

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

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ب) $y \geq x^3 + 1 \Rightarrow x^3 \leq y - 1 \Rightarrow x \leq \sqrt[3]{y - 1} \Rightarrow R_f = [R]$

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

ب) $y \geq x^2 - 5x + 1 \Rightarrow x^2 - 5x + (1 - y) \geq 0$
 $\Delta \geq b^2 - 4ac \geq 25 - 4(1 - y) \geq 21 + 4y$
 $21 + 4y \geq 0 \Rightarrow y \geq -\frac{21}{4}$
 $R_f = [-\frac{21}{4}, +\infty)$

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الف) $y \geq \frac{x^2 + 3}{x^2 - 2} \Rightarrow y(x^2 - 2) \geq x^2 + 3 \Rightarrow x^2(y - 1) \geq y + 3 \Rightarrow x^2 \geq \frac{y + 3}{y - 1}$
 $R_f = (-\infty, -1.5] \cup (1, +\infty)$

ب) $y \geq \frac{2|x| + 1}{x + 1} \Rightarrow y|x| + y \geq 2|x| + 1 \Rightarrow |x|(y - 2) \geq y + 1$
 $\frac{y + 1}{y - 2} \geq 0 \Rightarrow x \in (-\infty, -\frac{1}{y - 2}] \cup (\frac{1}{y - 2}, +\infty) = R_f$

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

الف) $y \geq x^2 - 4x + 2 \Rightarrow R_f = [-V, +\infty)$

ب) $y \geq x^2 + (x + 2) \Rightarrow R_f = (-\infty, 2]$



الف) $y = \sqrt{n^2 - 4n + 4} \Rightarrow \text{Ent} \left[\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right] \Rightarrow \sqrt{[-1, +\infty)} \cup [0, +\infty)$
 $R_f = \mathbb{R}$

ب) $y = \sqrt{-n^2 + 6n + 10} \Rightarrow \text{Ent} \left[\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right] \Rightarrow \sqrt{(-\infty, 1]} \cup [5, +\infty)$
 $R_f = \mathbb{R}$

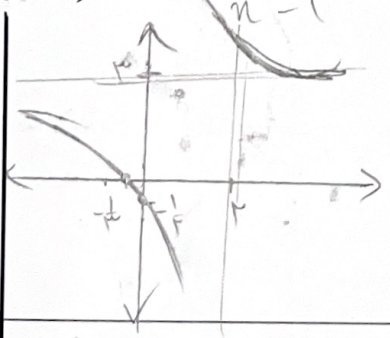
الف) $y = n^2 + 2n^2 + 2n + 1 \Rightarrow \text{نیزترین مقدار} \Rightarrow R_f = \mathbb{R}$

ب) $y = \sqrt{n^2 + 2n^2 + 2n + 1} \Rightarrow \text{دائره زیر را نگاه کنید} \Rightarrow \mathbb{R} \Rightarrow \sqrt{\mathbb{R}} = [0, +\infty)$

الف) $y = \frac{n+1}{n-2} \Rightarrow \frac{a}{c} \pm \frac{b}{1} \Rightarrow R_f = \mathbb{R} - \{2\}$

ب) $y = \sqrt{\frac{n+1}{n+2}} \Rightarrow \left| \frac{a}{c} \pm \frac{b}{1} \right| \Rightarrow 2 \Rightarrow R_f = \mathbb{R} - \{2\}$

الف) $y = \frac{n+1}{n-2} \Rightarrow \begin{cases} n=2 \rightarrow \text{مخرج صفر} \rightarrow y = -\frac{1}{2} \\ n \rightarrow \infty \rightarrow y = 1 \end{cases}$



ب) $y = \frac{n-2}{n-1} = \frac{-1(n-1)}{n-1} \Rightarrow \frac{n-1 \neq 0}{n \neq \frac{1}{2}}$

الف) $y = \cos^2 n + \frac{1}{\cos^2 n} \Rightarrow R_f = [2, +\infty)$
 $\cos^2 n > 0$

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