

الف) $\frac{x+1}{x-2}$ $x > 0$ $\frac{-x+1}{-2-x}$ $x < 0$ $R_f = \mathbb{R} - (-\frac{1}{2}, 1]$		ب) $x + \frac{1}{x}$ $x > 0$ $-(x + \frac{1}{x})$ $x < 0$ $R_f = [2, +\infty)$		1
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$xy + y^2 = x^2 + 2x - 2 \rightarrow x^2 + (2-y)x - (2+y^2) = 0 \rightarrow \Delta \geq 0$
 $(2-y)^2 + 4(2+y^2) \geq 0 \rightarrow (y+4)(y+2) \geq 0 \rightarrow R_f = \mathbb{R} - (-4, -2)$

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$\frac{(x - \frac{1}{2})^2}{(x - \frac{1}{2})^2 + \frac{3}{4}}$ $(x - \frac{1}{2})^2 = t$ $\frac{t}{t + \frac{3}{4}}$ $\xrightarrow{t=0} f(x) = 0$ $\xrightarrow{t=+\infty} f(x) = 1$

$R_f = [0, 1)$
 $D_f = \mathbb{R}$

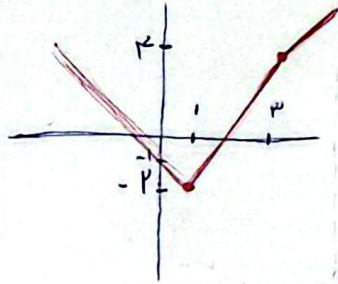
3

الف) $x_s = -\frac{b}{2a} = 2$ $y_s = 3$ $(-\infty, 3] \xrightarrow{\sqrt{\quad}} R_f = [0, \sqrt{3}]$	$\rightarrow x_s = -\frac{b}{2a} = 2$ $y_s = -1$ $[-1, +\infty) \xrightarrow{\sqrt[3]{\quad}} R_f = [-2, +\infty)$	4
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$R = [0, +\infty)$ $R = (-\infty, +\infty)$ $(x^2 - x + 1)$ $\log$ $\log$ $\log$ $\log$ هونگا ستم به سمت -∞ میل می کند	$\log(x + \frac{1}{x})$ $(-\infty, -2] \cup [2, +\infty) \xrightarrow{\log} R_f = [1, +\infty)$	5
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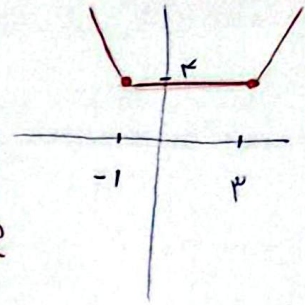
$$\text{الف) } \begin{cases} x+1 & x > 2 \\ y & 3x-5 & 1 < x < 3 \\ & -x-1 & x < 1 \end{cases}$$

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



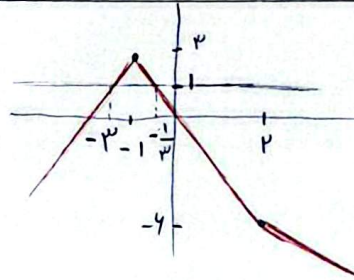
بـ)

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



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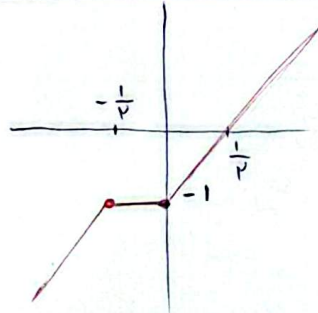
$$\begin{cases} -x-2 & x > 2 \\ -3x & -1 < x < 2 \\ x+2 & x \leq -1 \end{cases}$$



$$R = (-3, -\frac{1}{3})$$

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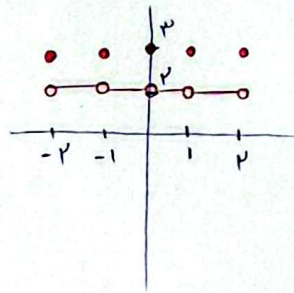
$$\begin{cases} 2x-1 & x > 0 \\ -1 & -\frac{1}{2} < x < 0 \\ x+1 & x < -\frac{1}{2} \end{cases}$$



$$R_f = \mathbb{R}$$

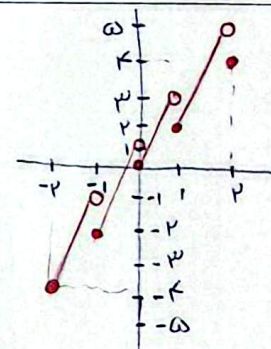
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$$\text{الف) } y = \begin{cases} 2 & x \in \mathbb{Z} \\ 1 & x \notin \mathbb{Z} \end{cases}$$



$$R_f = \{1, 2\}$$

$$\begin{aligned} \Rightarrow & \begin{cases} 2x-1 & x > 2 \\ 2x-1 & 1 < x < 2 \\ 2x & 0 < x < 1 \\ 2x+1 & -1 < x < 0 \\ 2x+1 & x < -1 \end{cases} \end{aligned}$$



$$R_f = [-1, +\infty)$$

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$$\text{الف) } \sin x \begin{cases} \frac{1}{2} & x > 2 \\ \frac{1}{2} & x < 2 \end{cases}$$

$$R_f = [1, 3]$$

$$\Rightarrow \sin x \begin{cases} \frac{1}{2} & x > 2 \\ \frac{1}{2} & x < 2 \end{cases}$$

$$R_f = [1, 3]$$

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