

$$\left. \begin{aligned} x \Rightarrow f(-x) - x f(x) &= x|x| + 1 \\ -x \Rightarrow f(x) + x f(-x) &= x|x| + 1 \end{aligned} \right\} \Rightarrow f(x) + x f(x) = -f(-x) - x f(-x)$$

$$f(x)(1+x) = -f(-x)(1+x) \Rightarrow f(x) = -f(-x) \Rightarrow \text{دالة فردية}$$

$$-f(x) - x f(x) = -f(x)(1+x) = x|x| + 1$$

$$f(x) = \frac{x|x| + 1}{-x - 1}$$

$$f(0) + f(0) = 9$$

$$f(0) = 14$$

$$f(x) = x^2 - 14x + 4 - 14$$

$$f(x) = x^2 - 14x + 10 \Rightarrow$$

$$f(x^2) = x^4 - 14x^2 + 10$$

$$y x - y = x^2 + x + 2 \quad x^2 + (1-y)x + 2+y = 0 \quad -14$$

$$\Delta \geq 0 \Rightarrow$$

$$(1-y)^2 - 4(2+y) \geq 0$$

$$y^2 - 4y - 8y - 1 + 1 \geq 0$$

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

$$(y-4)(y+3) \geq 0$$

$$\begin{array}{c} -1 \quad 4 \\ + \quad - \quad + \end{array}$$

$$R_f = (-\infty, -1] \cup [4, +\infty)$$

- ε

$$x_{ex} = \frac{+w}{\varepsilon}$$

$$x \times \frac{r\omega}{\lambda} - \frac{r\omega}{\varepsilon} + 1 = \frac{-r\omega}{\lambda} + 1 = \frac{-1v}{\lambda} \Rightarrow$$

(الف)

$$R_f = [-\frac{1v}{\lambda}, +\infty)$$

$$\frac{-9}{-r} = v$$

$$-9 + 11 - w = \varepsilon$$

$$\sqrt{(-\infty, \varepsilon]} \Rightarrow$$

(ب)

$$R_f = [0, r]$$

(ج)

$$x^v \times x^r \Rightarrow R_f = \mathbb{R}$$

$$\sqrt{-\infty, +\infty} \Rightarrow$$

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

$$a^v - 4x^r + vx + \varepsilon \Rightarrow R_f = \mathbb{R}$$

(د)

IR^k

$$\log(\mathbb{R}) \Rightarrow \mathbb{R} \Rightarrow \boxed{R_f = \mathbb{R}}$$

dn

د.د.

Alavi

مسئله با روش بیل زدن

الف

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

$$R_f = \mathbb{R} - \left\{ \frac{3}{2} \right\}$$

$$x \neq \sqrt{\frac{+2y+1}{y-3}} \Rightarrow \sqrt{R} = \sqrt{\mathbb{R} - \left\{ \frac{3}{2} \right\}} \xrightarrow{\sqrt{\quad}} [0, +\infty) - \left\{ \frac{3}{2} \right\}$$

$$\frac{x^2+3}{\sqrt{x^2+3}} + \frac{1}{\sqrt{x^2+3}} = \sqrt{x^2+3} + \frac{1}{\sqrt{x^2+3}} \Rightarrow$$

$$x=0 \Rightarrow \sqrt{3} + \frac{1}{\sqrt{3}}$$

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

$$\varepsilon \sqrt{3}$$

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

مکتبین $x^2 = 0$

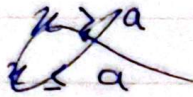
عکسین $x^2 = 0$

۱) $\varepsilon + \frac{1}{\varepsilon} - \varepsilon = \frac{1}{\varepsilon}$

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

dotnote

Asad



۶- الف) بیل زدن

$$x^2 + \frac{y + \varepsilon}{y - 3} \Rightarrow$$

$$\frac{-\varepsilon}{0 - 3} = \frac{3}{0 + 1} \Rightarrow R_f = (-\infty, -\varepsilon] \cup (3, +\infty)$$

$$R_f = (-\infty, -\varepsilon] \cup (3, +\infty)$$

ب) $\square = x^2 \xrightarrow{\max} +\infty \Rightarrow y = \frac{3x^2}{3x} = 3$
 $\xrightarrow{\min} 0 \Rightarrow y = \frac{0 + \varepsilon}{0 - 1} = -\varepsilon$

