

أ) $f(x) = (x+1)^2 + (3x-1)^2 + mx^2 + nx + mn \rightarrow f(x) = -3x$

$g(x) = \{(x, m)(n, p+1)(p+2, -1)(-9, p+k)\}$

$x^2 + 2x + 1 + 9x^2 - 4x + 1 + mx^2 + nx + mn = (1+m)x^2 + (2+n)x + 2+mn$

$mn = -8$

$m = -1$

$n = 8$

$g(x) = \{(x, -1)(8, p+1)(p+2, -1)(-9, p+k)\}$

$m+n+p+k = -5$

$-1 = p+1 \rightarrow p = -2$

$-2+k = -1 \rightarrow k = 1$

ب) $y = \sqrt{\frac{x-2}{x^2-2x-1}}$

$x' = t$

$\frac{x-2}{x^2-2x-1} \geq 0$

$\frac{-2}{-1} + \frac{2}{1} = 0$

$D = (-2, +\infty) - \{+1\}$

$t = \pm 1$
 $x = \pm 2$

ج) $f(x) = \frac{2x^2+1}{x^2-2x}$

$x^2-2x \neq 0 \rightarrow x \neq 0, x \neq 2$

$D_f = \mathbb{R} - (-2, -1]$

$-2 < x < 2$
 $-1 \geq x \geq 2$

د) $f(x) = \frac{\sqrt{x(x^2-1)}}{\sqrt{|x|+x}}$

$x(x^2-1) \geq 0$

$\frac{-1}{-1} + \frac{1}{1} = 0$

$[-1, 0] \cup [1, +\infty)$

$|x| > -x \rightarrow (0, +\infty)$

$D_f = \text{①} \cap \text{②} = [1, +\infty)$

هـ) $f(x) = \frac{\sqrt{|x-2|-x^2}}{|x|-1}$

$|x| \neq 1$
 $x \neq \pm 1$

$|x-2| \geq x^2$

$x-2 \geq x^2$
 $x-2 \leq -x^2$

$D_f = \text{①} \cap \text{②} = [-2, 1] - \{\pm 1\}$

$x^2+x-2 \leq 0$

