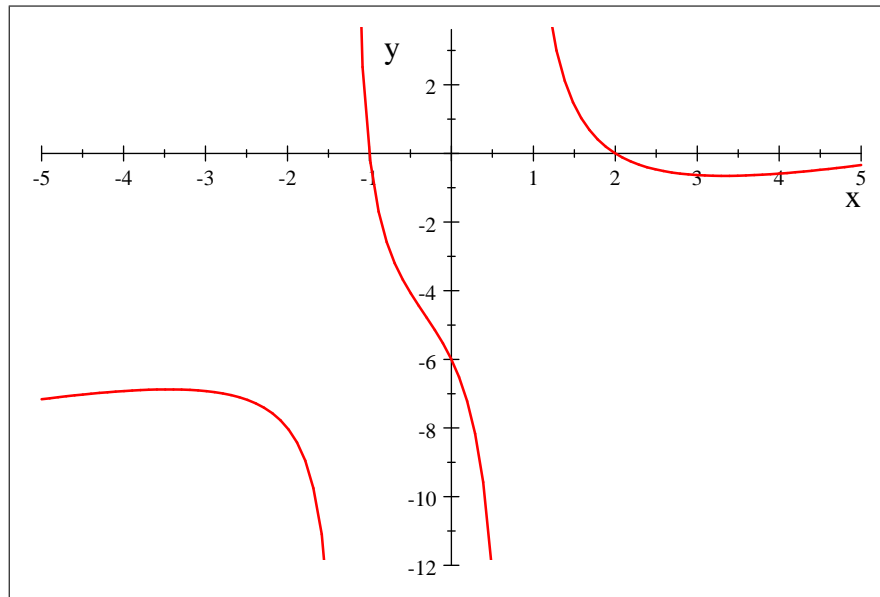


**Finding Intercepts**  
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1. Find the x and y intercepts for the following function

$$f(x) = \frac{x^3 - 7x^2 + 4x + 12}{2x^2 + x - 2}$$



In order to find the  $x$  intercept, we let  $y = 0$  and we solve for  $x$ .

$$\begin{aligned} y &= 0 \Rightarrow \frac{x^3 - 7x^2 + 4x + 12}{2x^2 + x - 2} = 0 \\ &\Rightarrow x^3 - 7x^2 + 4x + 12 = 0 \\ &\Rightarrow (x - 2)(x - 6)(x + 1) = 0 \\ &\Rightarrow x = 2, x = 6, \text{ and } x = -1 \end{aligned}$$

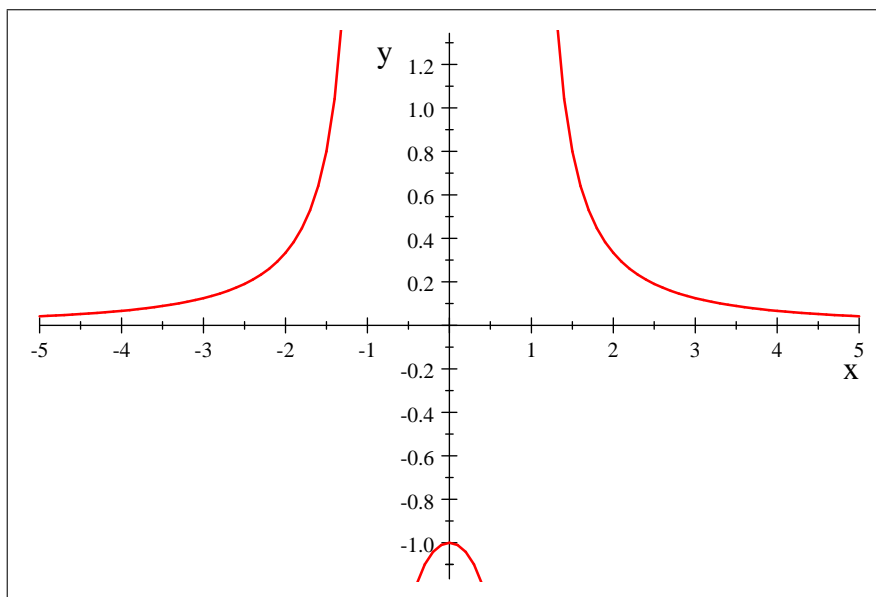
Thus the  $x$  intercepts are  $(2, 0)$ ,  $(6, 0)$ ,  $(-1, 0)$ . To find the  $y$  intercept, we let  $x = 0$

$$y = f(0) = \frac{12}{-2} = -6$$

The the  $y$  intercept is  $(0, -6)$  as shown in the picture above.

2. Find the x and y intercepts of the function

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



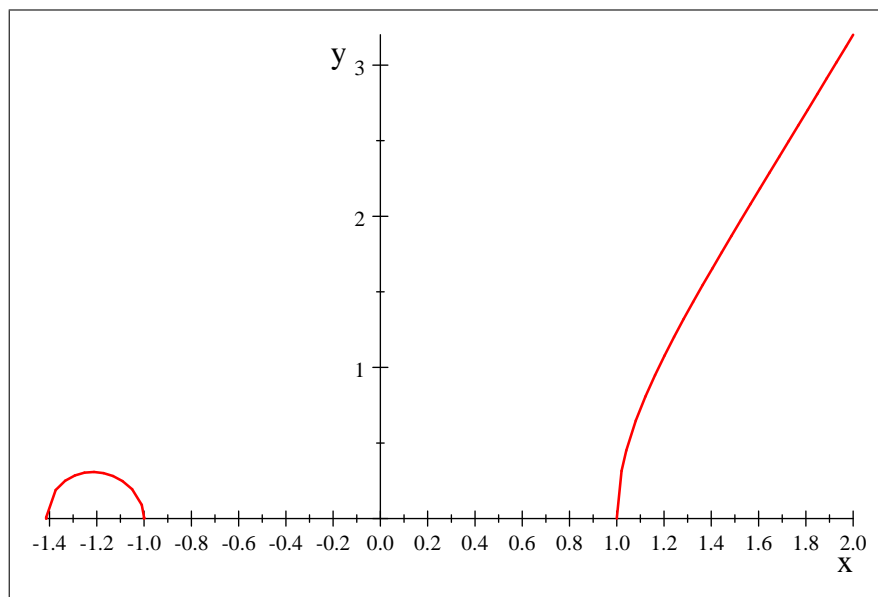
Clearly one can see from the graph of  $g$  that  $g$  has no x intercept since  $y = 0$  is a horizontal asymptote of the graph of  $g$ . However to find the  $y$  intercept, we let  $x = 0$

$$y = g(0) = \frac{1}{-1} = -1$$

Thus,  $(0, -1)$  is a y intercept for the graph of  $g$ .

3. Find the  $x$  and  $y$  intercept for

$$h(x) = \sqrt{(x^2 - 1)(x + \sqrt{2})}.$$



In order to find the  $x$  intercept, we let  $y = 0$ .

$$\begin{aligned}\sqrt{(x^2 - 1)(x + \sqrt{2})} &= 0 \\ (x^2 - 1)(x + \sqrt{2}) &= 0 \\ x^2 - 1 &= 0 \text{ or } x + \sqrt{2} = 0 \\ x &= \pm 1, x = -\sqrt{2}.\end{aligned}$$

Thus, the  $x$  intercepts are  $(0, 1)$ ,  $(0, -1)$ ,  $(0, -\sqrt{2})$ . To find the  $y$  intercept

$$y = h(0) = \sqrt{-\sqrt{2}} \text{ (undefined).}$$

Thus, the graph has no  $y$  intercept.