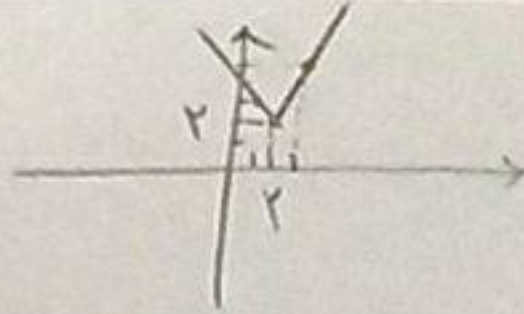


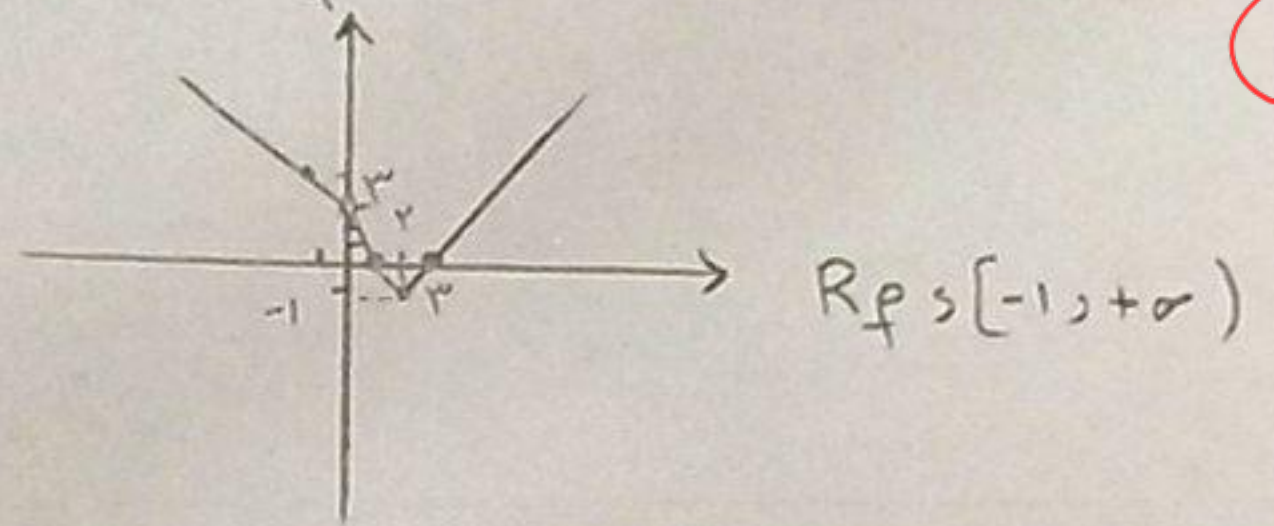
۵

الف)

$$\begin{array}{r|l} x-2x+2 & x+2x-2 \\ \hline = -x+2 & \textcircled{2} = 2x-2 \end{array}$$



$$R_f \text{ s } [2, +\infty)$$



$$R_f \text{ s } [-1, +\infty)$$

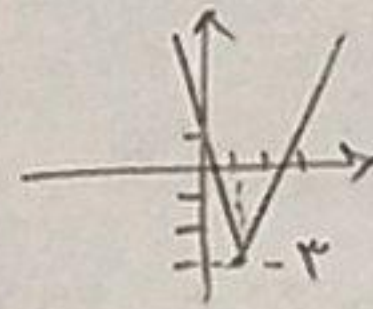
ب)

$$\begin{array}{r|l|l|l|l} 2-x-x+1+x & 2-x-x+1 & 2-x+x-1 & x-2+x-1-x & \\ \hline = 2-x & \textcircled{3} = 2-2x & = 1-x & \textcircled{-1} = x-2 & \end{array}$$

* خط افقی $y=k$ را بر روی نمودار رد نقطه قطع می‌کنند

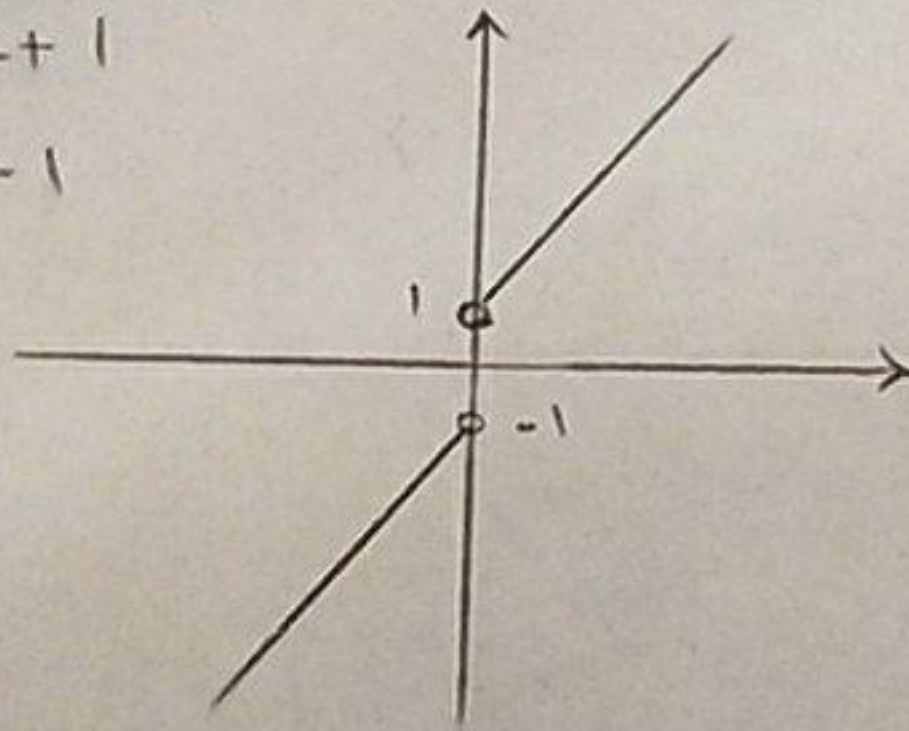
۵

$$\begin{cases} 2x+2 & x \leq -2 \\ -2x+1 & -2 \leq x \leq 1 \\ -2x+2 & x \geq 1 \end{cases} \rightarrow R_f \text{ s } [-3, +\infty)$$



