

الف: $y|x| - 2y = |x| + 1$

$y|x| - |x| = 2y + 1$

$|x|(y-1) = 2y+1$

$|x| = \frac{2y+1}{y-1}$ معاودة

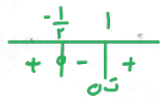
$x = \pm \frac{2y+1}{y-1}$

$R_f = \mathbb{R} \setminus \{1\}$

$\therefore \frac{x^2+1}{|x|} = |x| + \frac{1}{|x|}$

$|x| = +$

$R_f = [2, +\infty)$



صفحه آخر...

$yx + 3y = x^2 + 2x - 2$

$x^2 + x(2-y) - 2 - 3y = 0$

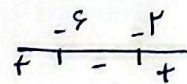
$\Delta \geq 0$

$(2-y)^2 - 4(-2-3y) \geq 0$

$y^2 + 4 - 4y + 8 + 12y \geq 0$

$y^2 + 8y + 12 \geq 0$

$(y+2)(y+6) \geq 0$



$R_f = \mathbb{R} - (-6, -2)$

$x^2 - x + 1 \neq 0$

$\Delta < 0$ ✓

این ازاد همه مقادیر

$R_f = \mathbb{R}$ ✓

$\Delta \geq 0$

$x = \frac{1-y \pm \sqrt{\Delta}}{2-2y}$

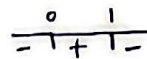
$2-2y \neq 0$
 $y \neq 1$ ✓

$yx^2 - yx + y = x^2 - x + \frac{1}{x}$

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

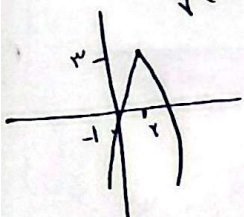
$y^2 + 1 - 2y + 4y - 4y^2 - 1 + y = -3y^2 + 3y \geq 0$

$3y(1-y) \geq 0$



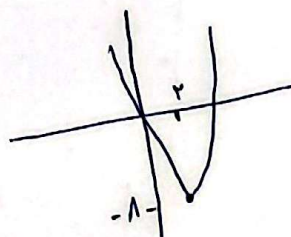
$R_f = [0, 1)$

الف: $\sqrt{(-\infty, 3]} = [0, \sqrt{3}]$



$R_f = [0, \sqrt{3}]$

$\therefore$



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

$\sqrt{[-1, +\infty)} = [-2, +\infty)$

الف: $x^3 - x + 1 \rightarrow \mathbb{R}$

$x^3 - x + 1 \in \mathbb{R}$
بر مبنای 10

$R_f = \mathbb{R}$ ✓

$\therefore y = \frac{x^2+1}{x}$

$x^2+1 = yx$

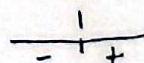
$x^2 - yx + 1 = 0$

$x = \frac{y \pm \sqrt{\Delta}}{1}$

$\Delta \geq 0$

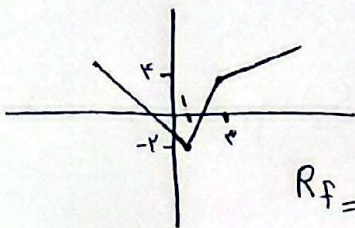
$4y^2 - 4 \geq 0$

$4y^2 \geq 4$



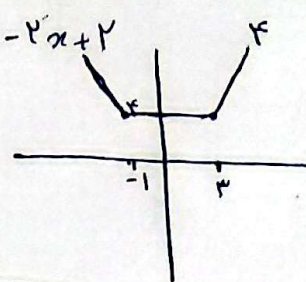
$R_f = [1, +\infty)$

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



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

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

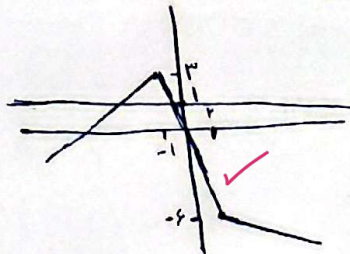


$$R_f = [2, +\infty)$$

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

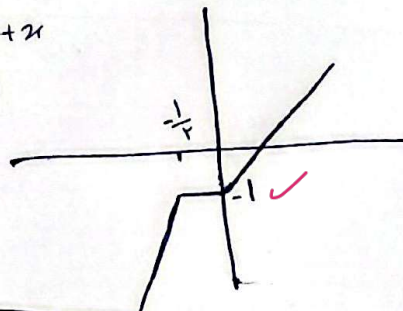
$$\begin{aligned} -2x &= 1 \\ x &= -\frac{1}{2} \end{aligned}$$

$$\begin{aligned} x+2 &= 1 \\ x &= -1 \end{aligned}$$



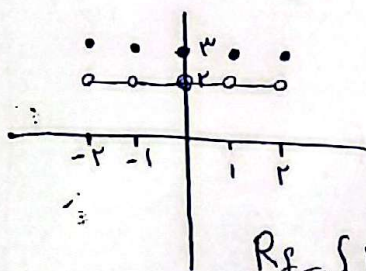
$$\text{الف: } \rightarrow \mathbb{R} - (-\frac{1}{2}, -\frac{1}{3})$$

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



$$R_f = \mathbb{R}$$

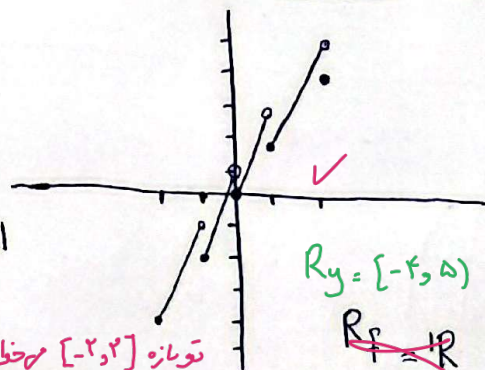
الف: $[x] + [-x] + 3$



$$R_f = \{3\}$$

ب:
$$\begin{aligned} [-2, -1) &\rightarrow x+2 \\ [-1, 0) &\rightarrow x+1 \\ [0, 1) &\rightarrow x \\ [1, 2) &\rightarrow x-1 \\ \{2\} &\rightarrow 2 \end{aligned}$$

توبانه $[-2, 2]$ مخطیتم



$$R_g = [-2, \infty)$$

$$R_f = \mathbb{R}$$

$\sin x$

$$\begin{aligned} 1 &\rightarrow 1-1+1=1 \\ -1 &\rightarrow 1+1+1=3 \\ \frac{1}{2} &\rightarrow \frac{1}{2}-\frac{1}{2}+1=\frac{3}{2} \end{aligned}$$

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

$\sin^2 x$

$$\begin{aligned} 0 &\rightarrow 0+0+1=1 \\ 1 &\rightarrow 1+1+1=3 \\ \frac{1}{2} &\rightarrow \frac{1}{2} \end{aligned}$$

$$R_f = [1, 3]$$

$$\text{الف) } \square = |x| \rightarrow \begin{cases} |x| = 0 \rightarrow y = \frac{-1}{2} \\ |x| = +\infty \rightarrow y = 1 \end{cases} \xrightarrow[\text{مفردش}]{\text{محدود و متوحد}} R_y = (-\infty, \frac{-1}{2}] \cup (1, +\infty) - 1$$