

الف) $y = x^2 - 5$ $x^2 = y + 5$ $y + 5 \geq 0$ $R_f = [-5, +\infty)$ (1)
 $x = \pm \sqrt{y + 5}$ $y \geq -5$

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

الف) $y = x^2 - 2x + 4$ $y = x^2 - 2x + 1 + 3$ $R_f = [3, +\infty)$ (2)
 $y - 3 = (x - 1)^2 \Rightarrow x = \pm \sqrt{y - 3} + 1$ $y - 3 \geq 0$ $y \geq 3$

ب) $y = x^2 - 4x + 1$ $x^2 - 4x + \frac{16}{4} - \frac{11}{4} = y$ $R_f = [-\frac{11}{4}, +\infty)$
 $(x - \frac{4}{1})^2 = y + \frac{11}{4} \Rightarrow x = \pm \sqrt{y + \frac{11}{4}} + \frac{4}{1}$
 $y \geq -\frac{11}{4}$

الف) $y = \frac{x^2 + 3}{x^2 - 2}$ $x^2 y - 2y = x^2 + 3$ $x^2 = \frac{3 + 2y}{y - 1}$ $\frac{1}{+\frac{1}{2}} - \frac{-\frac{3}{2}}{+}$ (3)
 $x^2(y - 1) = 3 + 2y$ $x = \pm \sqrt{\frac{3 + 2y}{y - 1}}$ $[-\infty, \frac{3}{2}] \cup (1, +\infty)$
 $R_f =$

ب) $y = \frac{2|x| + 1}{|x| - 4}$ $|x|y - 4y = 2|x| + 1$ $|x| = \frac{4y + 1}{y - 2}$ $\frac{1}{+\frac{1}{2}} - \frac{-\frac{1}{2}}{+}$
 $|x|(y - 2) = 4y + 1$ $|x| = \frac{4y + 1}{y - 2}$ $R_f = (-\infty, -\frac{1}{2}] \cup (2, +\infty)$

$y = \frac{1}{x^2 - 2x}$ $y x^2 - 2x y = 1$ $4y \pm \sqrt{16y^2 + 4y} = 16y^2 + 4y \geq 0$ (4)
 $x^2 y - 2x y - 1 = 0$ $\frac{4y \pm \sqrt{16y^2 + 4y}}{4y} = 16y^2 + 4y \geq 0$
 $\frac{0}{+} - \frac{-\frac{1}{4}}{+}$ $\frac{4y(4y + 1)}{4y} \geq 0$
 $R_f = [0, +\infty) \cup (-\infty, -\frac{1}{4}]$

الف) $y = x^2 - 4x + 4$ $\frac{-b}{2a} = \frac{4}{2} = 2$ $R_f = [-2, +\infty)$ (5)
 $\min$ $4 - 16 + 4 = -8$

ب) $-x^2 + 4x + 4 = y$ $\frac{-b}{2a} = \frac{-4}{-2} = 2$ $R_f = (-\infty, 4]$
 $\max$ $-4 + 16 + 4 = 16$

أ) $y = \sqrt{x^2 - 4x + 2}$
min

$\left| \frac{-b}{2a} = \frac{4}{2} = 2 \right|$

$\sqrt{[-4, +\infty)} = R_f = [0, +\infty)$

(4)

ب) $y = \sqrt{-x^2 + 4x + 10}$
max

$\left| \frac{-b}{2a} = \frac{-4}{-2} = 2 \right|$
 $-4 + 10 + 10 = 16$

$\sqrt{(-\infty, 16]} = R_f = [0, \sqrt{16}]$

أ) $y = x^2 + 4x + 4 + 1$

$R_f = \mathbb{R}$

(5)

ب) $y = \sqrt{x^4 + 4x^2 + 4 + 1}$

$R_f = [0, +\infty)$

أ) $y = \frac{3x+1}{x-2}$

$R_f = \mathbb{R} - \{3\}$

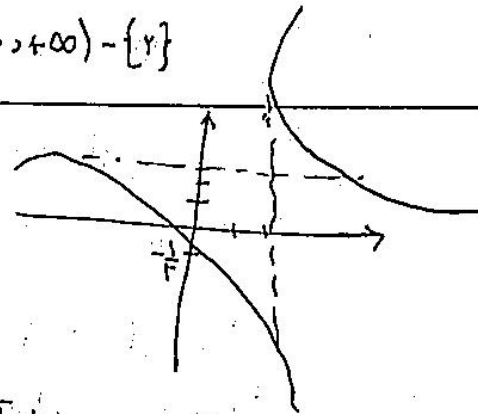
(6)

ب) $y = \sqrt{\frac{3x+1}{x+3}}$

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

أ) $y = \frac{3x+1}{x-2}$

3: جانب افقي
2: جانب قائم



(7)

ب) $y = \frac{4x-2}{-2x+1}$

$ad \neq bc$

$4x+1 = -2x-2$

فهمنا شكل الدالة

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

$R_f = [2, +\infty)$

(8)

ب) $y = \sqrt[3]{\frac{x^2+1}{x}}$

$= \sqrt[3]{x + \frac{1}{x}}$

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