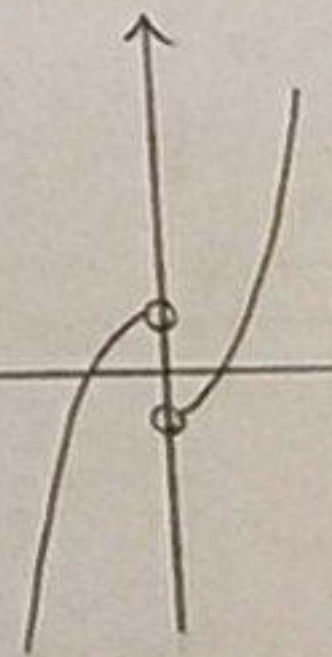
$$\rightarrow k \leq -3$$

الف) $x > 0 \rightarrow x+1$
 $x < 0 \rightarrow x-1$

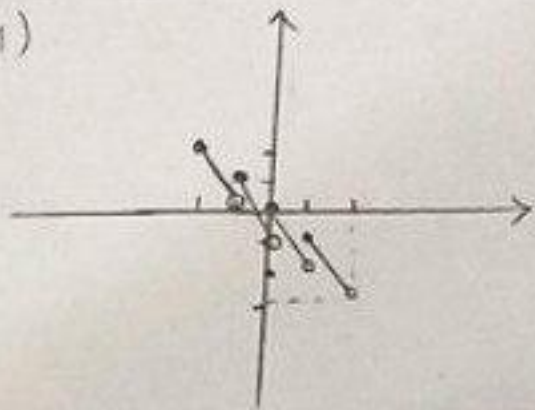


ب) $x > 0 \rightarrow x-1$
 $x < 0 \rightarrow -x^2+1$

۵

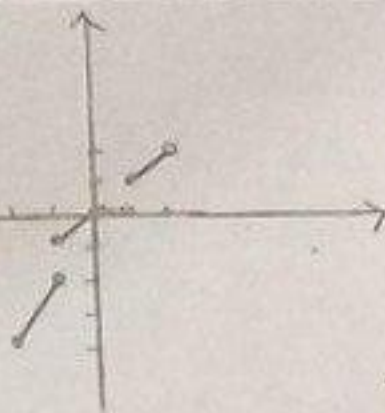


الف)



ب)

ضابطه ها نوشته شود



۵)

الف) $\forall x \in \mathbb{R} \rightarrow x - [x] \Rightarrow 0 \leq f(x) < 1$

ب) $f(x - [x]) \rightarrow 0 \leq x - [x] < 1 \Rightarrow 0 \leq f(x - [x]) < 1$

۱,۷۵)

د) ج) $\forall x \in \mathbb{R} \rightarrow x - [x] \Rightarrow 0 \leq \frac{x}{a} - [\frac{x}{a}] < 1 \xRightarrow{x \in \mathbb{R}} 0 \leq f(x) < 1$

ز) $[x] - x \rightarrow 0 \leq f(x) < -1$

$-1 < f(x) \leq 0$

$$\sin x = 1 \Rightarrow y = 1$$

$$f(\cos x) = f(1 - \sin x) = 1 - f(\sin x)$$

ا) $\sin x = f \sin x + \epsilon$ $y \in [-f \sin x + \epsilon, f \sin x + \epsilon]$ $[1, f]$

$$0 \leq \sin x \leq 1 \rightarrow -f \leq f \sin x - \epsilon \leq -f \Rightarrow R_f \subset [-f, -\epsilon]$$

1,50

ب) $\frac{f \cos x}{\frac{1}{\sin x}} \leq f \cos x \sin x = f \cos x \sin x \leq \sin x \Rightarrow R_f \subset [-1, 1]$

ا) $2^{1-x} \leq \sin^2 x + \cos^2 x \leq 1 \Rightarrow \frac{1}{2} \leq f(x) \leq 1$

1,70

ب) $[\frac{1}{2}] \leq [f(x)] \leq [1] \Rightarrow R_f \subset [0, 1]$

ا) $2x^2 + 7x - 4 \mid \frac{x+4}{2x-1} \Rightarrow y \leq 2x-1 \xrightarrow{x \rightarrow \infty} y = -9 \Rightarrow R_f \subset \mathbb{R} - \{-9\}$

1,70

ب) $y \leq \frac{(x-1)(x^2+x+1)}{x-1} \leq x^2+x+1 \xrightarrow{x \rightarrow 1} 1+1+1 = 3$

Min $\begin{cases} \frac{-b}{2a} = -\frac{1}{2} \\ \frac{1}{2} - \frac{1}{2} + \frac{3}{2} = \frac{3}{2} \end{cases}$

$\Rightarrow R_f \subset [\frac{3}{2}, +\infty) - \{x\}$

