

الف $\sqrt{x-1} + 1 = x \Rightarrow (\sqrt{x-1})^2 = (x-1) \Rightarrow x-1 = x-1 \Rightarrow x = 1$

$R_f = \mathbb{R}$

ب $\frac{1}{x^2+1} = y \Rightarrow y(x^2+1) = 1 \Rightarrow yx^2 + y = 1 \Rightarrow yx^2 = 1-y \Rightarrow x^2 = \frac{1-y}{y}$

$\Delta \geq 0 \Rightarrow 1-y \geq 0 \Rightarrow y \leq 1$

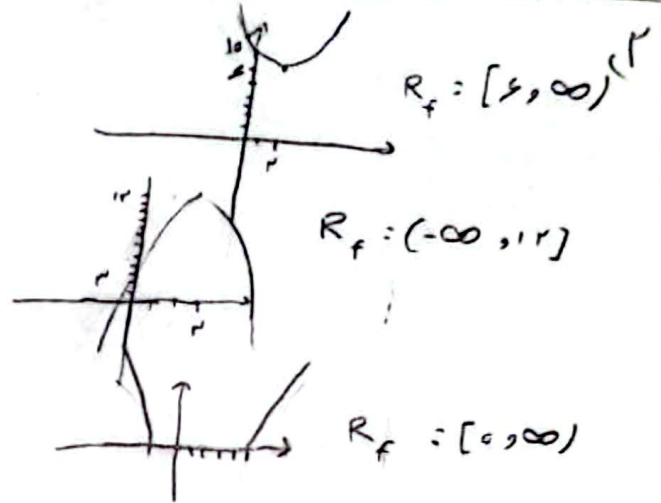
$R_f = (-\infty, 1] \cup [0, \infty)$

الف $x^2 + 2x + 1 = 0 \Rightarrow \begin{cases} \frac{-b}{2a} = -1 \\ \frac{-\Delta}{4a} = 0 \end{cases}$

ب $x^2 + 2x + 1 = 0 \Rightarrow \begin{cases} \frac{-b}{2a} = -1 \\ \frac{-\Delta}{4a} = 0 \end{cases}$

ج $\sqrt{x^2 + 2x + 1} = 0 \Rightarrow \begin{cases} \frac{-b}{2a} = -1 \\ \frac{-\Delta}{4a} = 0 \end{cases}$

د $\sqrt{x^2 + 2x + 1} = 0 \Rightarrow \begin{cases} \frac{-b}{2a} = -1 \\ \frac{-\Delta}{4a} = 0 \end{cases}$



الف $x^2 + 2x + 1 = 0 \Rightarrow R_f = \mathbb{R}$

ب $x^2 + 2x + 1 = 0 \Rightarrow R_f = \mathbb{R}$

ج $y = \sqrt{x^2 + 2x + 1} \Rightarrow R_f = [0, \infty)$

د $y = (x^2 + 2x + 1)^2 \Rightarrow R_f = [0, \infty)$

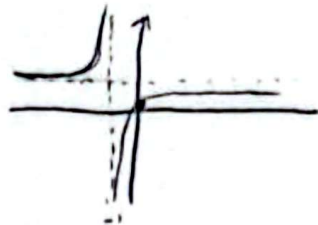
الف $y = \frac{x+1}{x-1} \Rightarrow R_f = \mathbb{R} - \left\{\frac{1}{1}\right\} = \mathbb{R} - \{1\}$

ب $y = \frac{x+1}{x+1} \Rightarrow R_f = \mathbb{R} - \{1\}$

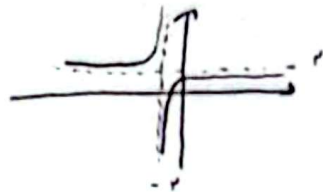
الف $y = \sqrt{\frac{x+1}{x-1}} \Rightarrow R_f = [0, \infty) - \left\{\frac{1}{1}\right\}$

ب $y = \sqrt{\frac{x+1}{x-1}} \Rightarrow R_f = [0, \infty)$

الف $y = \frac{x-2}{x+1} \Rightarrow$ بجانب د $\frac{-1}{x+1}$



ب $y = \frac{x-2}{x+1} \Rightarrow$ بجانب د $\frac{-1}{x+1}$



الف $y = \sin x + \frac{1}{\sin x} \rightarrow R_f = (-\infty, 0] \cup [1, \infty)$

ب $y = \frac{x^2+1}{x^2} \rightarrow x^2 + \frac{1}{x^2} \Rightarrow R_f = (-\infty, -1] \cup [1, \infty)$

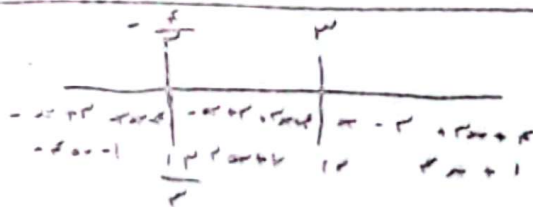
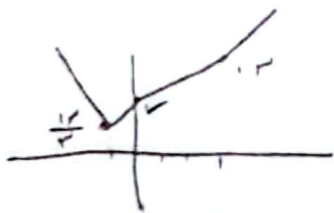
ج $y = \frac{\sqrt{x^2+1}}{\sqrt{x}} \rightarrow \sqrt{x} + \frac{1}{\sqrt{x}} \Rightarrow (-\infty, -1] \cup [1, \infty)$

د $y = \sqrt{x} + \frac{1}{\sqrt{x}} \Rightarrow R_f = [1, \infty)$

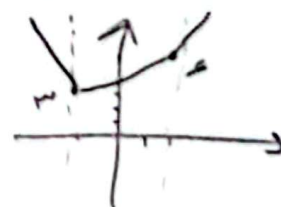
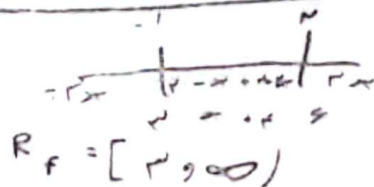
الف $y = x^2 + \frac{1}{x^2+2} \xrightarrow{x^2+2} (x^2+2) + \frac{1}{x^2+2} \Rightarrow R_f = [\frac{1}{2}, \infty)$

ب $y = \frac{x^2+2}{\sqrt{x^2+2}} \rightarrow \frac{(x^2+2)+1}{\sqrt{x^2+2}} \rightarrow \sqrt{x^2+2} + \frac{1}{\sqrt{x^2+2}} \rightarrow R_f = [1, \infty)$

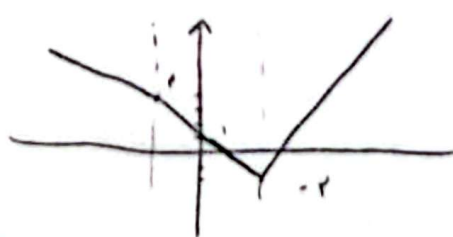
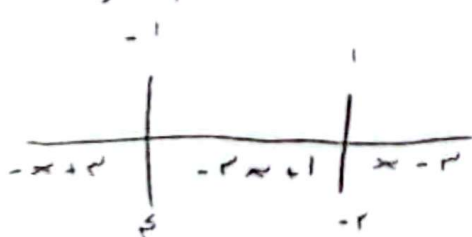
$y = |x-2| + |2x+2|$



الف $y = |x-2| + |2x+2|$



ب $y = |2x-2| - |x+1|$



$R_f = [-1, \infty)$