$(x+2)(x-1) \leq 0$
 $[-2, 1]$

$\frac{-2}{-1} + \frac{1}{1} = 0$

فصل اول - دوازدهم فصل ریاضی شریف

$$|x-2|-1 \neq k$$

$$D = R - \{k\}$$

$$|x-2|-1 \neq k$$

$$|x-2|-1 \neq k+1$$

$$|x-2| \neq k+1$$

$$x-2 \neq k+1$$

$$x \neq k+3$$

$$|x-2|-1 \neq -k$$

$$x-2 \neq -k-1$$

$$x \neq 1-k$$

$$|x-2| \neq -k+1$$

$$x-2 \neq -k+1$$

$$x \neq k-1$$

$$x-2 = k+1 \Rightarrow k = -1$$

$$x-2 = -k+1 \Rightarrow k = 1$$

$$x-2 = -k+1 \Rightarrow k = 1 \Rightarrow 3 > 0 > 2 \Rightarrow k = 1$$

$$y = 2x - [x]$$

$$[-2, 2]$$

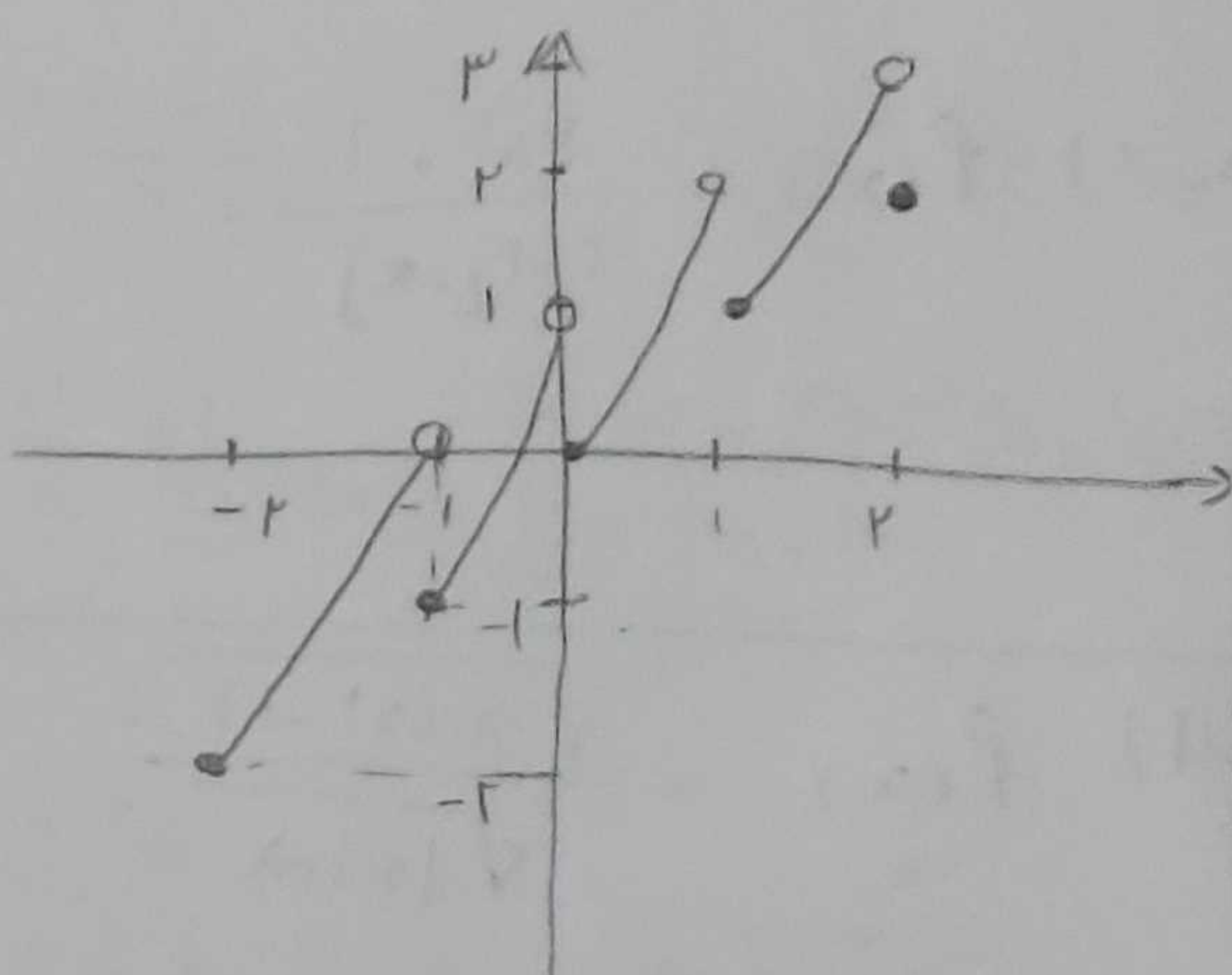
$$[-2, -1) \rightarrow [x] = -2 \rightarrow y = 2x + 2$$

$$[-1, 0) \rightarrow [x] = -1 \rightarrow y = 2x + 1$$

$$[0, 1) \rightarrow [x] = 0 \rightarrow y = 2x$$

$$[1, 2) \rightarrow [x] = 1 \rightarrow y = 2x - 1$$

$$\{2\} \rightarrow [x] = 2 \rightarrow y = 2$$



$$f(x) = \frac{x^2 - \varepsilon x + 3}{n+a} + b \rightarrow 0 \rightarrow f(x) = x \rightarrow \frac{x^2 - \varepsilon x + 3}{n+a} + b = x$$

$$\frac{x^2 - \varepsilon x + 3 + b(n+a)}{n+a} = x \rightarrow x^2 + (b-\varepsilon)x + ab+3 = x^2 + ax$$

