

"نزهة الابرار" "نزهة الابرار" "نزهة الابرار"

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

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

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

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

$$x = 2$$

$$\Delta < 0$$

$$x^2 - 2x = 0$$

$$x = 2 \checkmark$$

$$\left| \frac{x-1}{x} \right| < 2$$

$$|x-1| < 2|x|$$

$$(x-1)^2 < 4x^2$$

$$x^2 - 2x + 1 < 4x^2$$

$$-3x + 1 < 0$$

$$x > \frac{1}{3} \quad x \neq 0$$

$$-1 \left| \frac{x-1}{x+1} \right| < 1$$

$$|x-1| < |x+1|$$

$$(x-1)^2 < (x+1)^2$$

$$x^2 - 2x + 1 < x^2 + 2x + 1$$

$$-4x < 0 \quad x > 0$$

$$x+1=0 \rightarrow x = -1$$

$$x \in (-1, 0) \cup (0, 1)$$

$$|x-a| < b \Rightarrow$$

$$x+4 > x^2 \rightarrow x^2 - x - 4 < 0 \Rightarrow x \in (-2, 2)$$

$$x+4 < -x^2 \rightarrow x^2 + x + 4 < 0 \Rightarrow \Delta < 0 \rightarrow \text{no solution}$$

$$-1 < x < 1 \Rightarrow -\frac{1}{2} < x - \frac{1}{2} < \frac{1}{2} \Rightarrow |x - \frac{1}{2}| < \frac{1}{2} \Rightarrow x \in (0, 1)$$

$$x < -1$$

$$y = |x+1| - |x| + |x-1| \quad \min, \max$$

$$y = (x+1) + x - (x-1) = 1 \quad x = -1 \Rightarrow y = 2$$

$$-1 < x < 0 \rightarrow y = (x+1) + x - (x-1) = x+2 \quad x=0 \rightarrow y = 2$$

$$0 < x < 1 \rightarrow y = (x+1) - x - (x-1) = 2-x \quad x=1 \rightarrow y = 1$$

$$x > 1 \rightarrow y = (x+1) - x + (x-1) = x$$

$$\max + \min = 2 + 1 = 3$$

Date:

Subject:

$$y = \left| \frac{x}{r} \right| - 1 \rightarrow y = \left| \frac{x+\varepsilon}{r} \right| - 1 + 1 = \left| \frac{x+\varepsilon}{r} \right| - 1 \Rightarrow \left| \frac{x}{r} \right| - 1 \leq \left| \frac{x+\varepsilon}{r} \right| - 1$$

$$\left| \frac{x}{r} \right| \leq \left| \frac{x+\varepsilon}{r} \right| + 1 \Rightarrow |x| \leq |x+\varepsilon| + 1 \quad x \geq 0 \rightarrow x = x + \varepsilon + r \Rightarrow 0 \leq r x$$

$$-\varepsilon \leq x < 0 \rightarrow -x = x + \varepsilon + r \Rightarrow x \leq -r \quad x < -\varepsilon \rightarrow x = -(x + \varepsilon) + r \Rightarrow 0 \leq -r x$$

$$x \leq -r$$

$$\text{ii) } |1-x| - |x+\varepsilon| \rightarrow \begin{array}{ccc} -\varepsilon & 1 & \\ 1-x+x+\varepsilon & 1-x-x-\varepsilon & x-1-x-\varepsilon \\ -x-x & -x-x & -x-x \end{array}$$

$$R_1 = \{-0.5, -\varepsilon, -r, -1, 0, 1, r, \varepsilon, 0\} \quad R_2 = [-1, 0)$$

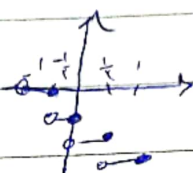
$$b = \frac{1}{x} - \left[1 + \frac{1}{x}\right] \rightarrow \frac{1}{x} - \left\lceil \frac{1}{x} \right\rceil - 1 \quad (x > 1)$$

$$\text{iii) } -1 < x \leq -\frac{1}{r} \rightarrow y = 1 - 1 = 0$$

$$-\frac{1}{r} < x \leq 0 \rightarrow y = 0 - 1 = -1$$

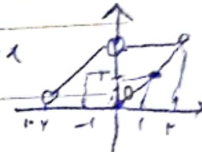
$$0 < x \leq \frac{1}{r} \rightarrow y = -1 - 1 = -2$$

$$\frac{1}{r} < x < 1 \rightarrow y = -x - 1 = -r$$



$$\text{iv) } -r < x < 0 \rightarrow y = x - r(-1) = x + r - r$$

$$0 \leq x < r \rightarrow y = x - r(-1) = x + r - r$$



$$\text{v) } x \leq -r \rightarrow y = 1$$

$$-r < x < -1 \rightarrow y = 0$$

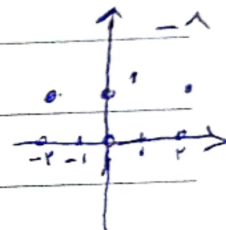
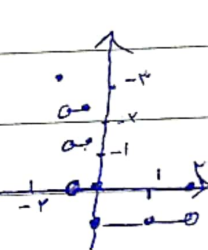
$$-1 < x < 0 \rightarrow y = 0$$

$$x \geq 0 \rightarrow y = 1$$

$$-r < x \leq 1 \rightarrow y = 0$$

$$1 \leq x < r \rightarrow y = 0$$

$$x \geq r \rightarrow y = 1$$



$$a + (b - \varepsilon) = \varepsilon, r$$

$$b - [a] = r, \varepsilon$$

$$b - (a - \varepsilon) = r, \varepsilon$$

$$a + [b] = \varepsilon, r \Rightarrow r b = r, \varepsilon + \varepsilon, r = \varepsilon, 1$$

$$a + b = 1/r + r, \varepsilon = \varepsilon, r$$

$$b = r, \varepsilon$$

$$a \leq 1/r$$

$$(1 + \sqrt{r})^q + (1 - \sqrt{r})^q \leq 198$$

$$(1 + \sqrt{r})^q = 198 - (1 - \sqrt{r})^q \Rightarrow -1 < 1 - \sqrt{r} < 0 \Rightarrow 0 < (1 - \sqrt{r})^q < 1$$

$$\left[(1 + \sqrt{r})^q \right] = \left[198 - 0 \dots \right] = 198$$

MAHAN