

$$f(x+1) + f(x+2) = 13x + f(3)$$

$$a(x+1) + b + a(x+2) + b = 13x + 13a + b$$

$$2ax + 13a + 2b = 13x + 13a + b$$

$$\Rightarrow a=1, b=0 \Rightarrow f(x)=x$$

$$y = \sqrt{x-x^2}$$

$$x_3 = -\frac{b}{2a} = -\frac{1}{2} \Rightarrow (-\infty, \frac{1}{2}] \Rightarrow R_y = [0, \frac{1}{2}]$$

$$f(x) = \frac{x^3 - 4x}{x+2} = \frac{x(x^2 - 4)}{x+2} = \frac{x(x-2)(x+2)}{x+2} = x(x-2)$$

$$R_{x^2-4x} = \frac{b}{4a} = 1 \Rightarrow [-1, +\infty) \Rightarrow c = -1$$

$$x^2 + 2x \neq 1 \Rightarrow x^2 + 2x - 1 \neq 0$$

$$\Rightarrow (x-2)(x+2) \neq 0 \Rightarrow x \neq 2$$

$$\Downarrow x \neq 2$$

$$D_f = \mathbb{R} - \{-2, 2\} \Rightarrow a = -2, b = 2$$

$$f\left(\frac{-2+2}{-2}\right) = f(-1) = 10$$

$$y = \sqrt[10]{x^{10} + ax^2 + bx - 1} = \sqrt[10]{(x-2)^{10}} = x-2$$

$$x^{10} - 2x^2 + 12x - 1 \quad D_f = [-9, 12]$$

$$\Rightarrow a = -2, b = 12$$

$$R_f = [-19, 10]$$

$$y_1 = \left(\frac{x+1}{1-x}\right)^{\frac{1}{2}} = -\frac{1}{2} + \frac{1}{2} \quad D_{y_1} = [-1, 1]$$

$$y_2 = \frac{ax^2-1}{x^2+b} \quad \begin{cases} x \rightarrow \infty \Rightarrow y_2 = \frac{a}{b} \\ x \rightarrow -\infty \Rightarrow y_2 = \frac{a}{b} \end{cases}$$

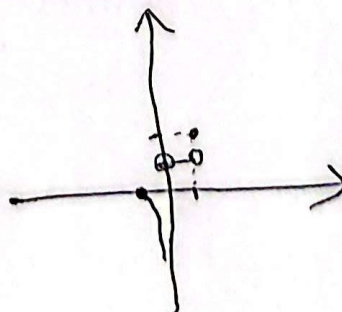
$$R_{y_2} = [-\frac{1}{b}, a]$$

$$\Rightarrow b=1, a=1$$

$$a+b=2$$

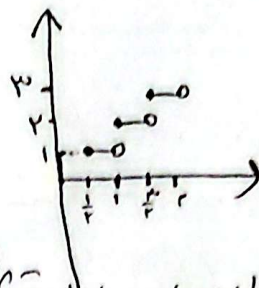
$$\frac{[x]}{x} + \frac{[x]}{x} \quad [-1, 1]$$

$$= \begin{cases} 2 & x=1 \\ 1 & 0 < x < 1 \\ -\frac{1}{x}-1 & -1 \leq x < 0 \end{cases}$$



$$y = [x] + \left[x + \frac{1}{p}\right] = [2x]$$

$$[2x] = \begin{cases} 1 & \frac{1}{p} \leq x < 1 \\ 2 & 1 \leq x < \frac{3}{p} \\ 3 & \frac{3}{p} \leq x < 2 \end{cases}$$



از نمودار خطی تشکیل شده

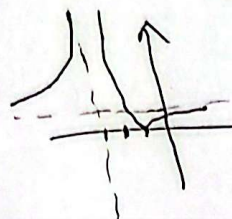
$$\left| \frac{x+1}{x+3} \right|$$

$(b, +\infty)$

با توجه به ویژگی‌های جدول واحد
 $y=1$ همان جانب افقی است

$$\frac{1}{a} = 1 \Rightarrow a = 1$$

$$\left| \frac{x+1}{x+3} \right|$$



$(-2, +\infty)$ $b = -2$

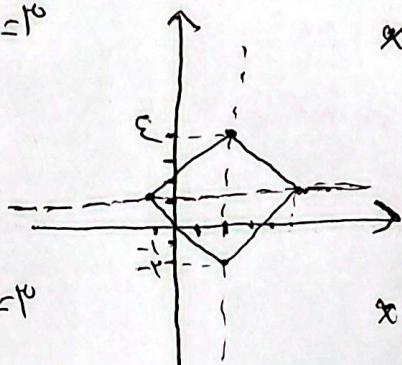
$$a - b = 1 + 2 = 3$$

$$|x-2| + |y-1| = 3$$

$$-x+2+y-1=3$$

$$y = x+2$$

$\Leftarrow$



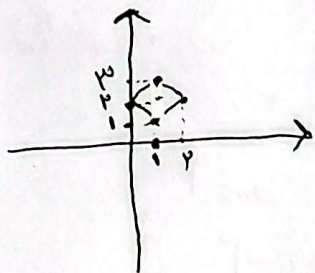
$$x-2+y-1=3 \Rightarrow y = -x+6$$

$$y = -x$$

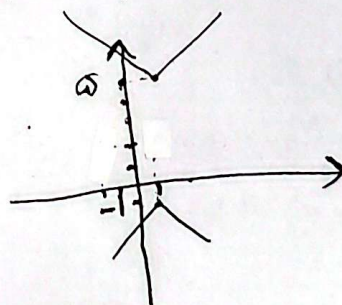
$$(-x+2-y+1=3)$$

$$x-2-y+1=3 \Rightarrow y = x-4$$

الف) $|x-1| + |y-2| = 1$



ب) $|x-1| - |y-2| = 3$
 $\Rightarrow |y-2| - |x-1| = 3$



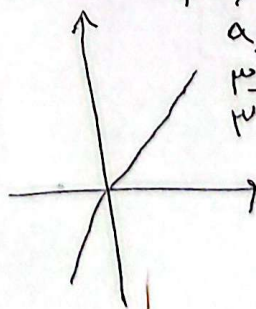
$$y = 3x + |ax + b|$$

با هر دو طرف مثبت است

$$\begin{aligned} 3+a &> 0 \\ a &> -3 \\ 3-a &> 0 \\ 3 &> a \end{aligned}$$

$$a \in (-3, 3)$$

$$\begin{aligned} &\frac{-b}{a} \\ (3-a)x - b &\quad (3+a)x + b \\ &\text{باید که کمتر باشد} \end{aligned}$$



II غیر 0 است
 $3a < 0$
 $a < 0$
 $3-a < 0$
 $3 < a$