$$(b-\varepsilon)x = ax \rightarrow b-\varepsilon = a \rightarrow (b-\varepsilon)b \rightarrow b^2 - \varepsilon b + 3 = 0$$

$$(b-1)(b-3) = 0$$

$$\text{if } b=1 \rightarrow a = -3$$

$$\text{if } b=3 \rightarrow a = -1$$

$$a-b \rightarrow -3-1 = -4 \rightarrow a-b = -4$$

$$-1-3 = -4$$

$$f(x) = \begin{cases} \frac{x^3 + 2x^2 - x - 2}{x^2 - 1} & x \neq \pm 1 \\ \frac{ax + 2}{x + b} & x = \pm 1 \end{cases} \quad g(x) = x + c$$

$$b + c = 9$$

$$x^3 + 2x^2 - x - 2 \xrightarrow{x=1} 0$$

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

$$\begin{array}{r} 3x^2 - x - 2 \\ -3x^2 + 3x \\ \hline 2x - 2 \\ -2x + 2 \\ \hline 0 \end{array}$$

$$\frac{(x-1)(x+1)(x+2)}{(x+1)(x-1)} = x + c$$

$$x + 2 = x + c \rightarrow c = 2$$

$$\frac{ax + 2}{x + b} \xrightarrow{x=1} \frac{a + 2}{b + 1} = 3$$

$$x = -1 \rightarrow g(x) = 1 \quad \frac{ax + 2}{x + b} \xrightarrow{x=-1} \frac{-a + 2}{b - 1} = 1$$

$$a + 2 = 3b + 3$$

$$a = 3b + 1$$

$$a + b = 3 \leftarrow 2a = b - 1 \leftarrow \frac{2-a}{b-1} = 1$$

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

$$-a + 3b = -1 \rightarrow b = \frac{1}{2}$$

$$b + c = 2 + \frac{1}{2} = \frac{5}{2} \rightarrow \frac{5}{2}$$

$$f(x) = \sqrt{\epsilon x - \frac{1}{\epsilon} a} + k - 1$$

$$g(x) = \sqrt{b - \epsilon x} + \frac{1}{\epsilon} k$$

$$f = g \{ (1, k) \}$$

$$\frac{1}{\epsilon} a - \frac{b}{\epsilon} - k = 2$$

$$Dg = b - \epsilon x \geq 0 \rightarrow \frac{b}{\epsilon} \geq x$$

$$Df = \epsilon x - \frac{1}{\epsilon} a \geq 0 \rightarrow x \geq \frac{1}{\epsilon} a$$

$$Df \cap Dg = \{1\}$$

$$\frac{1}{\epsilon} a = 1 \rightarrow a = \epsilon$$

$$\frac{b}{\epsilon} = 1 \rightarrow b = \epsilon$$

$$-2 = \frac{1}{\epsilon} k \rightarrow k = -2\epsilon$$

$$f = g = \sqrt{\epsilon x - \frac{1}{\epsilon} a} + k - 1 = \sqrt{\epsilon x - \epsilon} - 2\epsilon - 1 = \sqrt{\epsilon(x-1)} - 2\epsilon - 1$$

$$\frac{1}{\epsilon} a - \frac{b}{\epsilon} - k =$$

$$\frac{1}{\epsilon} (\epsilon) - \frac{\epsilon}{\epsilon} - (-2\epsilon) = 2\epsilon$$

