

الف) $y = x^2 - 5 \Rightarrow y + 5 = x^2 \Rightarrow x = \sqrt{y+5} \Rightarrow R_f = [-5, +\infty)$ ب) $y = x^3 + 1 \Rightarrow y - 1 = x^3 \Rightarrow \sqrt[3]{y-1} = x \Rightarrow R = \mathbb{R}$	۱
الف) $y = x^2 - 6x + 4 \Rightarrow y = x^2 - 6x + 9 - 5 \Rightarrow y = (x-3)^2 - 5 \Rightarrow y - 2 = (x-2)^2$ $\Rightarrow \pm \sqrt{y-2} + 2 = x \Rightarrow R = [2, +\infty)$ ب) $y = x^2 - 5x + 1 \Rightarrow x^2 - 5x + 1 + 5,25 - 5,25 = x^2 - 5x + 6,25 - 5,25$ $\Rightarrow (x - 5,25)^2 - 5,25 = y \Rightarrow \pm \sqrt{y+5,25} + 5,25 = x \Rightarrow R = [-5,25, +\infty)$	۲
الف) $y = \frac{x^2+3}{x^2-2} \Rightarrow yx^2 - 2y = x^2 + 3 \Rightarrow yx^2 - x^2 = y + 3 \Rightarrow x^2(y-1) = y+3$ $\Rightarrow x^2 = \frac{y+3}{y-1} \Rightarrow x = \pm \sqrt{\frac{y+3}{y-1}} \Rightarrow R = (1, +\infty)$ ب) $\frac{y x +1}{ x -4} = y \Rightarrow y x - 4y = y x + 1 \Rightarrow y x - 2 x = y + 1$ $\Rightarrow x (y-2) = y+1 \Rightarrow x = \frac{y+1}{y-2} \Rightarrow R = (2, +\infty)$	۳
$yx^2 - 4xy = 1 \Rightarrow (y)x^2 - (4y)x - 1 = 0$ $\Rightarrow \frac{4y \pm \sqrt{16y^2 + 4y}}{2y} \Rightarrow 16y^2 + 4y \geq 0 \Rightarrow 16y^2 + 4y > 0$ $\Rightarrow 4y^2 + y > 0 \Rightarrow 4y^2 > -y \Rightarrow R_f = \mathbb{R}$	۴
الف) $y = x^2 - 4x + 2 \Rightarrow \min \left \begin{matrix} x_{\min} = -\frac{b}{2a} = 2 \\ y_{\min} = -1 \end{matrix} \right. \quad [-1, +\infty)$ ب) $y = -x^2 + 6x + 2 \Rightarrow \max \left \begin{matrix} x_{\max} = 3 \\ y_{\max} = 11 \end{matrix} \right. \quad [-\infty, 11]$	۵

الف) $y = \sqrt{x^2 - 6x + 2} \Rightarrow \min | -\frac{3}{2} | \Rightarrow R = \sqrt{[-\frac{3}{2}, +\infty)} \Rightarrow R = [0, +\infty)$

ب) $y = \sqrt{-x^2 + 4x + 10} \Rightarrow \max | \frac{2}{1} | \Rightarrow R = \sqrt{(-\infty, 10]} \Rightarrow R = [0, 10]$

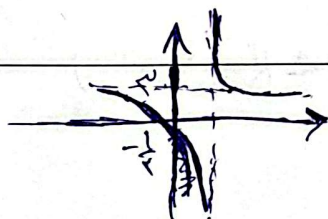
الف) $R_f = \mathbb{R}$

ب) $R_f = [0, +\infty)$

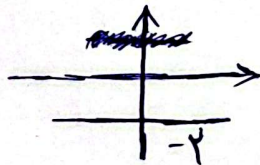
الف) $\frac{x+1}{x-2} \Rightarrow \mathbb{R} - \{2\}$

ب) $y = \sqrt{\frac{x+1}{x+2}} \Rightarrow R_f = [0, +\infty) - \{2\}$

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



$y = \frac{x-2}{1-2x}$



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

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