Lesson 6.5: Sketching Rational Functions

How to Sketch:

1. Find and graph Holes and Vertical Asymptotes
2. Find and Graph Horizontal/Oblique asymptote
3. Find and graph intercepts.
4. Finish with table

<u>Finding x-intercepts:</u> Set each factor in the numerator equal to 0.

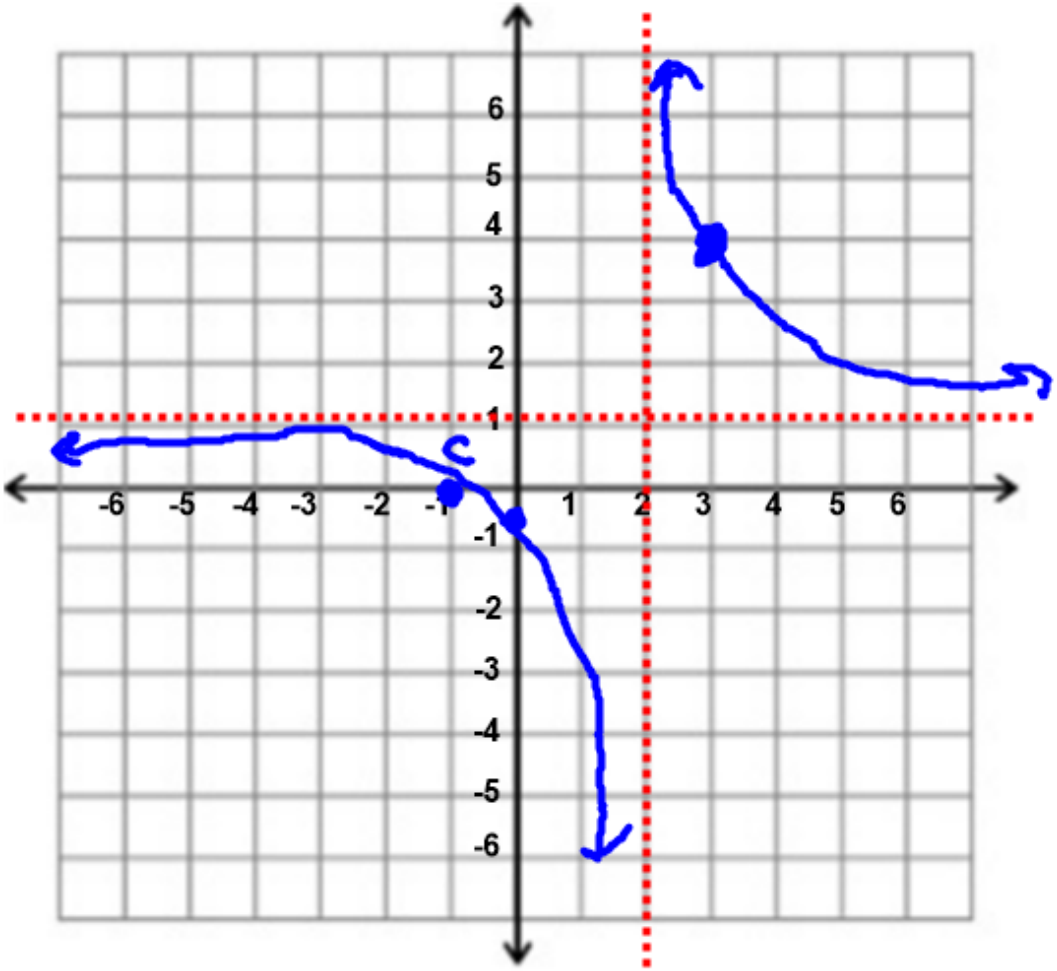
Cross = odd exponent

Bounce = even exponent

<u>Finding y-intercept:</u> Plug 0 in for each x.

*Use Simplified Equation for Both!!!!

