



EXAMPLE Let  $y = \frac{x^2 - 2x - 3}{x - 1}$

(a) Find the zeros.

$$x^2 - 2x - 3 = 0$$

$$(x - 3)(x + 1) = 0$$

$$x = 3, x = -1$$

x-int  $(-1, 0), (3, 0)$

(b) Vertical Asymptote.

The line  $x = 1$



this is where  
 $f(x)$  is undefined

(c) Find the horizontal or oblique asymptote.

sol deg num = deg denom + 1  
Oblique asymptote.

$$\begin{array}{r}
 \text{Division} \\
 x-1 \overline{) x^2 - 2x - 3} + \frac{-4}{x-1} \\
 \underline{-x^2 + x} \quad \downarrow \\
 -x - 3 \\
 \underline{+x + 1} \\
 -4
 \end{array}$$

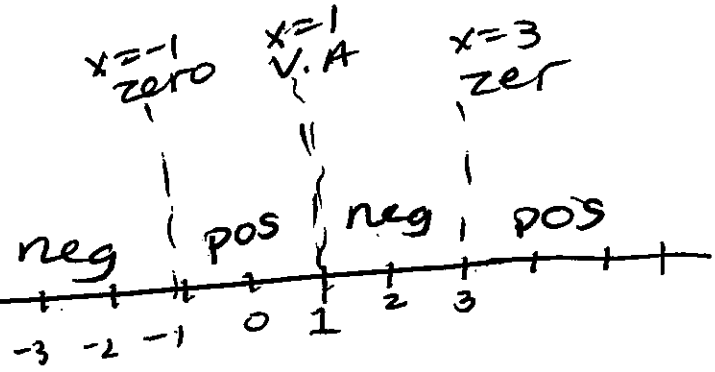
$$\begin{array}{r}
 1 \quad | \quad 1 \quad -2 \quad -3 \\
 \hline
 \quad \quad | \quad \quad 1 \quad -1 \\
 \quad \quad \hline
 \quad \quad | \quad 1 \quad -1 \quad -4 \\
 \quad \quad \quad \quad | \quad \quad \quad y = x - 1 \quad -\frac{4}{x-1}
 \end{array}$$

Oblique Asymptote  $y = x - 1$

d) Make a sign chart.

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

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



Test number:

- $x = 0$   $y = \frac{0^2 - 2 \cdot 0 - 3}{0 - 1} = 3$  POS

- $x = 4$   $y = \frac{(4-3)(4+1)}{4-1}$  POS

e) Sketch the graph

