

$$\frac{|x|+1}{|x|-2} \xrightarrow{\text{مخرج}} |x|, \frac{y+1}{y-1} \rightarrow y \neq 1$$

$$\frac{y+1}{y-1} \geq 0 \quad \frac{-1 \quad 1}{+ \quad - \quad - \quad +}$$

$$y = \frac{x^* + y_a - r}{a + r} \rightarrow y a + r y = x^* + y_a - r \quad x^* + (r - y)a - r - r y$$

$$x_2 = \frac{-(r-y) \pm \sqrt{(r-y)^2 - r(-r-y)}}{r} \rightarrow (r-y)^2 - r(-r-y) \geq 0$$

$$y^T y + \varepsilon + 11y + 1 \geq 0 \quad y^T + 11y + 1 \geq 0 \quad (y+4)(y+4) \geq 0$$

$$f(a) = \underline{a^2 - a + \frac{1}{2}} \rightarrow f(a) = \underline{\left(a - \frac{1}{2}\right)^2} \quad \min\left(a - \frac{1}{2}\right)^2 = 0 \quad (3)$$

$$\frac{a^x - a + 1}{a^x - a + \frac{1}{\varepsilon} + \frac{\mu}{\varepsilon}} \quad (a - \frac{1}{\Gamma})^x + \frac{\mu}{\varepsilon} \quad \frac{R_F = [0, 1]}{+\infty} = 1$$

الف) $y = \sqrt{-x^2 + 6x - 1}$ $y' = -x + 3$ $2x = -\frac{6}{-1} = 6 \rightarrow y = -\frac{6}{-1} + 1 = 7$ $\frac{1}{\sqrt{e}}$ $\frac{1}{\sqrt{e}}$

$$R_{g_1} = (-\infty, 1] \quad R_{g_2} = \sqrt{(-\infty, 1]} \quad R_g = [0, \sqrt{1/2}]$$

$$b) y_z \xrightarrow{\text{Kar}-\Lambda a} y'_z \xrightarrow{\text{Kar}-\Lambda a} \text{as } z \xrightarrow{\frac{\Lambda}{\varepsilon}} z' \rightarrow y_s, \Lambda - 14z - \Lambda \quad R y'_z, [\Lambda, +\infty)$$

$$R_y, \sqrt[3]{-1, +\infty} \quad R_y, [-1, +\infty)$$

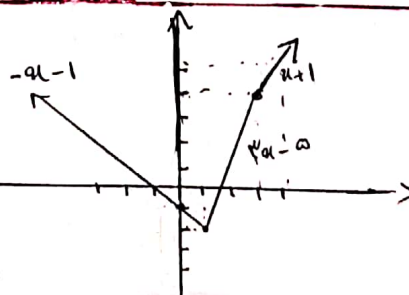
الف) $y = \log(a^x - a + 1)$ $y' = a^x - a + 1 \rightarrow \uparrow \parallel R_{y'} = \mathbb{R}$ (a)

$$R_y: \log R \quad R_y: (-\infty, +\infty)$$

$$\rightarrow g, \log\left(\frac{x^{p+1}}{a}\right) \quad g = \frac{x^p}{a} + \frac{1}{a} = a + \frac{1}{a} \sqrt{\frac{a^p}{x^p}} \quad y' \in [p, +\infty) \quad \overline{g} \overline{g}$$

$$D_y = \frac{u^2 + 1}{u} \xrightarrow{u \rightarrow 0} +\infty \quad R_y = \log_2 [r, +\infty) \quad R_y = [1, +\infty)$$

$$\text{iii) } y_2 \mid y_{\alpha-1} - |x-1| \mid -1 \mid -1 \left\{ \begin{array}{l} x > 1 \rightarrow x+1 \\ 1 < x < 1 \rightarrow x-1 \\ x < 1 \rightarrow -x-1 \end{array} \right.$$

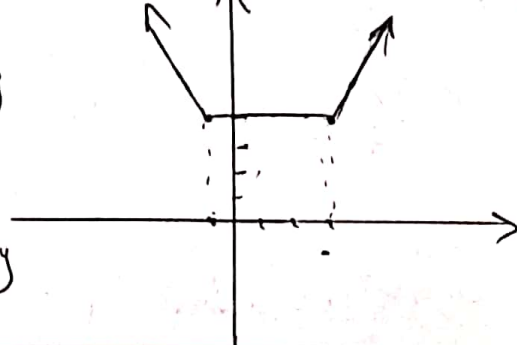


$$b) y = |x-3| + |x+1|$$

$$x-3=0 \rightarrow x=3 \rightarrow y=4$$

$$x+1=0 \rightarrow x=-1 \rightarrow y=4$$

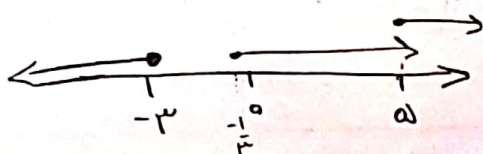
$$\begin{cases} x > 3 & y = x-3 \\ -1 < x < 3 & y = 4 \\ x < -1 & y = -x-1 \end{cases}$$



$$|x-3| - |x+1| \leq 1$$

$$x-3=0 \rightarrow x=3 \rightarrow y=-4$$

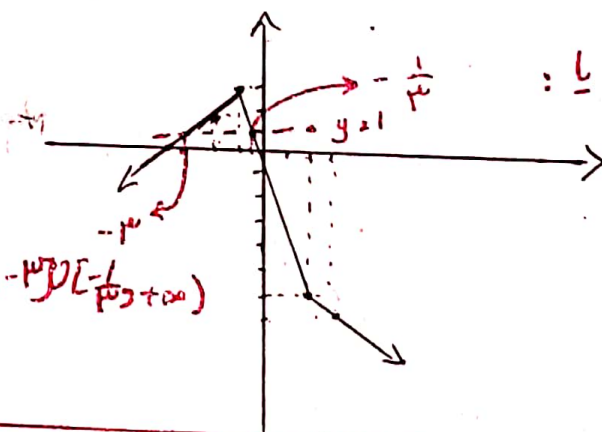
$$x+1=0 \rightarrow x=-1 \rightarrow y=4$$