$x^2 - 1 \Rightarrow$ صفری شود $\Rightarrow (-\infty, -\varepsilon] \cup (3, +\infty)$

$$\delta_{\min} = -\frac{-3y - \varepsilon}{y - 3} = \frac{3y + \varepsilon}{y - 3} \quad \text{راه خوب}$$

$\delta_{\min} \xrightarrow{\max} 1 \Rightarrow y = \frac{3 + \varepsilon}{1 - 3} = \frac{\varepsilon}{-2} = -\frac{\varepsilon}{2}$

$\xrightarrow{\min} -1 \Rightarrow y = \frac{\varepsilon - 3}{-1 - 3} = \frac{3 - \varepsilon}{-4} = -\frac{3 - \varepsilon}{4}$

$\delta_{\min} = 3 \Rightarrow$ صفری شود $\Rightarrow R_f = [-3, -\frac{1}{2}]$

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

$$x = \frac{-1}{\epsilon y - r} \Rightarrow R_f = \sqrt{1 - \left\{ \frac{r}{\epsilon} \right\}} \Rightarrow \sqrt{\quad}$$

$$\text{كل } x \Rightarrow R_f = [0, +\infty) - \left\{ \frac{\epsilon}{r} \right\}$$

$$\sqrt{\frac{9x-1}{x-1}} = \sqrt{\frac{9(x-r)}{\epsilon(x-r)}} = \sqrt{\frac{9}{\epsilon}} = \frac{r}{y} \Rightarrow$$

$$R_f = \left\{ \frac{r}{y} \right\}$$

$$x/|x| - rx = x(|x| - r) \quad -9$$

$$\left[\begin{array}{l} x > 0 \\ x < 0 \end{array} \right. \quad x^r - rx \Rightarrow x_{\min} = \frac{r}{r} = 1 \Rightarrow y = 1 - r = -1 \Rightarrow R_f = [-1, +\infty) \textcircled{1}$$

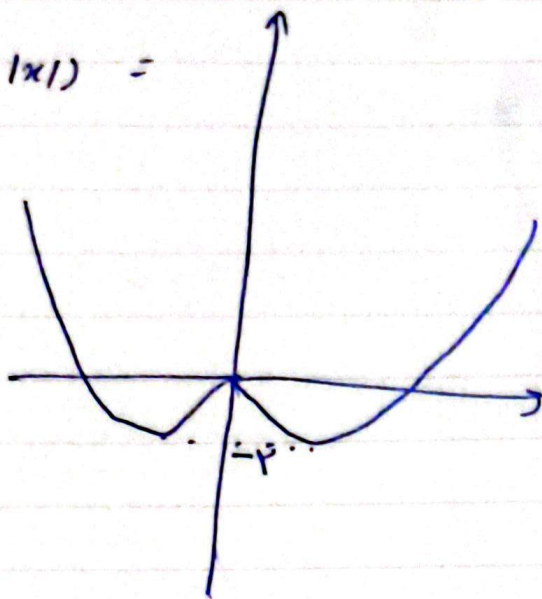
$$-x^r - rx \Rightarrow x_{\max} = \frac{r}{-r} = -1$$

$$-1 + r = 1 \Rightarrow R_f = (-\infty, -1] \textcircled{2}$$

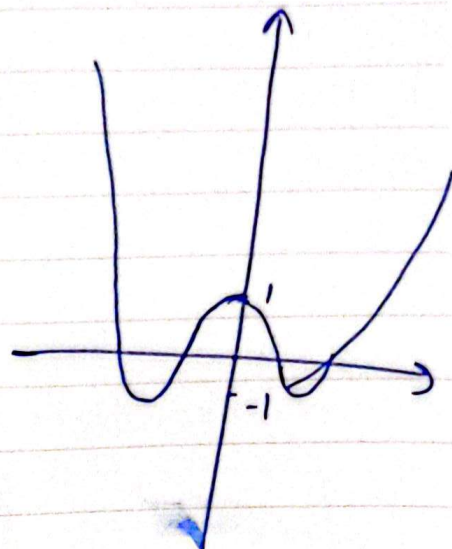
$$\textcircled{1} \cap \textcircled{2} = (-\infty, +\infty) = \mathbb{R}$$

10 - $f(x) = f(x)$ چون قریب است ϵ δ بقدری

$$f(x) =$$



$$f(x) + 1 =$$



$$y = |f(x) + 1| =$$