$$f(x) = \sqrt{m-x} + x$$

$$g(x) = \sqrt{2x+2}$$

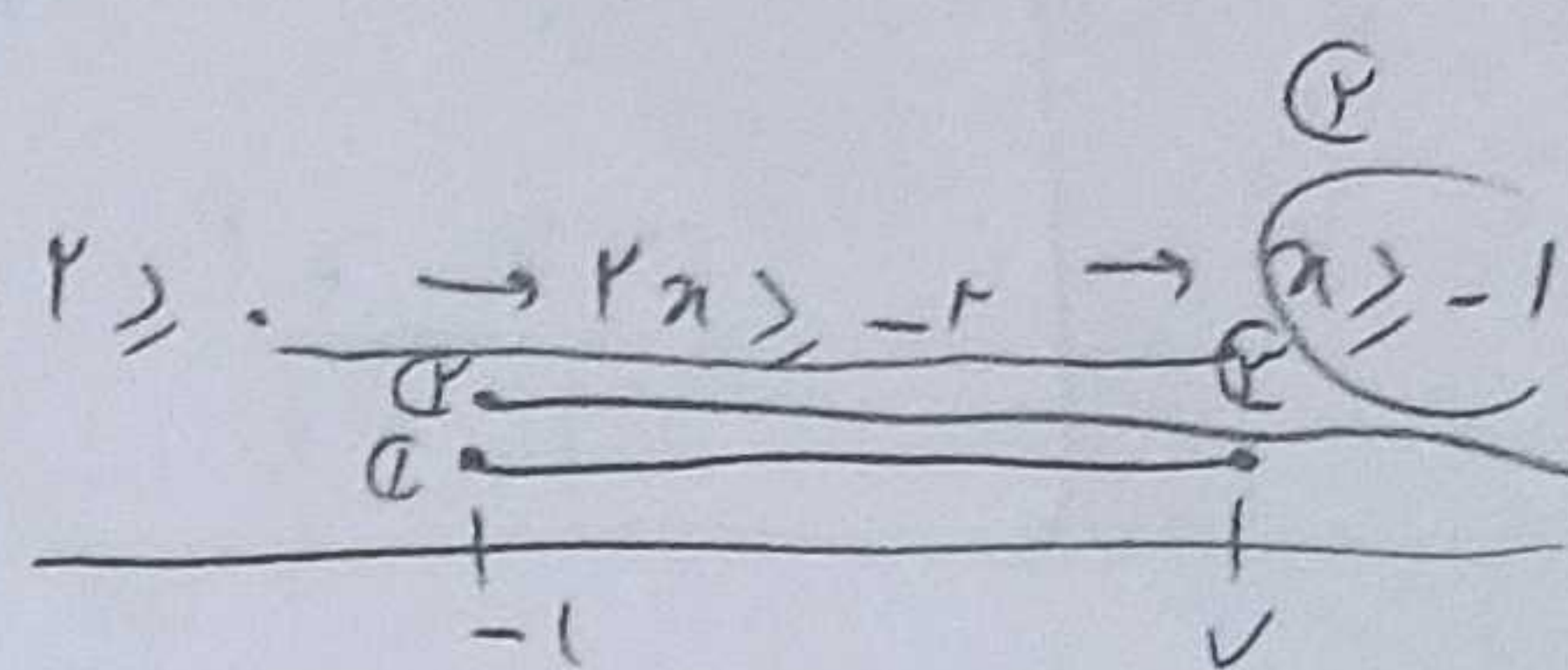
$$D_{f \times g} = [-1, 5]$$

$$f - g(x) = 4\sqrt{2}$$

$$m+n=9$$

$$D_{f \cdot g} = [-1, 5] = D_g \cap D_f$$

$$D_g = 2x+2 \geq 0 \rightarrow 2x \geq -2 \rightarrow x \geq -1$$



$$D_f = (-\infty, 5] \rightarrow m-x \geq 0 \rightarrow m \geq x \rightarrow m=5$$

