

مهری کریمی - تکلیف شماره ۳ ۱۸,۲۵ **دست نزن!**

$$y = \frac{x^2 + x + 2}{x - 1} \rightarrow xy - y = x^2 + x + 2 \Rightarrow x^2 + (1 - y)x + 2 + y = 0$$

$$\Rightarrow x = \frac{y-1 \pm \sqrt{1+y^2-2y-4-y^2}}{2} = \frac{y-1 \pm \sqrt{y^2-6y-3}}{2} \Rightarrow (y-1)(y+1) \geq 0$$

$$\Rightarrow (y-1)(y+1) \geq 0$$

$$\Rightarrow \frac{-1}{1-1} \Rightarrow (\infty, -1] \cup [1, +\infty) = R_f$$

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(۲) (۲)

الف) $\frac{-b}{2a} = \frac{\omega}{2} \Rightarrow 2(\frac{\omega}{2})^2 - \omega(\frac{\omega}{2}) + 1 = -\frac{14}{\lambda} \Rightarrow R_f = [-\frac{14}{\lambda}, +\infty)$

ب) $\frac{-b}{2a} = \frac{-6}{-2} = 3 \Rightarrow -9 + 11 - \omega = 4 \Rightarrow R_f = [0, 2]$

ج) $\Rightarrow R_f = [0, +\infty)$

د) $\Rightarrow R_f = (-\infty, +\infty)$

الف) $\frac{3x+1}{x-4} \Rightarrow R_f = \mathbb{R} - \{\frac{3}{2}\}$ ب) $R_f = \sqrt{\mathbb{R} - \{4\}} \Rightarrow R_f = [0, +\infty) - \{2\}$

(۳) (۱, ۷۵)

ج) $\frac{x^2+3}{x^2+2} + \frac{1}{\sqrt{x^2+3}} \Rightarrow \sqrt{x^2+3} + \frac{1}{\sqrt{x^2+3}} \Rightarrow R_f = [\frac{2\sqrt{3}}{3}, +\infty)$

د) $x^2 + \frac{1}{x^2+2} - 2 = y \xrightarrow{t=\frac{x^2}{x^2+2}} (t + \frac{1}{t}) - 2 = y \Rightarrow \frac{1}{t} + t - 2 = y \Rightarrow \frac{1}{t} + t \geq 2 \Rightarrow \frac{14}{2} \Rightarrow R_f = [\frac{1}{2}, +\infty)$

$\min = \frac{1}{2} \rightarrow R_f = [\frac{1}{2}, +\infty)$

$y x^2 - y = 3x^2 + 4 \Rightarrow y x^2 - 3x^2 = 4 + y \Rightarrow x^2 = \frac{4+y}{y-3} \Rightarrow x = \sqrt{\frac{4+y}{y-3}} \Rightarrow \frac{-4}{+} - \frac{3}{+} \Rightarrow R_f = (\infty, -4] \cup (3, +\infty)$

حالت $x^2 = 0 \Rightarrow -4$
 بزرگترین $x^2 = \infty \Rightarrow 3 \Rightarrow R_f = (\infty, -4] \cup (3, +\infty)$

$y \sin x + 3y = 2 \sin x - 1 \Rightarrow y \sin x - 2 \sin x = -3y - 1 \Rightarrow \sin x = \frac{-3y-1}{y-2} \Rightarrow -1 \leq \frac{-3y-1}{y-2} \leq 1$

$\Rightarrow \frac{-3y-1}{y-2} \leq 1 \Rightarrow \frac{-3y-1}{y-2} - 1 \leq 0 \Rightarrow \frac{-3y-1-y+2}{y-2} \leq 0 \Rightarrow \frac{-4y+1}{y-2} \leq 0 \Rightarrow y = [-\frac{1}{4}, \frac{1}{2}]$

(۴) (۵) (۲)

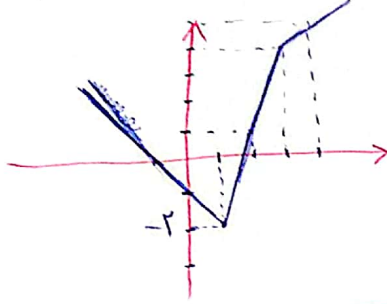
کوچکترین $\sin x = -1 \Rightarrow -\frac{3}{2}$
 بزرگترین $\sin x = 1 \Rightarrow \frac{1}{2} \Rightarrow [-\frac{3}{2}, \frac{1}{2}] = R_f$

$$\frac{x^2 - x + \frac{1}{2}}{x^2 - x + 1 - \frac{1}{2} + \frac{1}{2}} = \frac{(x - \frac{1}{2})^2 + 0}{(x - \frac{1}{2})^2 + \frac{1}{2}} \Rightarrow (x - \frac{1}{2})^2 \begin{cases} \rightarrow 1 \\ \rightarrow 0 \end{cases} \Rightarrow R_f = [0, 1]$$