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



Holes: None

VA: $x = 2$

HA/OA: $y = \frac{1}{1} = 1$

x-int: $x + 1 = 0$

$x = -1$ c

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

x	y
3	$\frac{3+1}{3-2} = \frac{4}{1} = 4$

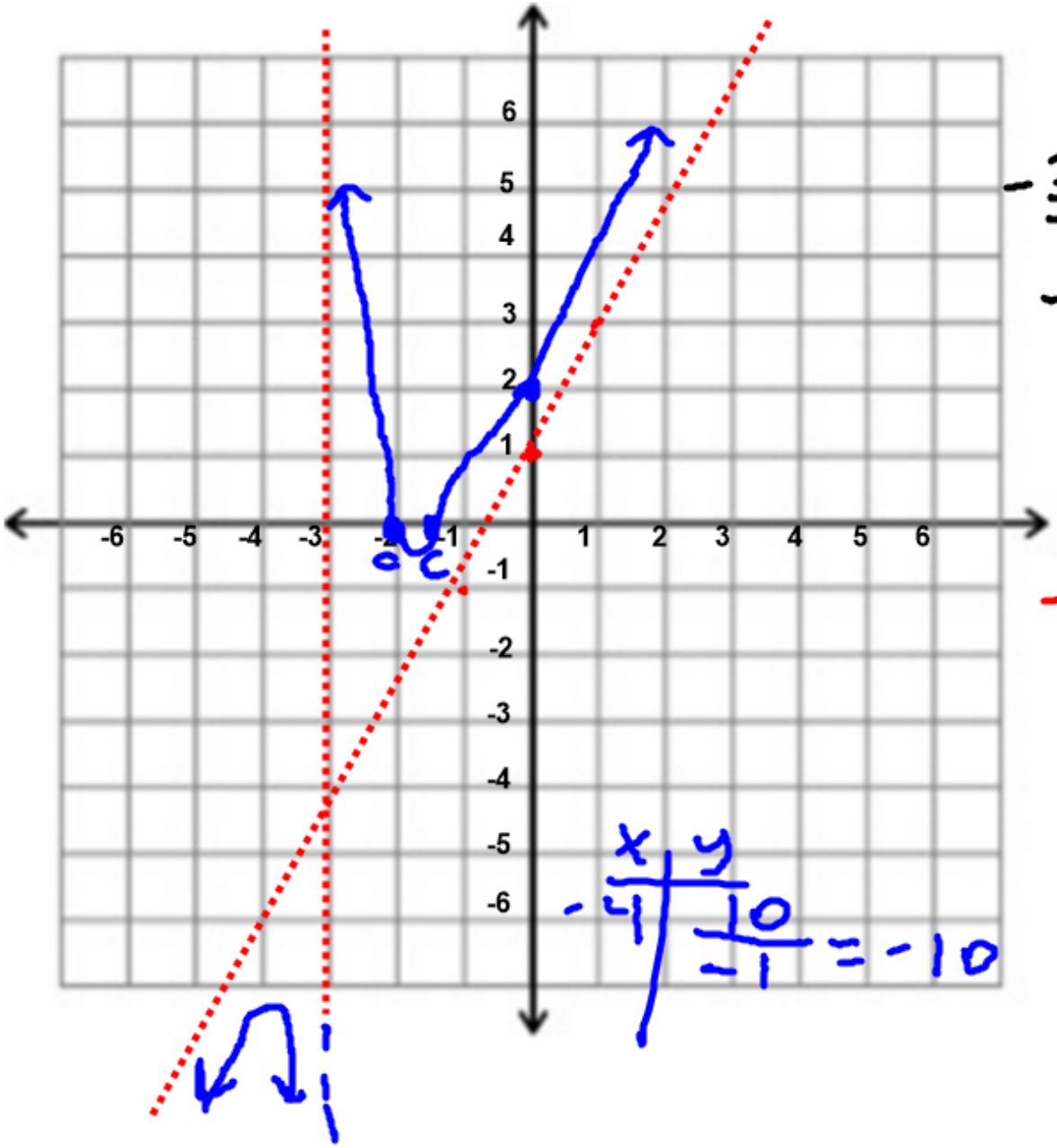
$$f(x) = \frac{2x^{2} + 7x + 6}{x^{1} + 3} = \frac{(2x+3)(x+2)}{x+3}$$

Hole: None

VA: $x = -3$

HA/OA: $y = 2x + 1$

	x^2	x^1	c
-3	2	7	6
+	↓	-6	
	2	1	



$y = 2x + 1$

slope

y-int.

