

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

ب) $x^2 = y - 1 \quad x = \pm \sqrt{y - 1} \rightarrow R_f = [1, +\infty)$

الف) $y = x^2 - 4x + 4 \Rightarrow y = (x - 2)^2 + 2 \Rightarrow (x - 2)^2 = y - 2 \Rightarrow x = \sqrt{y - 2} + 2$

$R_f = [2, +\infty)$

ب) $y = x^2 - 2x + 1 \Rightarrow (x^2 - 2x + \frac{1}{4}) - \frac{1}{4} + 1 = y \Rightarrow y = (x - \frac{1}{2})^2 + \frac{3}{4} \Rightarrow (x - \frac{1}{2})^2 = y - \frac{3}{4} \Rightarrow x = \sqrt{y - \frac{3}{4}} + \frac{1}{2}$

$R_f = [-\frac{3}{4}, +\infty)$

الف) $y = \frac{x^2 + 3}{x^2 - 2} \Rightarrow x^2 + 3 = yx^2 - 2y \Rightarrow x^2 - yx^2 = -2y - 3 \Rightarrow x^2(1 - y) = -2y - 3 \Rightarrow x^2 = \frac{-2y - 3}{1 - y}$

ب) $\frac{2x + 1}{|x| - 2} = y \Rightarrow |2x + 1| = y|x| - 2y \Rightarrow |2x + 1| = -1 - 4y \Rightarrow |2x + 1| = -1 - 4y \Rightarrow |2x + 1| = -1 - 4y \Rightarrow |2x + 1| = -1 - 4y$

ج) $y = \frac{1}{x^2 - 4x} \Rightarrow 1 = yx^2 - 4xy \Rightarrow x^2y - 4xy - 1 = 0 \Rightarrow x = \frac{4y \pm \sqrt{16y^2 + 4y}}{2y} \Rightarrow x = \frac{4y \pm 2\sqrt{4y^2 + y}}{2y} \Rightarrow x = \frac{2y \pm \sqrt{4y^2 + y}}{y}$

الف) $y = x^2 - 4x + 4 \quad \min \left| \begin{matrix} 4 \\ -4 \end{matrix} \right| \quad R_f = [-4, +\infty)$

ب) $y = -x^2 + 4x + 4 \quad \max \left| \begin{matrix} 4 \\ 4 \end{matrix} \right| \quad R_f = (-\infty, 4]$

الف) $y = \sqrt{x^2 - 4x + 2}$ $\min \left| \frac{y}{x} = \frac{2}{-1} \right|$ $R_f = [0, +\infty)$

ب) $y = \sqrt{-x^2 + 6x + 16}$ $\max \left| \frac{-f}{-1} = 2 \right|$ $R_f = [0, \sqrt{16}]$

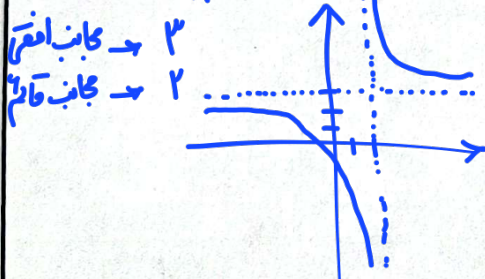
الف) $y = x^3 + 3x^2 + 2x + 1 \Rightarrow R_f = \mathbb{R}$

ب) $y = \sqrt{x^3 + 6x^2 + 4x + 1} \Rightarrow R_f = [0, +\infty)$

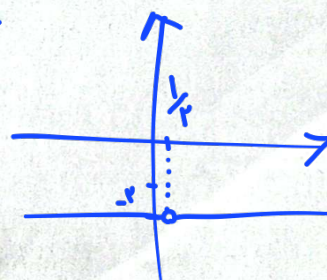
الف) $y = \frac{2x+1}{x-2} \Rightarrow R_f = \mathbb{R} - \{2\}$

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

الف) $y = \frac{2x+1}{x-2}$



ب) $y = \frac{2x-2}{1-2x} = -2$
 $x \neq \frac{1}{2}$



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

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