$$x \in (-\infty, -1] \cup [5, +\infty)$$

$$f(x) = \begin{cases} x-3 & x > 3 \\ -1 & -1 < x \leq 3 \\ -x-1 & x < -1 \end{cases}$$

$$\begin{array}{c|c|c} \text{خارجی قدر مطلق} & \text{قریبی قدر مطلق} & \text{خارجی قدر مطلق} \\ \hline -1 & 3 & 5 \\ \hline -x+3 & -x+3-x-3 & x-3-x-3 \\ \hline x+3 & -x & -x-4 \\ \hline x+3 & -x & -x-4 \\ \hline x+3 & -x & -x-4 \\ \hline x+3 & -x & -x-4 \end{array}$$



$$x \in (-\infty, -1] \cup [5, +\infty)$$

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

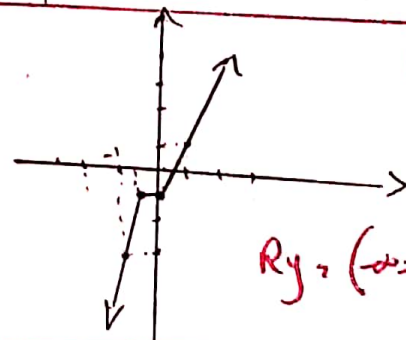
$$x+1=0 \rightarrow x=-1$$

$$x=0$$

$$-1$$

$$f(x) = \begin{cases} x-1 & x > 0 \\ -1 & -1 < x \leq 0 \\ -x-1 & x < -1 \end{cases}$$

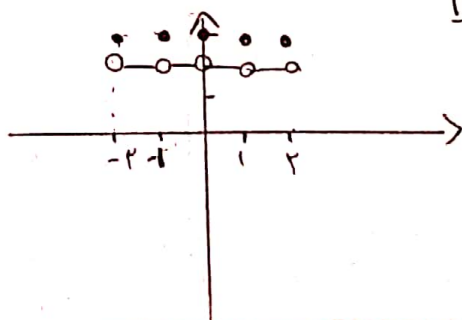
$$\begin{cases} x > 0 & y = x-1 \\ -1 & -1 < x \leq 0 \\ x < -1 & y = -x-1 \end{cases}$$



$$Ry = (-\infty, +\infty)$$

$$a) y = [x] + [x] = [x] + [-x] + 3 \quad \frac{x \in \mathbb{Z}}{0+3=3 \rightarrow x \in \{+1, +2, 0\}}$$

$$|x| \leq 1 \rightarrow -1 \leq x \leq 1 \rightarrow x \in (-1, 1) \cup (-1, 0) \cup (0, 1) \cup (1, 2)$$



$$b) y = \cos x - [x]$$

$$-x < -1 \rightarrow \cos x + 1$$

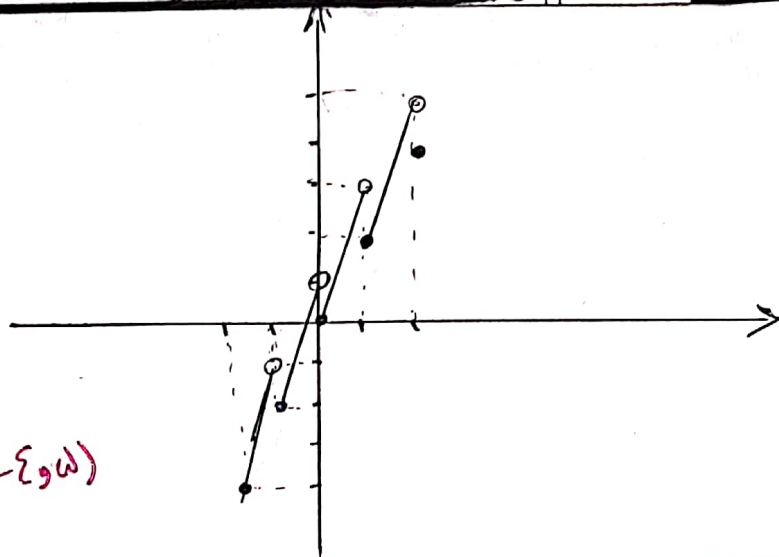
$$-1 < x < 0 \rightarrow \cos x + 1$$

$$0 < x < 1 \rightarrow \cos x$$

$$1 < x < 2 \rightarrow \cos x - 1$$

$$x \geq 2 \rightarrow 1$$

$$R_y = [-\varepsilon, \omega)$$



$$ii) \sin^x x - \sin x + 1$$

$$\sin x = -1 \rightarrow 1 + 1 + 1 = 3$$

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

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

$$R_y = \left[\frac{1}{x}, 3\right] \quad (10)$$

$$b) \sin^x x + \sin x + 1$$

$$\sin x = -1 \quad \text{GUE}$$

$$\sin x = 1 \rightarrow 1 + 1 + 1 = 3$$

$$\sin x = \frac{1}{x} \rightarrow \frac{1}{x} + \frac{1}{x} + 1 = 1$$

$$\sin x = 0 \rightarrow 0 + 1 + 1 = 2$$

$$R_y = [1, 3]$$