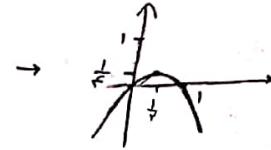


$$f(x(x+1)) + f(x(x+2)) = 3x + f(3) \rightarrow x=1 \Rightarrow f(2) + f(3) = 3 + f(3) \Rightarrow f(2) = 2$$

از آنجایی که تابع خطی است و همواره برقرار است پس $f(x) = x$ است

$$y = \sqrt{f(x) - x^2} \xrightarrow{f(x)=x} y = \sqrt{x - x^2} \rightarrow x - x^2 = x(1-x), \text{ ext } \left| \frac{-b}{2a} \right| = \frac{1}{2}$$



$$\rightarrow R = (-\infty, \frac{1}{2}] \quad \text{چون برای } x < 0 \text{ مقدار } y \text{ را نمی توانیم بدست آوریم} \quad R = [0, \frac{1}{2}]$$

$$f(x) = \frac{x^3 - 4x}{x+2} \quad \left\{ \begin{array}{l} x+2 \neq 0 \rightarrow x \neq -2 \rightarrow \boxed{\alpha \neq -2} \end{array} \right.$$

$$D_f = \mathbb{R} - \{\alpha, b\}$$

$$\boxed{b = 4} \leftarrow x+4, x \neq -2$$

$$R_f = [6, +\infty) - 1 \rightarrow \frac{x^3 - 4x}{x+2} \neq 1 \rightarrow \frac{x(x-2)(x+2)}{x+2} \Rightarrow x(x-2) \neq 1 \rightarrow x^2 - 2x - 1 \neq 0 \rightarrow (x-1)^2 \neq 0 \rightarrow x \neq 1$$

$$y = \frac{x^3 - 4x}{x+2} \rightarrow \frac{x(x-2)(x+2)}{x+2} = x(x-2) \rightarrow \text{ext } \left| \frac{-b}{2a} \right| = \frac{-2}{2} = -1 \rightarrow R_f = [-1, +\infty) - \{1\} \Rightarrow \boxed{C = -1}$$

$$\Rightarrow f\left(\frac{\alpha+b}{2}\right) = f\left(\frac{-2+4}{2}\right) = f(1) = \frac{-1+4}{1} = 3$$

$$y = \sqrt[3]{x^3 + ax^2 + bx - 1} \xrightarrow{\text{فرض کنیم } (x-2)^3 \text{ است}} y = \sqrt[3]{(x-2)^3} \Rightarrow (x-2)^3 = x^3 - 6x^2 + 12x - 1 \rightarrow \boxed{\alpha = -6}, \boxed{b = 12}$$

$$\Rightarrow D_f = [-6, 12]$$

$$\text{if } x = -6 \rightarrow y = \sqrt[3]{(-6-2)^3} = -8 - 2 = -10 \rightarrow \boxed{-10} \quad \left\{ \begin{array}{l} R_f = [-10, 10] \end{array} \right.$$

$$\text{if } x = 12 \rightarrow y = \sqrt[3]{(12-2)^3} = 10 - 2 = 8 \rightarrow \boxed{8}$$

$$y_1 = \left(\frac{x+1}{1-x}\right)^{\frac{1}{2}} = \sqrt{\frac{x+1}{1-x}} \xrightarrow{\text{فرض کنیم } (x-1)^2 \text{ است}} \sqrt{\frac{x+1}{1-x}} \rightarrow 1-x \neq 0 \rightarrow x \neq 1 \rightarrow D_f = \mathbb{R} - \{1\} \rightarrow R_f = \mathbb{R} - \{1\}$$

$$y_2 = \frac{ax^2-1}{x^2-b} \rightarrow x^2 = \frac{-by_2+1}{y_2-a} = \frac{by_2-1}{y_2-a} \rightarrow y_2-a \neq 0, y_2 \neq 1 \rightarrow \boxed{\alpha = 1} \rightarrow y_2 = \frac{x^2-1}{x^2-b}$$

$$\rightarrow y_2 \neq 1 \rightarrow \frac{x^2-1}{x^2-b} \neq 1 \rightarrow x^2-b \neq x^2-1 \rightarrow \boxed{b=1} \rightarrow \alpha+b=1+1=2 \rightarrow \boxed{2}$$

