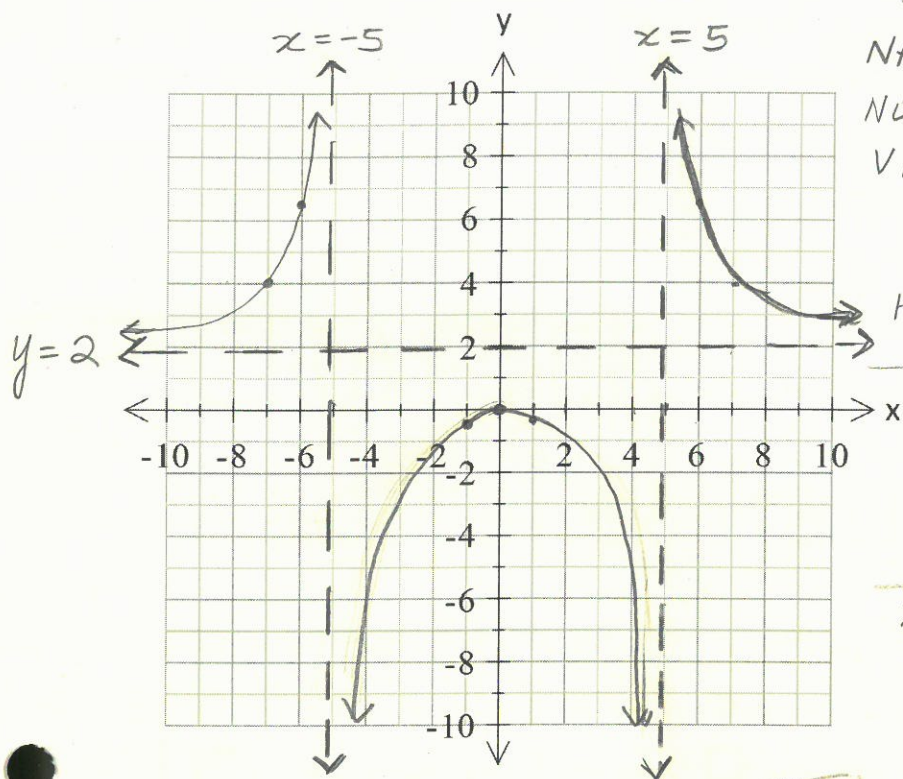


Example 2: Sketch the graph of  $y = \frac{2x^2}{x^2-25}$

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



NPV:  $x = 5$   $x = -5$

NO common factors  $\rightarrow$  No holes

VA:  $x = 5$  and  $x = -5$

deg  $p(x) = \text{deg } q(x)$

HA:  $y = \frac{a}{b}$   $y = 2$

y-int, set  $x = 0$

$$y = \frac{2(0)^2}{0^2 - 25}$$

$$y = 0 \quad (0, 0)$$

x-int, set  $y = 0$

$$0 = \frac{2x^2}{x^2 - 25}$$

$$0 = \cancel{2}x^2$$

$$0 = x^2$$

$$(0, 0)$$

Example 3: Sketch the graph of  $y = \frac{2x+1}{2x^2-5x-3}$

x-int, set  $y = 0$

$$0 = \frac{2x+1}{2x^2-5x-3}$$

$$0 = 2x+1$$

$$-2x = 1$$

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

y-int, set  $x = 0$

$$y = \frac{1}{-3}$$

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

NPV:  $x = -\frac{1}{2}$   $x = 3$

since there is a common factor there is a hole at  $x = -\frac{1}{2}$

$$y = \frac{1}{x-3}$$

$$y = \frac{1}{-\frac{1}{2} - 3}$$

