

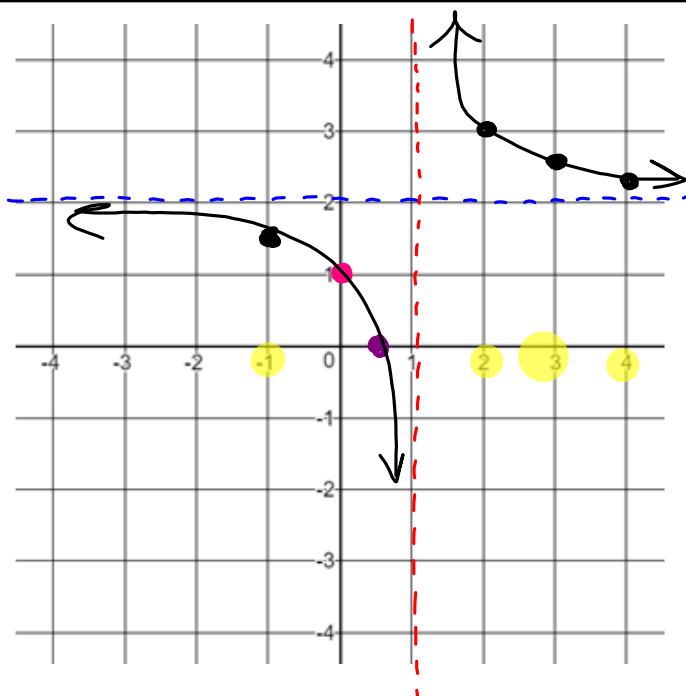
7.3 - Day 2 - Graphing Rational Functions

- 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: at $y = 2$
- y-int: $\frac{-1}{-1} \rightarrow (0, 1)$
- x-int: $2x - 1 = 0$
 $2x = 1$ $(0.5, 0)$
- Holes:
none
- VA: $x - 1 = 0$
 $\rightarrow x = 1$



Ex2.

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

• HA : $y=0$

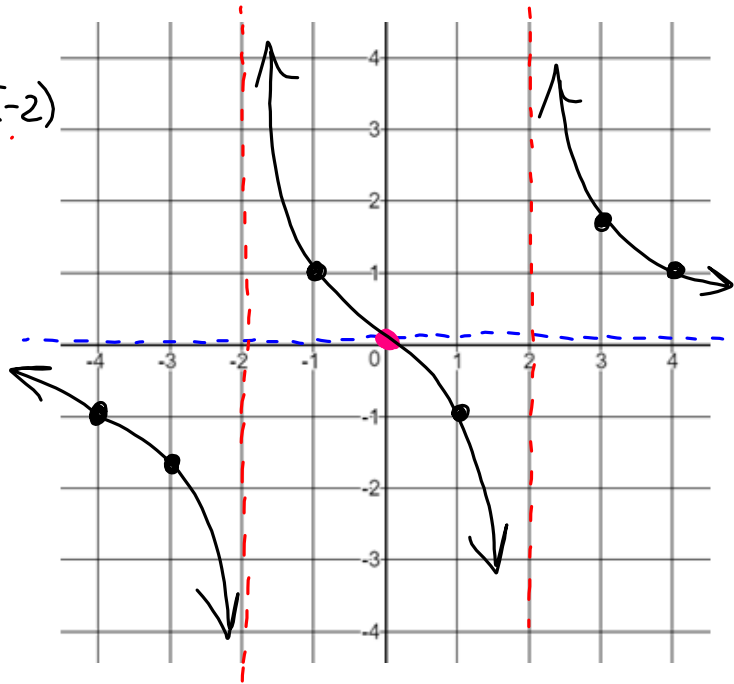
• y-int : $\frac{0}{-4} \rightarrow (0,0)$

• x-int : $3x=0$
 $x=0$ $(0,0)$

• Holes:

none

• VA : $x=2$
 $x=-2$

**Ex3.**

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

• HA : $y=1$

• y-int : $-\frac{9}{6} \rightarrow (0, -1.5)$

• x-int : $(x+3)(x-3)=0$
 $x=-3$ $x=3$
 ~~$(3,0)$~~ $(-3,0)$

• Hole : at $x=3$ • VA : $x=2$

