

الف) $y = x^3 - 3x^2 + 3x$

$R_f = \mathbb{R}$

$y = \frac{x^2 - 2x}{x^2 - 2x}$ $\left\{ \begin{array}{l} E_y(y+1) \geq 1 \\ E_y^2 + E_y \geq 0 \end{array} \right.$
 $y(x^2) - 2xy = 1$
 $2(x^2) - 2xy - 1 = 0 \rightarrow (2y)^2 - 4xy - 1 = 0$

الف) $y = x^2 - 4x + 6$

$\rightarrow C - \frac{b^2}{4a} \rightarrow 6 - \frac{16}{4} \rightarrow 2$ $R_f = [2, +\infty)$

ب) $y = -x^2 + 4x + 3$

$C - \frac{b^2}{4a} \rightarrow 3 - \frac{16}{-4} \rightarrow 11$ $R_f = (-\infty, 11]$

ج) $y = \sqrt{x^2 - 4x - 3}$ $R_f = [0, +\infty)$

$C - \frac{b^2}{4a} \rightarrow -2 - \frac{16}{4} \rightarrow -7$ $R_f = [-7, +\infty)$

د) $y = \sqrt{4x - x^2}$

$C - \frac{b^2}{4a} \rightarrow -\frac{16}{-4} \rightarrow 4$ $R_f = [0, 4]$

الف) $y = 2x - 5x^2 + 2x + 1$

$R_f = \mathbb{R}$

ب) $y = x^5 - 4x^4 + 3x + 1$

$R_f = \mathbb{R}$

ج) $y = \sqrt{x^5 - 4x^4 + 5x + 1}$

$R_f = [0, +\infty)$

د) $y = (x^5 - 4x^4 + 3x + 1)^2$

$R_f = [0, +\infty)$

الف) $y = \frac{3x+1}{x-2}$

$R_f = \mathbb{R} - \{2\}$

ب) $y = \frac{2x+1}{x+1}$

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

الف) $y = \sqrt{\frac{2x+1}{x+1}}$

$\mathbb{R} - \{1\} \rightarrow [0, +\infty) - \{1\}$ R_f

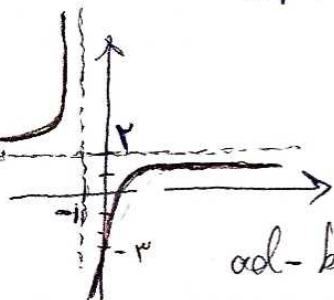
ب) $y = \sqrt{\frac{3x+1}{2-x}}$

$\mathbb{R} - \{2\} \rightarrow R_f = [0, +\infty) - \{1\}$

$\frac{3x+1}{2-x} \geq 0$ $\left\{ \begin{array}{l} 3x+1 \geq 0 \\ 2-x > 0 \end{array} \right.$

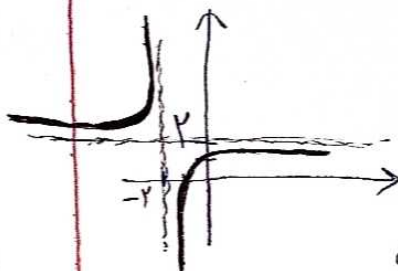
$\rightarrow x \geq -\frac{1}{3}$ $\rightarrow \frac{1}{2} \rightarrow$ در این صورت

$$\text{الف) } y = \frac{2x-3}{x+1}$$



ad-be < 0 → 8x < 0

$$\text{ب) } y = \frac{2x-1}{x+2}$$



ad-be < 0 → 8x < 0

$$\text{الف) } y = \sin x + \frac{1}{\sin x}$$

$$R_f = (-\infty, -2] \cup [2, +\infty)$$

$$\text{ب) } y = \frac{x^4+1}{x^3}$$

$$R_f = (-\infty, -1] \cup [1, +\infty)$$

$$\text{ج) } y = \frac{\sqrt[3]{x^2+1}}{\sqrt[3]{x}}$$

$$R_f = (-\infty, -1] \cup [1, +\infty)$$

$$\text{د) } y = \sqrt{x} + \frac{1}{\sqrt{x}}$$

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

$$\text{الف) } y = x^2 + \frac{1}{x^2+3} - 3$$

ad-be < 0

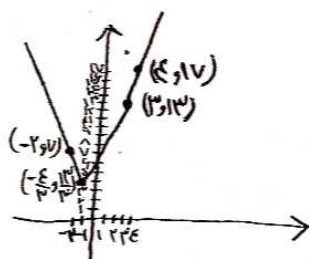
$$R_f = \left[\frac{1}{3}, +\infty\right)$$

$$\text{ب) } y = \frac{x^2+5}{\sqrt{x^2+5}}$$

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

$$y = |x-3| + |3x+5|$$

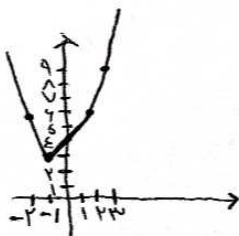
	$-\frac{5}{3}$	3	
$y = x-3 + 3x+5 $	$ x+3 + 3x+5 $	$ x-3 + 3x+5 $	$ x-3 + 3x+5 $
	$-5x-1$	$2x+8$	$4x+2$



$$R_f = \left[\frac{10}{3}, +\infty\right)$$

$$\text{الف) } y = |x^2| + |2x+1|$$

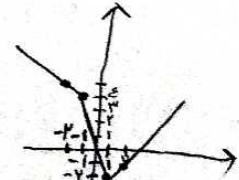
	-1	0	
$y = x^2 + 2x+1 $	$ x^2 + 2x+1 $	$ x^2 + 2x+1 $	$ x^2 + 2x+1 $
	$-x^2-2x-1$	x^2+2x+1	x^2+2x+1



$$R_f = [0, +\infty)$$

$$\text{ب) } y = |2x-1| - |x+1|$$

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



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