

Determining whether $R(x)$ intersects the Horizontal or Oblique Asymptote

Ex. 1 $R(x) = \frac{x-1}{x^2-4} = \frac{x-1}{(x+2)(x-2)}$

a.) Since degree of num. $<$ degree of denom.

HA is $y=0$

b.) set $R(x)=0$, since the HA $= 0$, solve

$$\frac{x-1}{x^2-4} = 0 \rightarrow \frac{x-1}{x^2-4} = 0 \cdot \frac{x^2-4}{x^2-4}$$

$$x-1=0 \rightarrow \boxed{x=1}$$

Therefore, the graph $R(x)$ intersects the HA @ $(1,0)$

Ex. 2 $R(x) = \frac{x^2-1}{x} = \frac{(x+1)(x-1)}{x}$

a.) Since $n = m+1$, there is an OA

$$\begin{array}{r} \boxed{x} \\ x+0 \overline{) x^2-1} \\ \underline{x^2+0} \\ -1 \end{array} \quad \text{OA at } y=x$$

b.) set $R(x) = x$ solve

$$x \cdot \frac{x^2-1}{x} = x \cdot x \quad x^2-1 = x^2$$

no solution, thus $R(x)$ does not intersect the OA $y=x$