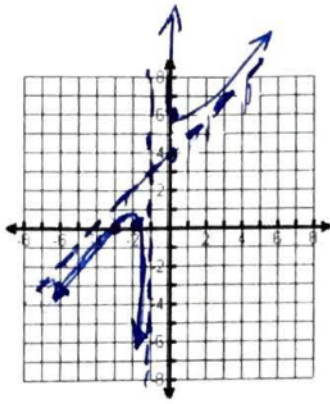
x-int: $(-3, 0); (-2, 0)$

SA: $y = x + 4$

Describe the end behavior:

As $x \rightarrow -1^+$ $f(x) \rightarrow +\infty$

As $x \rightarrow -1^-$ $f(x) \rightarrow -\infty$



5.

$$y = \frac{8x^2}{4x^2 + 7}$$

Domain: $\{x \in \mathbb{R}\}$

Discontinuity: none

Hole(s): none

VA: none

HA: $y = 2$

crosses? NO

y-int: $(0, 0)$

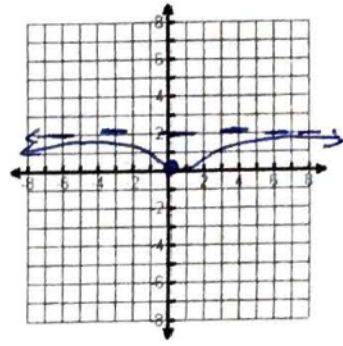
x-int: $(0, 0)$

SA: none

Describe the end behavior:

As $x \rightarrow 2^+$ $f(x) \rightarrow 1.39 = 32/23$

As $x \rightarrow -3$ $f(x) \rightarrow 1.67 = 72/43$



$4x^2 = -7$
 $x^2 = -7/4$ none

$$\frac{8(2)^2}{4(2)^2 + 7} = \frac{32}{23}$$

$$\frac{8(3)^2}{4(3)^2 + 7} = \frac{72}{43}$$

$$\begin{array}{r} x+4 \\ x+1 \overline{) x^2+5x+6} \\ \underline{-x^2+x} \\ 4x+6 \\ \underline{-4x+4} \\ 2 \end{array}$$

OR

$$\begin{array}{r} -1 \overline{) 1 \ 5 \ 6} \\ \underline{1 \ 4 \ 2} \\ 1 \ 1 \ 4 \\ \underline{1 \ 4 \ 2} \\ 0 \ 0 \ 0 \end{array}$$

