

## 8-4B Graphing Rational Functions

1. Determine vertical asymptotes and points of discontinuity.

*excluded values*

2. Determine horizontal asymptotes.

2. Make a table of values and plot points.

3. Draw in asymptotes and holes where needed.

*before  
you graph*

*after  
you graph.*

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## Horizontal Asymptotes

In a simplified function,  $f(x) = \frac{a(x)}{b(x)}$

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

- if the degree of  $a(x)$  \_\_\_\_\_  $b(x)$ , \_\_\_\_\_
- if the degree of  $a(x)$  \_\_\_\_\_  $b(x)$ , horizontal asymptote \_\_\_\_\_
- if the degree of  $a(x)$  \_\_\_\_\_  $b(x)$ , horizontal asymptote at  $y =$  \_\_\_\_\_

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

$$f(x) = \frac{(x+1)}{(x^2-4)}$$

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

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Examples: Determine the horizontal asymptote, if any.

$$1. \frac{x^2 + 4x + 3}{x^2 - 1} = \frac{\cancel{(x+1)}(x+3)}{\cancel{(x+1)}(x-1)} = \frac{x+3}{x-1} \quad y=1$$

$$2. \frac{3^0}{x^2 - 1} \quad \text{H.A.: } y=0$$

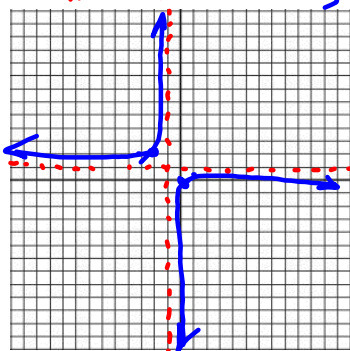
$$3. \frac{2x' + 1}{x' - 3} \quad \text{H.A. } y = \frac{2}{1} = 2$$

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Examples: Graph the following rational functions.

$$1. g(x) = \frac{x'}{x'+1}$$

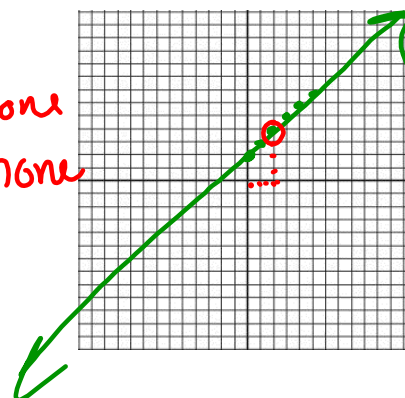
V.A.:  $x = -1$   
holes: none  
H.A.:  $y = 1$



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

$h(x) = \frac{(x+2)\cancel{(x-2)}}{\cancel{(x-2)}}$   
hole at  $x=2$   
 $h(x) = x+2$

V.A.: none  
H.A.: none



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