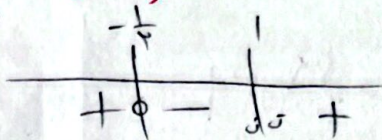


$$|x| = \frac{x+1}{x-1} \rightarrow \frac{x+1}{x-1} \geq 0$$

(الجزء الموجب) (الجزء السالب)



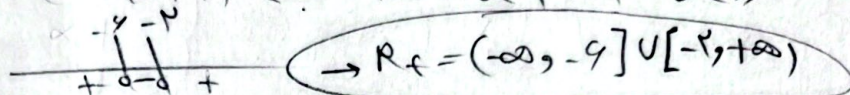
$$R_f = (-\infty, -\frac{1}{2}] \cup (1, +\infty)$$

$$|x| + \frac{1}{|x|} \rightarrow a > 0 \rightarrow [1, +\infty) = R_f$$

$$x^2 + \frac{1}{x} = x^2 + \frac{x}{x^2} = x^2 + \frac{1}{x} \rightarrow x^2 + \frac{1}{x} - \frac{1}{x} = x^2 - \frac{1}{x}$$

$$x^2 + x(1-x) - \frac{1}{x} = x^2 + x - x^2 - \frac{1}{x} = x - \frac{1}{x} \rightarrow \Delta \geq 0 \rightarrow (x-\frac{1}{x})^2 - 4(-\frac{1}{x})$$

$$x^2 + \frac{1}{x} + \frac{1}{x} \geq 0 \rightarrow (x+\frac{1}{x})(x+\frac{1}{x}) \leftarrow x^2 + \frac{1}{x} + \frac{1}{x} + \frac{1}{x^2} \geq 0$$



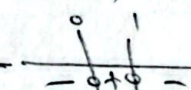
$$R_f = (-\infty, -\frac{1}{2}] \cup [1, +\infty)$$

$$R_f = \mathbb{R}$$

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

$$\Delta \geq 0 \rightarrow 1 + x^2 - 2x - 4(x^2 - \frac{1}{x} + \frac{1}{x}) = 1 + x^2 - 2x - 4x^2 + \frac{4}{x} - \frac{4}{x} = -3x^2 - 2x + 1$$

$$R_f = [0, 1]$$



$$x(-3x+2) \geq 0 \leftarrow -3x^2 + 2x \geq 0$$

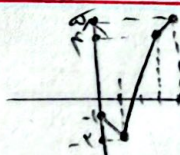
$$\text{الف) } -x^2 + 2x - 1 \rightarrow \frac{-x}{-1} = 2 \sqrt{(-\infty, 2]} \rightarrow R_f = [0, \sqrt{2}]$$

$$\text{ب) } \frac{1}{x} = 2 \rightarrow R_f = [1, +\infty)$$

$$\text{الف) } (-\infty, +\infty) = R_f \quad \text{ب) } \left| \frac{x^2+1}{x} \right| > 0 \rightarrow x \neq 0, x > 0$$

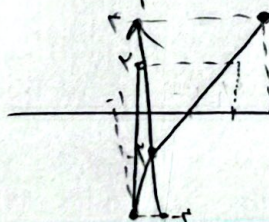
$$x + \frac{1}{x} \sim x \geq 1 \rightarrow \log(1, +\infty) \rightarrow R_f = [1, +\infty)$$

$$\text{الف) } \begin{vmatrix} 0 & 1 & 3 & 4 \\ -1 & -2 & 4 & 5 \end{vmatrix} \rightarrow$$



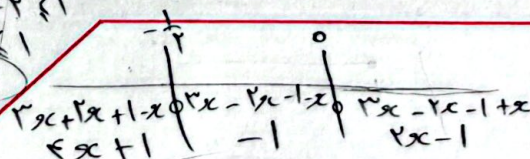
$$R_f = [-1, +\infty)$$

$$\text{ب) } \begin{vmatrix} 2 & 3 & -1 & 0 \\ 2 & 4 & -4 & -2 \end{vmatrix}$$

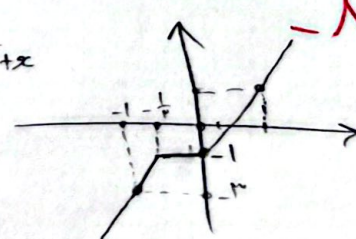


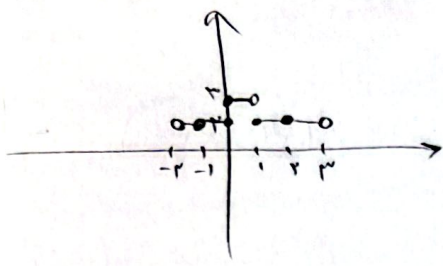
$$R_f = [-1, +\infty)$$

$$\begin{aligned} 2-x+2x+2 & \rightarrow 2-x-2x-2 \leq 1 \rightarrow x-2-2x-2 \leq 1 \rightarrow -x-4 \leq 1 \rightarrow -x \leq 5 \rightarrow x \geq -5 \\ 2x+4 \leq 1 & \rightarrow 2x \leq -3 \rightarrow x \leq -\frac{3}{2} \\ -x \leq 1 & \rightarrow x \geq -1 \\ x \geq -5 & \end{aligned}$$

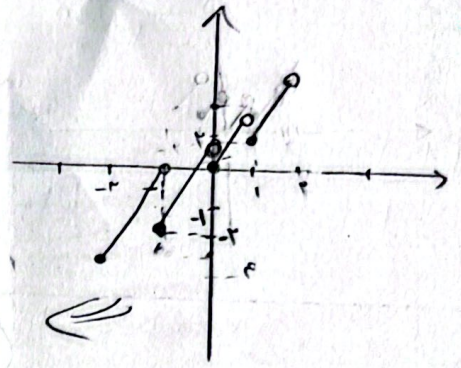


$$R_f = \mathbb{R}$$





$$\Rightarrow R_f = \{2, 3\}$$



$$R_f = [-f, \omega)$$

$$\begin{aligned} &\xrightarrow{1} 1 - 1 + 1 = 1 \\ &\xrightarrow{-1} 1 + 1 + 1 = 3 \Rightarrow \left[\frac{1}{f}, 3 \right] = R_f \\ &\xrightarrow{-\frac{b}{f_a}} = \frac{1}{f} \end{aligned}$$

$$\begin{aligned} &\xrightarrow{1} 1 + 1 + 1 = 3 \\ &\xrightarrow{0} 1 \\ &\xrightarrow{-\frac{b}{f_a}} = -\frac{1}{f} \end{aligned} \Rightarrow R_f = \left[-\frac{1}{f}, 3 \right]$$