

الف) $y = x^2$ $x^2 = y + 1 \Rightarrow x = \pm \sqrt{y+1}$ $\Rightarrow y + 1 \geq 0 \Rightarrow y \geq -1$ $\Rightarrow R_f = [-1, \infty)$	ب) $y = x^2 + 1$ $x^2 = y - 1 \Rightarrow x = \pm \sqrt{y-1} \Rightarrow R_f = [1, \infty)$ ۲
--	--

الف) $y = x^2 - 4x + 4$ $y = x^2 - 4x + 4 \Rightarrow y = (x-2)^2$ $\Rightarrow (x-2)^2 = y \Rightarrow x-2 = \pm \sqrt{y} \Rightarrow x = 2 \pm \sqrt{y}$ $\Rightarrow y \geq 0 \Rightarrow y \geq 0 \Rightarrow R_f = [0, \infty)$	ب) $x^2 - 4x + 1 = y$ $\Rightarrow y = x^2 - 4x + \frac{16}{4} - \frac{15}{4}$ $\Rightarrow y = (x-2)^2 - \frac{15}{4}$ $\Rightarrow x-2 = \pm \sqrt{y + \frac{15}{4}}$ $\Rightarrow x = 2 \pm \sqrt{y + \frac{15}{4}} \Rightarrow R_f = [-\frac{15}{4}, \infty)$ ۲
---	--

الف) $y = \frac{x^2 + 3}{x^2 - 1}$ $y(x^2 - 1) = x^2 + 3 \Rightarrow yx^2 - x^2 = y + 3$ $\Rightarrow x^2(y-1) = y+3 \Rightarrow x^2 = \frac{y+3}{y-1}$ $\Rightarrow x = \pm \sqrt{\frac{y+3}{y-1}} \Rightarrow R_f = (1, \infty)$ $R_f = (-\infty, -\frac{1}{2}] \cup (1, \infty)$	ب) $y x - 1 = y x + 1$ $\Rightarrow y x - 1 = y x + 1 \Rightarrow y x = 2 \Rightarrow x = \frac{2}{y}$ $\Rightarrow R_f = (0, \infty)$ $R_f = (-\infty, -\frac{1}{2}] \cup (1, \infty)$
--	--

الف) $y = x^2 - 4x + 4$ $\Delta = 16y^2 + 4y$ ب) $x^2 - (4y)x - 1 = 0$ $x = \frac{4y \pm \sqrt{16y^2 + 4y}}{2} \Rightarrow y \neq 0, 16y^2 + 4y \geq 0 \Rightarrow 4y(y+1) \geq 0$ $\Rightarrow y \geq 0 \text{ or } y \leq -1$ $\Rightarrow R_f = [0, \infty) \cup (-\infty, -1]$	$R_f = (-\infty, -\frac{1}{2}] \cup (1, \infty)$ ۱
---	--

الف) $y = x^2 - 4x + 4$ $\min \left \frac{-a}{2a} = \frac{-24}{4} = -6 \Rightarrow R_f = [-6, \infty)$ $\Delta = b^2 - 4ac = 144 - 16 = 128$	ب) $y = x^2 + 4x + 4$ $\max \left \frac{-a}{2a} = \frac{-4}{2} = -2 \Rightarrow R_f = (-\infty, -2]$ $\Delta = 16 - 16 = 0$ ۲
---	---

الف) $y = \sqrt{x^2 - 8x + 7}$

$R_f = [-1, +\infty) \Rightarrow R_f = [0, +\infty)$ ✓

ب) $y = \sqrt{-x^2 + 2x + 1}$ $\xrightarrow{a < 0}$ $\begin{cases} x_{\max} = \frac{-b}{2a} = 1 \\ y_{\max} = 1 \end{cases}$

$R_f = [0, 1]$ $R_f = (-\infty, 1] = [0, \sqrt{1}]$

(1)

الف) $y = 2x^2 + 12x + 1$

$R_f = \mathbb{R}$ ✓

ب) $y = \sqrt{x^2 + 4x + 1}$

$\Rightarrow R_f = \sqrt{\mathbb{R}} \Rightarrow R_f = [0, +\infty)$ ✓

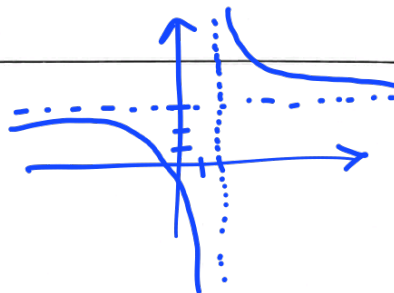
(2)

الف) $R_f = \mathbb{R} - \{2\}$ ✓

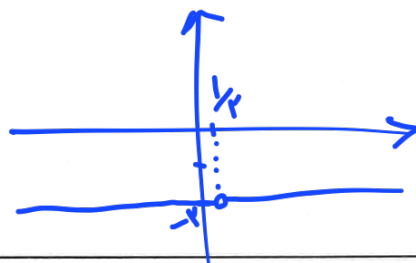
(2)

ب) $R_f = [0, +\infty) - \{2\}$

الف) $R_f = \mathbb{R} - \{2\}$
جانب اعلى = 3
جانب مائل = 2



ب) $R_f = \mathbb{R} - \{2\}$ $y = -2$
 $a \neq \frac{1}{x}$



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

$\Rightarrow R_f = [2, +\infty)$ ✓

(10)

ب) $y = \sqrt{\frac{x^2 + 1}{x}}$ $\Rightarrow y = \sqrt{x + \frac{1}{x}}$

$R_f = \sqrt[3]{(-\infty, -1] \cup [1, +\infty)} \rightarrow R_f = (-\infty, \sqrt[3]{-1}] \cup [\sqrt[3]{1}, +\infty)$