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$$D_f \Rightarrow \text{مخرج صفر} \rightarrow R_f = \mathbb{R}$$

الف) $|2x - 2| - |x - 3|$

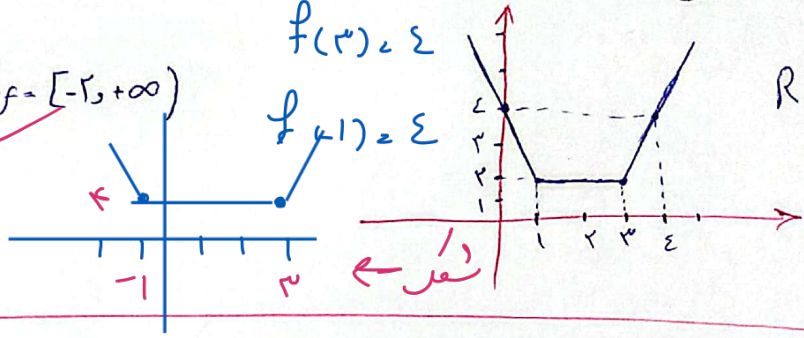


$$\Rightarrow R_f = [-2, +\infty)$$

ب) $|x - 3| + |x + 1| \rightarrow$ مبرك

$$f(3) = 2$$

$$f(-1) = 2$$



$$R = [2, +\infty)$$

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$$\begin{array}{c|c|c} -1 & 2 & \\ \hline -x+2 & 2x+2 & -x+2 & 2x-2 \\ x+2 & \leq 1 & -3x & \leq 1 \\ x-2 & -2x-2 & x-2 & -2x-2 \\ -x-2 & \leq 1 & -x-2 & \leq 1 \end{array}$$

$$\Rightarrow x = (-\infty, -3] \cup [-\frac{1}{3}, 2] \cup [2, +\infty)$$

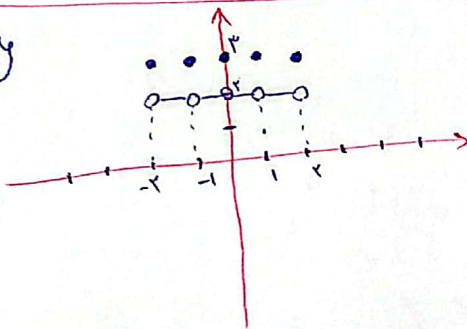
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$$x = (-\infty, -3] \cup [\frac{1}{3}, +\infty)$$

$$x < -3 \checkmark \quad x = -\frac{1}{3} \quad x > 2 \checkmark \quad x \geq 0 \text{ ! أهم خاص مبرك}$$

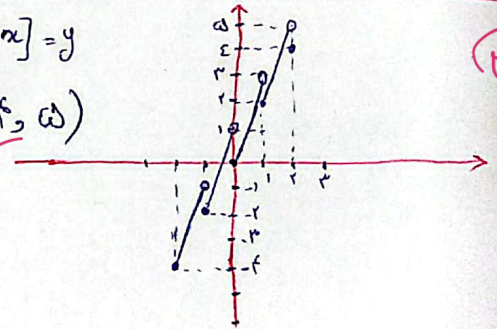
الف) $[x] + [x - x] = y$

$$R = \{2, 3\} \checkmark$$



ب) $2x - [x] = y$

$$R = [-\frac{1}{2}, \infty)$$



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الف) $\sin x \begin{cases} \rightarrow 1 \\ \rightarrow -1 \end{cases} \Rightarrow R = [1, 3]$

$$\frac{-b}{a} = \frac{1}{2} \rightarrow \frac{3}{2}$$

$$R = [\frac{3}{2}, 3]$$

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ب) $\sin^{-1} x \begin{cases} \rightarrow 0 \\ \rightarrow 1 \end{cases} \Rightarrow R = [1, 3]$

$$\frac{-b}{a} = \frac{-1}{2} \times$$