$$f(x) - g(x) = 4\sqrt{2}$$

$$\sqrt{5-x} + x - \sqrt{2x+2} = 4\sqrt{2}$$

$$n = \sqrt{2x+2} - 2 \quad m+n = \sqrt{2x+2} - 2 + 5 = \sqrt{2x+2} + 3$$

$$y = (-1)^x (x - [x]) = \frac{1}{x}$$

$$[-2, 2]$$

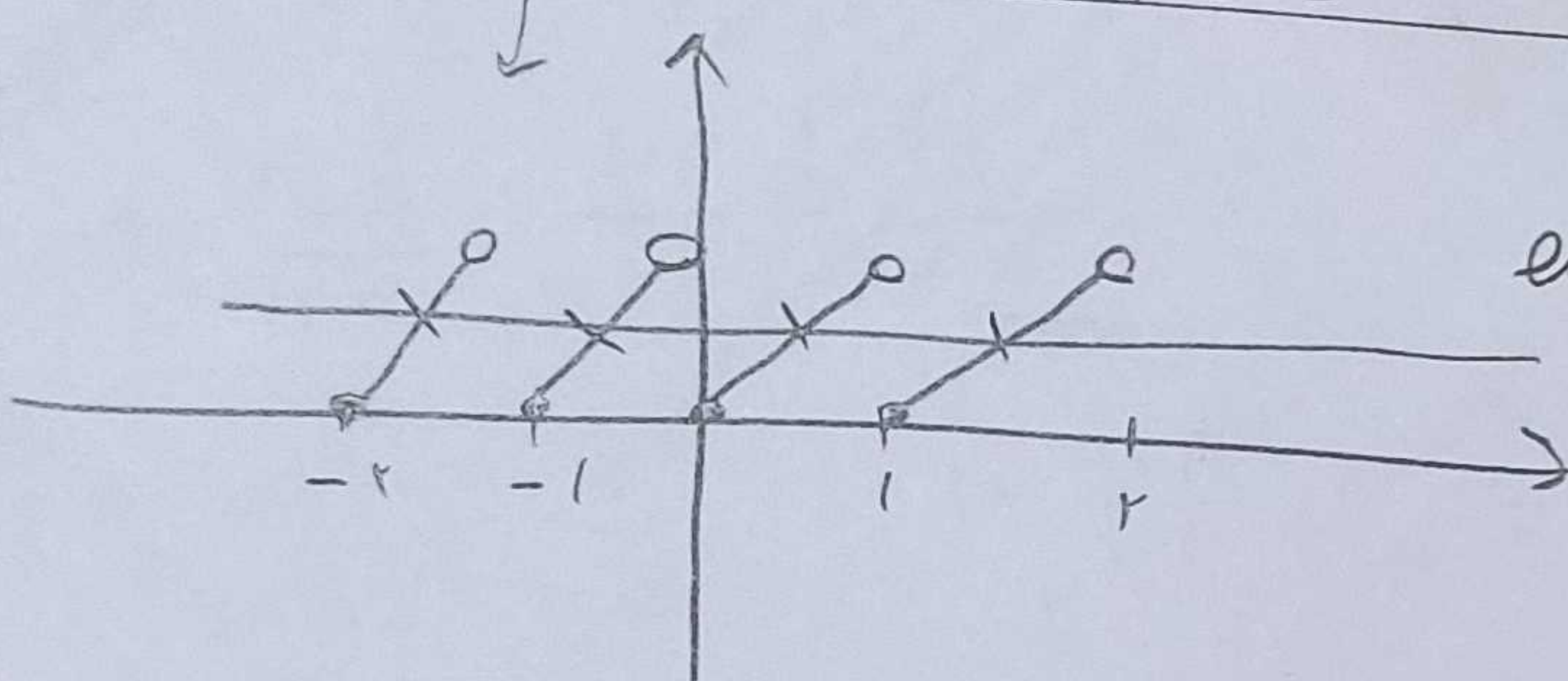
$$-2 \leq x < -1 \rightarrow x+2 = \frac{1}{x} \rightarrow x = \frac{3}{x} \checkmark$$

$$-1 \leq x < 0 \rightarrow x+1 = \frac{1}{x} \rightarrow x = \frac{1}{x} \checkmark$$

$$0 \leq x < 1 \rightarrow x = \frac{1}{x} \checkmark$$

$$1 \leq x < 2 \rightarrow x-1 = \frac{1}{x} \rightarrow x = \frac{3}{x} \checkmark$$

$$x=2 \rightarrow x-2 = \frac{1}{x} \rightarrow x = \frac{1}{x} \checkmark$$



حل مسئله