X-int: $-\frac{3}{2}$, $-\frac{2}{c}$

- $2x + 3 = 0$

$2x = -3$

- $x + 2 = 0$

y-int: $\frac{(2(0)+3)(0+2)}{0+3} = \boxed{2}$

x	y
-4	$\frac{10}{-1} = -10$

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

$x^2(x-1) - 4(x-1)$

$(x^2-4)(x-1)$

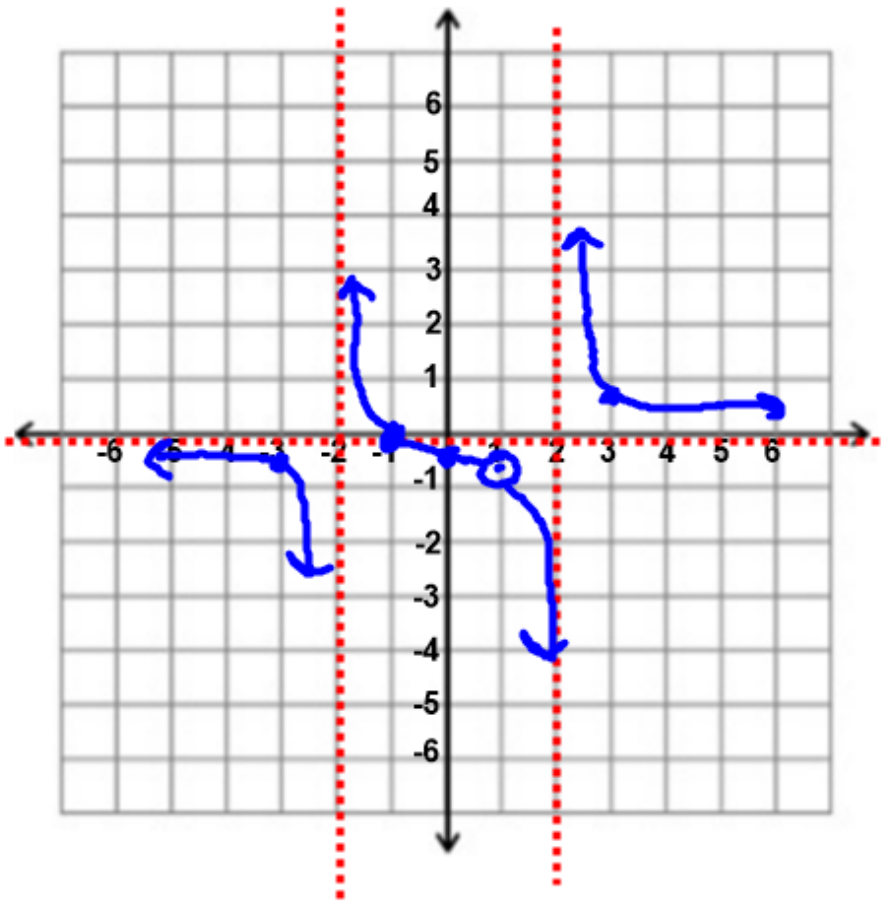
Hole: $(1, -2/3)$

VA: $x = 2, -2$

