

$$\text{الف) } y = x^2 - 5 \rightarrow x^2 = y + 5 \rightarrow x = \pm \sqrt{y + 5} \quad R_f = [-5, +\infty)$$

$$\text{ب) } y = x^2 + 1 \rightarrow x^2 = y - 1 \rightarrow x = \pm \sqrt{y - 1} \quad R_f = \mathbb{R}$$

$$\text{الف) } y = x^2 - 6x + 4 \rightarrow y = x^2 - 6x + 9 - 5 \rightarrow y = (x - 3)^2 - 5 \rightarrow (x - 3)^2 = y + 5$$

$$\rightarrow x = \pm \sqrt{y + 5} + 3 \quad R_f = [-5, +\infty)$$

$$\text{ب) } y = x^2 - 6x + 1 \rightarrow y = x^2 - 6x + 9 - 8 \rightarrow y = (x - 3)^2 - 8$$

$$(x - 3)^2 = y + 8 \rightarrow x = \pm \sqrt{y + 8} + 3 \quad R_f = (-8, +\infty)$$

$$\text{الف) } y = \frac{x^2 + 3}{x^2 - 2} \rightarrow x^2 + 3 = yx^2 - 2y \rightarrow 3 + 2y = yx^2 - x^2 \rightarrow$$

$$3 + 2y = x^2(y - 1) \rightarrow x^2 = \frac{3 + 2y}{y - 1} \rightarrow x = \pm \sqrt{\frac{3 + 2y}{y - 1}} \quad \frac{-1,5}{+0} - \frac{1}{0} +$$

$$R_f = (-\infty, -1,5] \cup (1, +\infty)$$

$$\text{ب) } y = \frac{2|x| + 1}{|x| - 2} \rightarrow 2|x| + 1 = y|x| - 2 \rightarrow y|x| - 2|x| = 1 \rightarrow |x|(y - 2) = 1$$

$$\rightarrow |x| = \frac{1}{y - 2} \quad R_f = (2, +\infty)$$

$$y = \frac{1}{x^2 - 4x} \rightarrow 1 = yx^2 - 4xy \rightarrow yx^2 - 4xy - 1 = 0 \quad x = \frac{-b \pm \sqrt{\Delta}}{2a}$$

$$x = \frac{-(-4y) \pm \sqrt{(-4y)^2 - 4(y)(-1)}}{2y} \rightarrow \Delta \geq 0 \rightarrow (-4y)^2 - 4(y)(-1) \geq 0 \rightarrow 16y^2 + 4y \geq 0$$

$$\rightarrow 4y(4y + 1) \geq 0 \quad \frac{-\frac{1}{4}}{+0} - \frac{0}{-1} + \quad R_f = (-\infty, -\frac{1}{4}] \cup [0, +\infty)$$

$$\text{الف) } y = x^2 - 4x + 2 \quad \text{Min} \left| \begin{array}{l} \frac{-b}{2a} = \frac{4}{2} = 2 \\ 4 - 16 + 2 = -10 \end{array} \right.$$

$$R_f = [-10, +\infty)$$

$$\text{ب) } y = -x^2 + 6x + 2 \quad \text{Max} \left| \begin{array}{l} \frac{-b}{2a} = \frac{-6}{-2} = 3 \\ -9 + 18 + 2 = 11 \end{array} \right.$$

$$R_f = (-\infty, 11]$$

الف) $y = \sqrt{x^2 - 4x + 4}$

min $\left| \begin{array}{l} \frac{-b}{2a} = \frac{4}{2} = 2 \\ 9 - 18 + 2 = -7 \end{array} \right.$

$R_f = \sqrt{[-7, +\infty)} = [0, +\infty)$

-4

ب) $y = \sqrt{-x^2 + 4x + 10}$

max $\left| \begin{array}{l} \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ -4 + 8 + 10 = 14 \end{array} \right.$

$R_f = \sqrt{(-\infty, 14]} = [0, \sqrt{14}]$

الف) $y = x^4 + 2x^2 + 2x + 1$

$R_f = \mathbb{R}$

-5

ب) $y = \sqrt{x^4 + 4x^2 + 4x + 1}$

$R_f = [0, +\infty)$

الف) $y = \frac{2x+1}{x-2}$

$R_f = \mathbb{R} - \{2\}$

-6

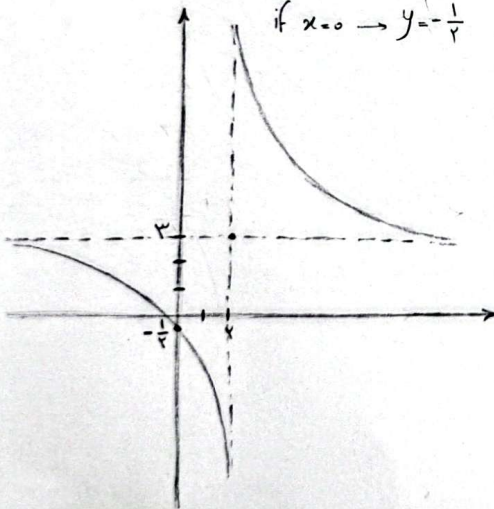
ب) $y = \sqrt{\frac{4x+1}{x+3}}$

$R_f = \sqrt{\mathbb{R} - \{-3\}} = [0, +\infty) - \{-3\}$

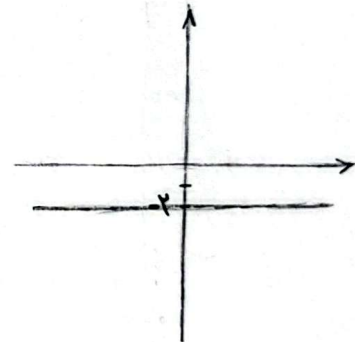
الف) $y = \frac{2x+1}{x-2}$

مجاہد نام (x) = 2
مجاہد انتی (y) = $\frac{a}{c} = 3$

if $x \rightarrow \infty \rightarrow y = -\frac{1}{2}$



ب) $y = \frac{4x-2}{1-2x} \rightarrow \frac{2(2x-1)}{-(2x-1)} = -2$



الف) $y = \cos^2 x + \frac{1}{\cos^2 x}$

$R_f = [2, +\infty)$

-10

ب) $y = \sqrt[3]{\frac{x^2+1}{x}} = \sqrt[3]{x + \frac{1}{x}}$

$R_f = (-\infty, -2] \cup [2, +\infty)$