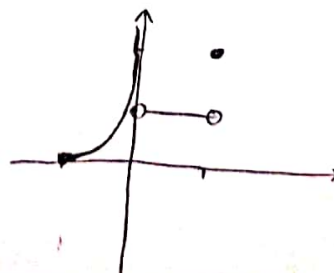
$$y = \frac{[x]}{x} + \frac{|x|}{x}$$

$$-1 < x < 0 \rightarrow [x] = -1, \frac{|x|}{x} = -1 \rightarrow y = \frac{-1}{x} - 1 \xrightarrow{x=-1} 1-1=0, x=0^- \rightarrow y = +\infty$$

$$x=0 \rightarrow \text{تعریف نشده}$$

$$0 < x < 1 \rightarrow [x] = 0, \frac{|x|}{x} = 1 \rightarrow \boxed{y=1}$$

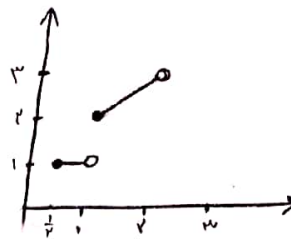
$$x=1 \rightarrow y = 1+1=2 \rightarrow \boxed{2}$$



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

$$\frac{1}{p} < x < 1 \rightarrow [x] = 0 \begin{cases} x = \frac{1}{p} \rightarrow 0 + [1] = 1 \\ x = 1 \rightarrow 0 + [\frac{p}{p}] = 1 \end{cases}$$

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



ا؛ ۲ باره خط تشکیل شده است.

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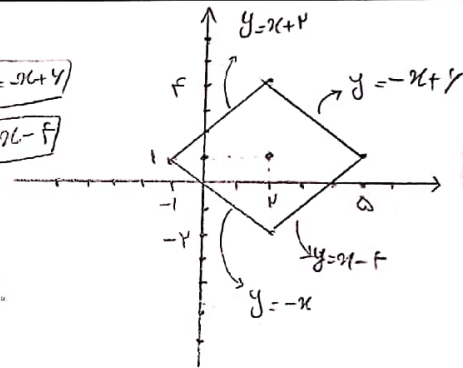
$$|x-2| + |y-1| = 3$$

① $x > 2 \rightarrow x-2 + |y-1| = 3 \rightarrow |y-1| = -x+5$

$$\begin{cases} y-1 = -x+5 \Rightarrow y = -x+6 \\ y-1 = -(-x+5) \Rightarrow y = x-4 \end{cases}$$

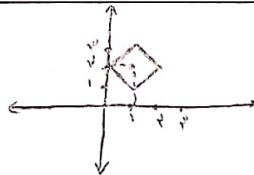
② $x < 2 \rightarrow 2-x + |y-1| = 3 \rightarrow |y-1| = x+1$

$$\begin{cases} y-1 = -(x+1) \Rightarrow y = -x \\ y-1 = +(x+1) \Rightarrow y = x+2 \end{cases}$$

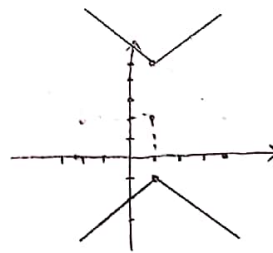


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الف) $|x-1| + |y-2| = 1$



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



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$$y = px + |ax+b| \xrightarrow{\text{با } x \text{ ضرب و جمع}} y = px + ax + b = y = (p+a)x + b \quad \begin{matrix} \text{با } x \text{ ضرب و جمع} \\ \text{در } \mathbb{R} \end{matrix} \rightarrow p+a \neq 0 \rightarrow \boxed{a \neq -p}$$

$$y = px + |ax+b| \xrightarrow{\text{با } x \text{ ضرب و جمع}} y = px - ax - b = y = (p-a)x - b \quad \begin{matrix} \text{با } x \text{ ضرب و جمع} \\ \text{در } \mathbb{R} \end{matrix} \rightarrow p-a \neq 0 \rightarrow \boxed{a \neq p}$$

$$\alpha = \mathbb{R} - \{p, -p\}$$

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