

سوال ۱

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

$$x^3 = y - 1 \Rightarrow x = \sqrt[3]{y-1} \Rightarrow R_f = \mathbb{R}$$

1. $\Delta \geq 0$

الف) $y = x^2 - 4x + 4$

Discriminant

$$x^2 - 4x + 4 - y = 0 \Rightarrow 16 - 4y + 4y \geq 0 \Rightarrow 16 - 4y \geq 0 \Rightarrow y \leq 4 \rightarrow R_f = (-\infty, 4]$$

ب) $y = x^2 - 8x + 1$

$$0 = x^2 - 8x + 1 - y \Rightarrow 64 - 4(1-y) \geq 0 \Rightarrow 11 + 4y \geq 0 \Rightarrow y \geq -\frac{11}{4} \Rightarrow R_f = [-\frac{11}{4}, \infty)$$

سوال ۲

الف) $y = x^2 - 2y = x^2 + 3$

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

ب) $y = |x| - 4y = 2|x| + 1$

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

سوال ۳

$y = x^2 - 4xy = 1 \rightarrow yx^2 - 4xy - 1 = 0$

$$16y^2 - 4(-y) \geq 0 \rightarrow 16y^2 + 4y \geq 0 \rightarrow 4y(4y+1) \geq 0 \Rightarrow y \leq -\frac{1}{4} \text{ or } y \geq 0 \rightarrow R_f = (-\infty, -\frac{1}{4}] \cup [0, \infty)$$

سوال ۴

الف) $x^2 - 4x + 2 \rightarrow \text{MOX}$

$$-\frac{b}{2a} \rightarrow \frac{2}{2} \rightarrow 2 / 4 - 16 + 2 \rightarrow -10 \rightarrow [-10, \infty) = R_f$$

ب) $-x^2 + 4x + 2 \rightarrow \text{Min}$

$$\frac{-b}{2a} \rightarrow 2 / -1 + 16 + 2 \rightarrow 17 \rightarrow (-\infty, 17] = R_f$$

سوال ۵

الف) $x^2 - 4x + 2 \rightarrow \text{MOX}$

$$\frac{4}{2} \rightarrow 2 / 4 - 16 + 2 \rightarrow -10 \rightarrow [-10, \infty) \xrightarrow{\text{Zir-e-Asal}} [0, \infty) = R_f$$

ب) $-x^2 + 4x + 1 \rightarrow \text{Min}$

$$\frac{-4}{-2} \rightarrow 2 / -4 + 16 + 1 \rightarrow 13 \rightarrow (-\infty, 13] \xrightarrow{\text{Zir-e-Asal}} [0, 13] = R_f$$

سوال ۶

الف) $x^4 + 3x^2 + 2x + 1 \Rightarrow R_f = \mathbb{R}$

ب) $\sqrt{x^4 + 3x^2 + 2x + 1} \Rightarrow R_f = [0, \infty) \Rightarrow \text{Zir-e-Asal}$

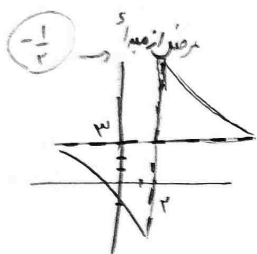
سوال 8

ا) $ad \neq bc$ و $c \neq 0 \Rightarrow R_f = \mathbb{R} - \left\{ \frac{3}{c} \right\}$ ☺

ب) $ad \neq bc$ و $c \neq 0 \Rightarrow R_f = \mathbb{R} - \left\{ \frac{3}{c} \right\} \rightarrow \sqrt{\frac{4}{c}} \rightarrow 2$

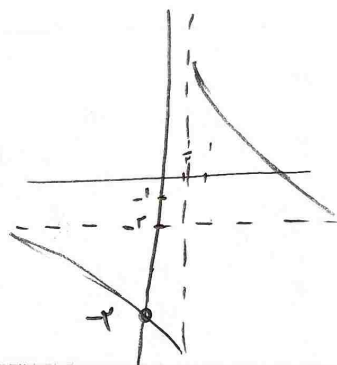
سوال 9

$$y = \frac{3n+1}{x-2} \Rightarrow \begin{cases} \text{مجاوب افقی} \Rightarrow \frac{a}{c} \Rightarrow 3 = y \\ \text{مجاوب عمودی} \Rightarrow x = 2 \end{cases}$$



$$y = \frac{4n-2}{-2n+1} \Rightarrow \begin{cases} \text{مجاوب افقی} \rightarrow \frac{1}{2} \\ \text{مجاوب عمودی} \rightarrow \frac{a}{c} = -2 \end{cases}$$

☺ -2 → مجاوب عمودی



سوال 10

$$y = \cos^2 n + \frac{1}{\cos^2 n} \Rightarrow R_f = [2, \infty_+)$$

هواره مثبت و یا صفر

فاقد نایب

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

☺ Amere