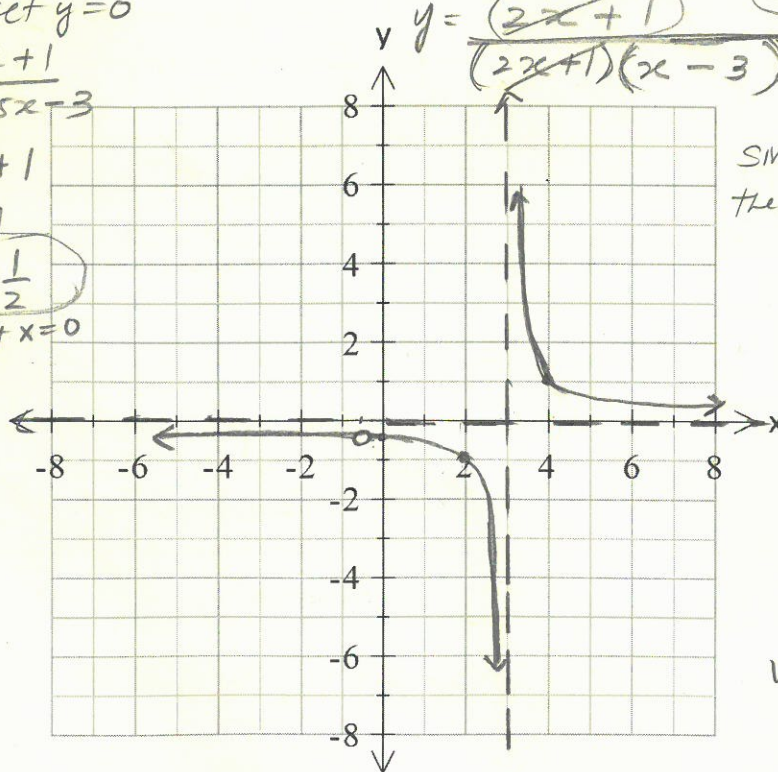
$$y = \frac{1}{-\frac{7}{2}}$$

$$y = -\frac{2}{7} \quad \text{Hole is at } \left(-\frac{1}{2}, \frac{2}{7}\right)$$

VA:  $x = 3$

deg  $p(x) < \text{deg } q(x)$

HA:  $y = 0$



denominator is not factorable

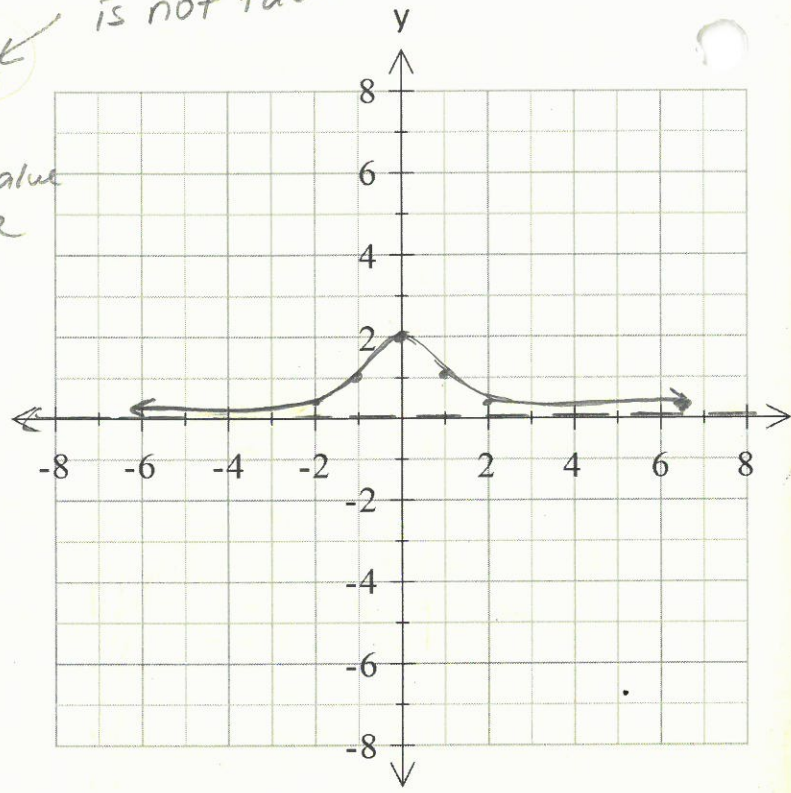
Example 4: Sketch the graph of  $y = \frac{2}{x^2+1}$

$x^2 + 1 = 0$   
 $\sqrt{x^2} = \sqrt{-1}$   
 $x = \sqrt{-1}$   
 There is no non-permissible value  
 All  $x$  values are permissible  
 VA: None

HA:  $y = 0$

y int, set  $x = 0$   
 $y = \frac{2}{0^2+1}$   
 $y = 2$

x int,  $y = 0$   
 $0 = \frac{2}{x^2+1}$   
 $0 = 2$



Example 5: Sketch the graph of  $y = \frac{x-4}{x^2+5}$

npv.  $x^2 + 5 = 0$   
 $\sqrt{x^2} = \sqrt{-5}$   
 $x = \sqrt{-5}$   
 All  $x$ -values are allowed  
 NO VA and NO Hole

deg  $p(x) <$  deg  $q(x)$   
 HA:  $y = 0$

y int, set  $x = 0$   
 $y = \frac{0-4}{0^2+5}$   
 $y = \frac{-4}{5}$

x-int, set  $y = 0$   
 $0 = \frac{x-4}{x^2+5}$   
 $0 = x-4$   
 $x = 4$

