

الف) $y = x^2 - 5 \rightarrow x^2 = y + 5 \rightarrow x = \sqrt{y+5} \rightarrow y+5 \geq 0 \rightarrow y \geq -5 \rightarrow R_f = [-5, +\infty)$
 ب) $y = x^2 + 1 \rightarrow x^2 = y - 1 \rightarrow x = \sqrt{y-1} \rightarrow R_f = \mathbb{R}$

الف) $y = x^2 - 6x + 4 \rightarrow (x-3)^2 + 2 = y \rightarrow (x-3)^2 = y-2 \rightarrow x-3 = \sqrt{y-2} \rightarrow x = \sqrt{y-2} + 3 \rightarrow y-2 \geq 0 \rightarrow y \geq 2$
 $R_f = [2, +\infty)$

ب) $y = x^2 - 6x + 1$ $y+5 \geq 0 \rightarrow x^2 - 6x + 4, 20$
 $y+5, 20 = (x-3, 0)^2 \rightarrow \sqrt{y+5, 20} = x-3, 0 \rightarrow x = \sqrt{y+5, 20} + 3, 0$
 $R_f = [-5, 20, +\infty)$ $y+5, 20 \geq 0 \rightarrow y \geq -5, 20$

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

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

$yx^2 - 4xy = 1$ $\frac{y}{a} x^2 - \frac{4y}{b} x - \frac{1}{c} = 0$ $\Delta = b^2 - 4ac = 16y^2 + 4y \rightarrow 16y^2 + 4y \geq 0 \rightarrow 4y(y+1) \geq 0$
 $x = \frac{-4y \pm \sqrt{16y^2 + 4y}}{-2}$ $\frac{-1}{+} \frac{0}{+}$
 $R_f = (-\infty, -\frac{1}{4}] \cup (0, +\infty)$

الف) $y = x^2 - 4x + 2 \xrightarrow{a.c.} \max \left| x = -\frac{b}{2a} = \frac{4}{2} = 2 \right. \left. R_f = (-\infty, -2] \right.$
 $y = 9 - 18 + 2 = -7$

ب) $y = -x^2 + 4x + 2 \xrightarrow{a.c.} \min \left| x = -\frac{b}{2a} = \frac{-4}{-2} = 2 \right. \left. R_f = [4, +\infty) \right.$
 $y = -4 + 8 + 2 = 4$

الف) $y = \sqrt{x^2 - 4x + 2} \xrightarrow{a.c.} \max \left| x = -\frac{b}{2a} = \frac{4}{2} = 2 \right. \left. R_f = (-\infty, -2] = \emptyset \right.$
 $\sqrt{[-7, 2]} = [0, +\infty)$

الف) $y = x^4 + 3x^2 + 2x + 1 \rightarrow$ برترین توان نرد $\rightarrow R_f = \mathbb{R}$

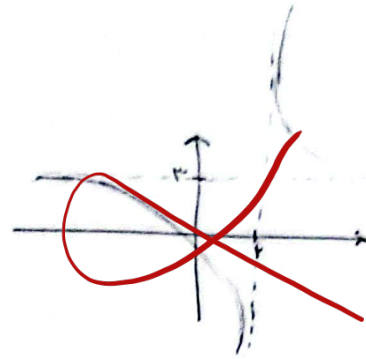
ب) $y = \sqrt{x^4 + 4x^2 + 4x + 1} \rightarrow$ برترین توان نرد $\rightarrow R_f = [0, +\infty)$

الف $y = \frac{3x+1}{x-2} \rightarrow$ هورتایک $\rightarrow R_f = R - \{2\}$

۱/۵

ب $y = \sqrt{\frac{3x+1}{x+2}} \rightarrow [0, +\infty) - \{2\}$

الف $y = \frac{3x+1}{x-2} \rightarrow$ مخرج نام $= x-2=0 \rightarrow x=2$
 جواب افقی $= y = \frac{3}{1} = 3$
 ۵/۵



۱

ب $y = \frac{3x-2}{1-2x} \rightarrow$ هورتایک نیست $R_f = \{-2\}$ ۵/۵
 $2x1 = -2x-2$
 ؟ سده

۱/۵

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

ب $\sqrt[3]{\frac{x^2+1}{x}} \rightarrow \sqrt[3]{x + \frac{1}{x}} \rightarrow \sqrt[3]{(-\infty, -1] \cup [1, +\infty)} \rightarrow R_f = (-\infty, -1] \cup [1, +\infty)$
 $x > 0 \rightarrow (\sqrt[3]{x}, +\infty)$
 $x < 0 \rightarrow (-\infty, \sqrt[3]{x})$