

## Topic 1.4 - Day 2 - Graphing Rational Functions

- 1.) Find the **horizontal asymptote** (if there is one).
- 2.) **Find the y-intercept** (if there is one) by evaluating the function at  $f(0)$ . (Plug in zero for  $x$ , and calculate.)
- 3.) **Find the x-intercept(s)** (if there is any) by setting the numerator equal to zero and solving for  $x$ .
- 4.) Factor/Simplify if you can. Any factors of  $x$  that cancel from the denominator represent a **hole** in the graph.
- 5.) Find **Vertical Asymptotes** (if there is any). Factors of  $x$  that are left over in the denominator represent the vertical asymptotes.
- 6.) **Graph** the function. Plot points around the vertical asymptotes and x-intercepts if you can. Place the hole in the graph last! (if there is one).

### Ex1.

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

HA:  $y = 2$

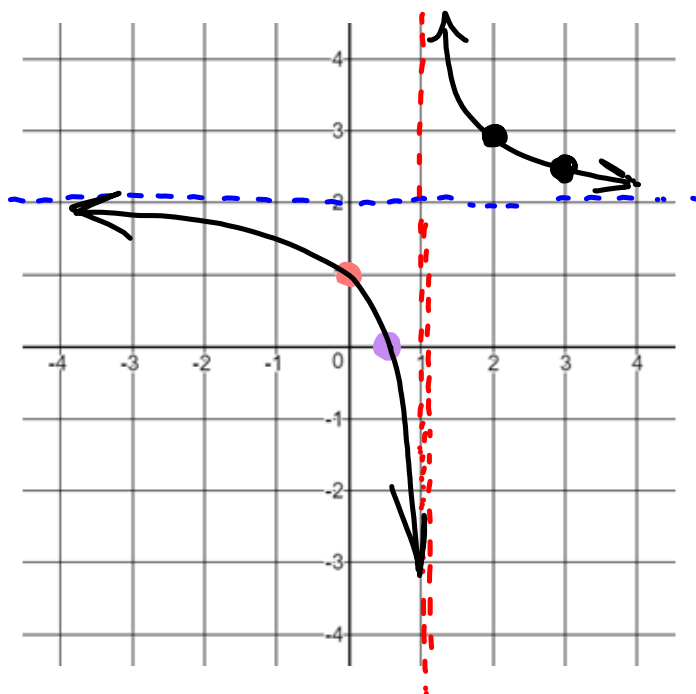
y-int:  $\frac{2(0) - 1}{(0) - 1} = \frac{-1}{-1} = 1$

x-int:  $2x - 1 = 0$  Solve.  
 $2x = 1$   
 $x = \frac{1}{2}$

Holes:

none

VA:  $x = 1$



**Ex2.**

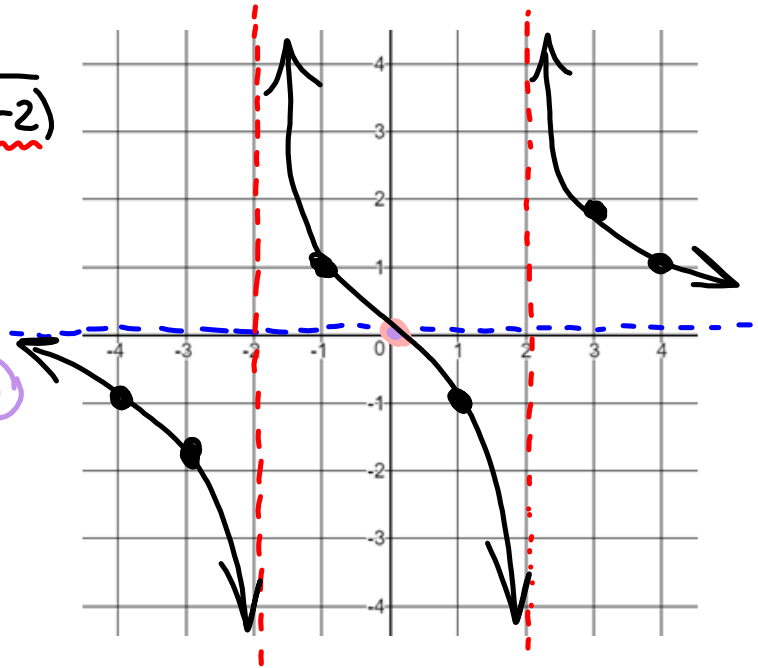
$$f(x) = \frac{3x}{x^2 - 4} \rightarrow \frac{3x}{(x+2)(x-2)}$$

HA:  $y=0$

y-int:  $\frac{0}{-4} = 0$

x-int:  $\frac{3x}{3} = \frac{0}{3} \quad x = 0$

VA:  $x=-2$ ,  $x=2$



**Ex3.**

$$f(x) = \frac{x^2 - 9}{x^2 - 5x + 6} \frac{(x+3)\cancel{(x-3)}}{\cancel{(x-3)}(x-2)}$$

HA:  $y=1$

y-int:  $-9/6 \rightarrow -1.5$

x-int:  $x^2 - 9 = 0$   
 $(x+3)(x-3) = 0$

Hole:  $(-3)$   ~~$(3)$~~   
 $(3)$

V.A.:  $x=2$