HA/OA: $y = 0$

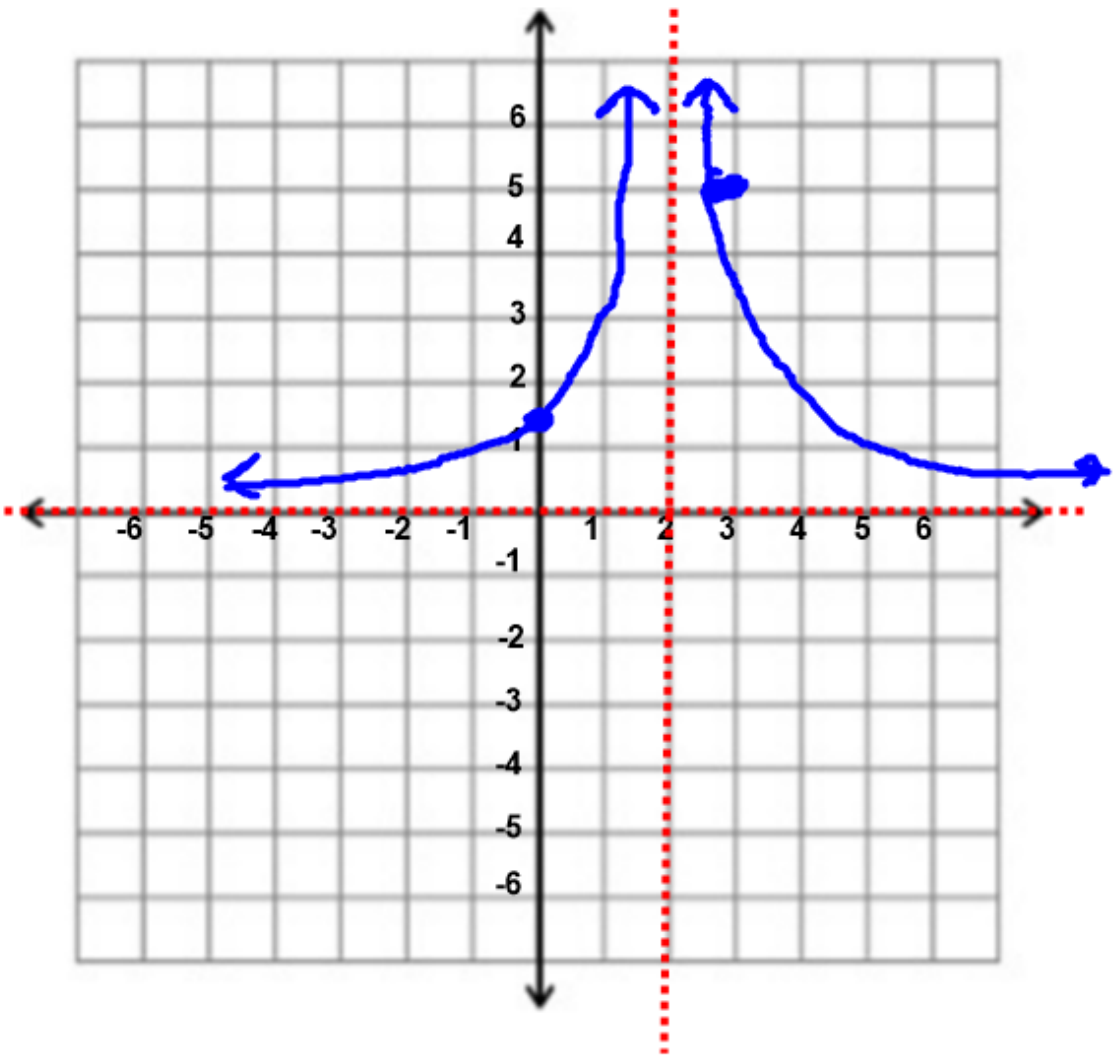
x-int: -1

y-int: $-1/4$



x	y
3	$\frac{4}{5}$
-3	$-\frac{2}{5}$

$$G(x) = \frac{5}{x^2 - 4x + 4} = \frac{5}{(x-2)(x-2)}$$



Holes: None

VA: $x = 2$

HA: $y = 0$

x-int: $5 \neq 0$

None

y-int:

$$\frac{5}{(0-2)(0-2)}$$

$$= 5/4$$

$$= 1.25$$

x	y
3	$\frac{5}{(3-2)(3-2)} = 5$