

5.3 The Graph of a Rational pg. 353

ex. 1) Analyze the Graph of $R(x) = \frac{x-1}{x^2-4}$

Step 1: Factor the numerator & denominator & find Domain.

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

$$D: \{x \mid x \neq -2, 2\}$$

Step 2: Simplify $R(x)$ (already simplified)

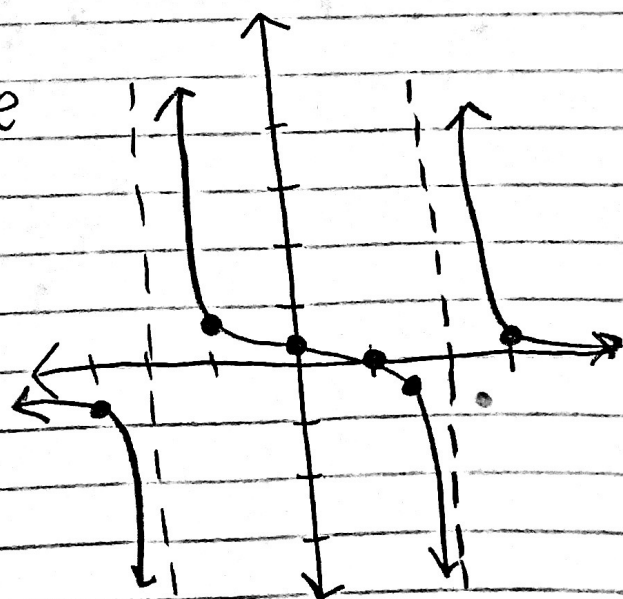
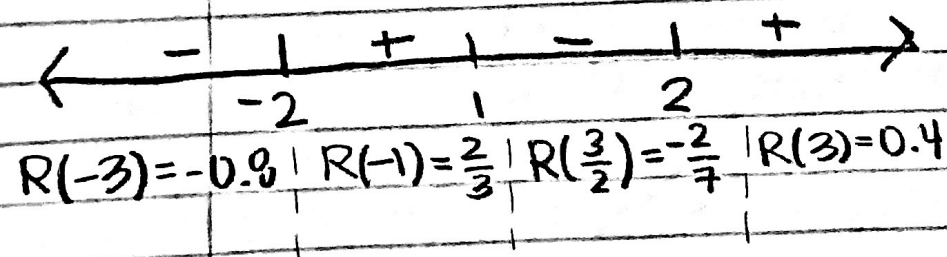
Step 3: Find & plot x-int & y-int:

$$0 = \frac{x-1}{x^2-4} \rightarrow 0 = x-1 \rightarrow \boxed{x=1} \quad R(0) = \frac{1}{4}$$

Step 4: Find v.a.'s & graph them:
v.a. are at $x=2$ and $x=-2$

Step 5: Find H.A.
H.A. at $y=0$

Step 6: Determine where the graph is above or below the x-axis



Step 7: Graph ☺

ex.2) graph $R(x) = \frac{x^2-1}{x}$

① Factor: $R(x) = \frac{(x+1)(x-1)}{x}$ D is $\{x | x \neq 0\}$

② simplify: already is

③ intercepts:

since $x \neq 0 \rightarrow$ no y-int.

x-int: $0 = \frac{(x+1)(x-1)}{x}$ so $x = -1, x = 1$

④ V.A.: $x = 0$

⑤ H.A.: oblique:

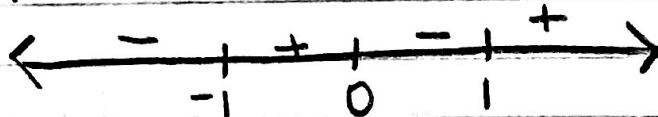
$$\frac{x^2 + 0x - 1}{x + 0}$$

$$x \begin{array}{|c|c|} \hline x^2 & 0x \\ \hline 0x & 0 \\ \hline \end{array} = -1$$

$y = x - \frac{1}{x}$
↑ goes to 0

$y = x$

⑥ + or -?



$R(-2) = -\frac{3}{2}$ | $R(-\frac{1}{2}) = \frac{3}{2}$ | $R(\frac{1}{2}) = -\frac{3}{2}$ | $R(2) = \frac{3}{2}$

⑦

