

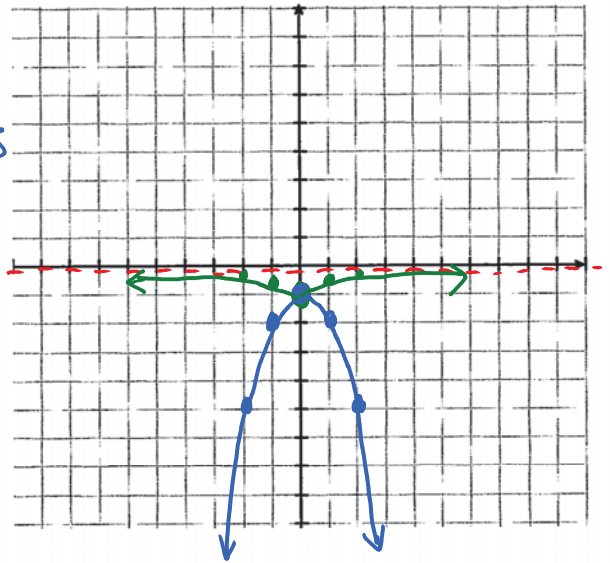
**8.5 Graphing Reciprocals of Quadratic Functions**

The graphs of reciprocal quadratic functions fall into three possible scenarios. For each of the following three graphs sketch the reciprocal function.

**Example #1:** Graphing a Reciprocal Function with No Vertical Asymptotes

$$y = \frac{1}{-x^2 - 1}$$

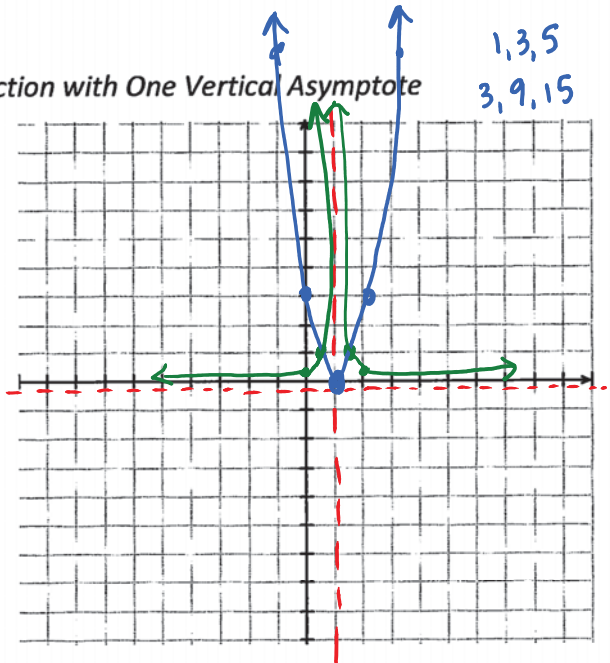
- ① First graph  $y = -x^2 - 1$   
\*notice the graph has no x-intercepts which means no vertical asymptotes
- ② Horizontal asymptote at  $y = 0$
- ③ Take reciprocal of each point



**Example #2:** Graphing a Reciprocal Function with One Vertical Asymptote

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

- ① graph  $3(x-1)^2 = y$   
\*the graph has an x-intercept at 1, so there will be a vertical asymptote there
- ② Hor. & Ver. asymptotes  
 $y = 0$      $x = 1$
- ③ Graph the reciprocal



**Example #3: Graphing a Reciprocal Function with Two Vertical Asymptotes**

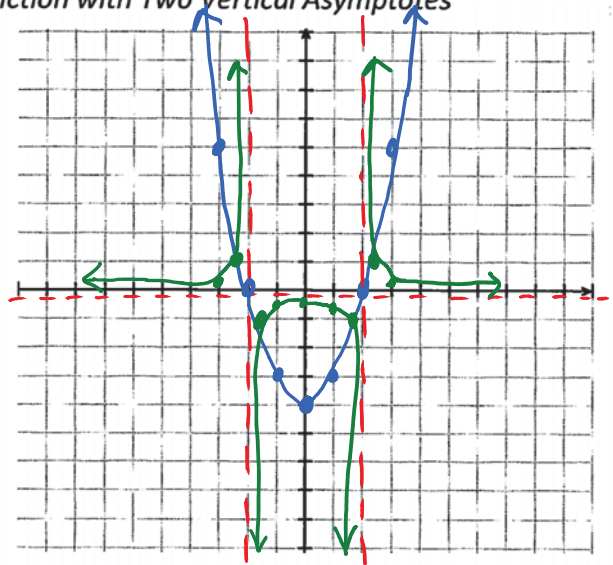
$$y = \frac{1}{(x-2)(x+2)}$$

① Graph  $y = (x-2)(x+2)$

$$y = x^2 - 4$$

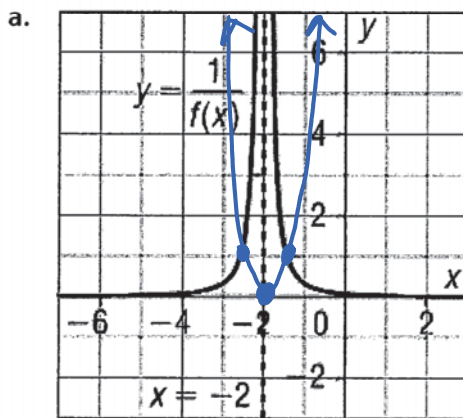
② Hor. Asymptote at  $y=0$   
 Ver. Asymptotes at  $x=2$   
 $x=-2$

③ Graph Reciprocal

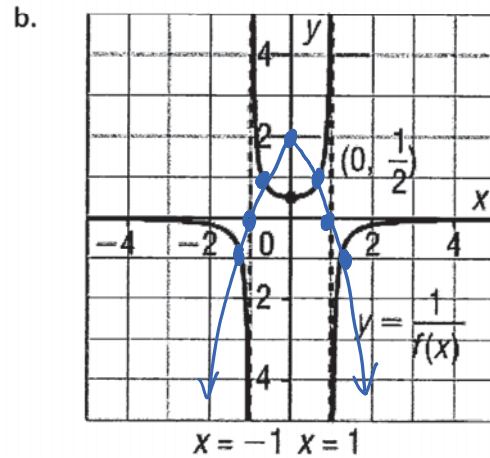


**Example #4: Using a Graph of  $y = \frac{1}{f(x)}$  to Graph  $y = f(x)$**

Use the graph of each reciprocal function to graph the related quadratic function.



Since the graph has one vertical asymptote, the quadratic graph touches the x-axis once (bounces)



2 asymptotes = 2 roots

☺ The End!!