

مسائل / تكليف

$$f(x+1) + f(x+2) = 3x + f(3) \quad y = \sqrt{f(x) - x^2} \quad (1)$$

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

$$f(x) = ax + b \rightarrow 2ax + a + b + ax + 2a + b = 3x + 3$$

$$3ax + 3a + 2b = 3x + 3 \rightarrow a=1, b=0 \rightarrow f(x) = x$$

$$y = \sqrt{-x^2 + x} \rightarrow \frac{-b}{2a} = \frac{-1}{-2} = \frac{1}{2} \rightarrow y = \frac{1}{2}$$

$$R_f = (\sqrt{-\infty}, \sqrt{\frac{1}{4}}] = (0, \frac{1}{2}]$$

$$f(x) = \frac{x^3 - 2x}{x+2} \quad D_f = \mathbb{R} - \{a, b\} \quad R_f = [c, +\infty) - \{\lambda\} \quad (2)$$

$$f(x) = \frac{x(x-2)(x+2)}{x+2} = x^2 - 2x \rightarrow x \neq -2 \rightarrow y \neq \lambda$$

$$y \neq \lambda \rightarrow x \neq -2 \Rightarrow D_f = \mathbb{R} - \{-2, 2\}$$

$$R_f = [-1, +\infty) - \{\lambda\}$$

$$f\left(\frac{a+b}{2c}\right) = f\left(\frac{-2+2}{2(-1)}\right) = f(-1) = \frac{-1+2}{-1+2} = 1$$

$$y = \sqrt{x^3 + ax^2 + bx - 1} \quad (3)$$

$$(x-2)^3 = x^3 - 6x^2 + 12x - 8 \Rightarrow a = -6, b = 12$$

$$y = \sqrt{(x-2)^3} = x-2$$

$$D_f = [-6, 12] \rightarrow -6 \leq x \leq 12 \xrightarrow{-2} -1 \leq x-2 \leq 10 \rightarrow R_f = [-1, 10]$$

$$y_1 = \left(\frac{x+1}{1-x} \right)^{\frac{1}{\omega}}$$

$$y_2 = \frac{ax^k - 1}{x^k + b}$$

$$a+b=?$$

(f)

$$\hookrightarrow \log \frac{y_1}{\frac{x+1}{1-x}} = \frac{1}{\omega}$$

$$\frac{x+1}{1-x} \xrightarrow{-1} \frac{-1}{-1+1} \xrightarrow{1} \frac{-1}{0}$$

$$\frac{x+1}{1-x} \neq 1 \rightarrow x+1 \neq 1-x \rightarrow 2x \neq 0 \rightarrow x \neq 0$$

$$Df = (-1, 1) - \{0\}$$

$$x^k = -\frac{yb+1}{y-a} \rightarrow x = \sqrt{\frac{yb+1}{a-y}} \xrightarrow{>0} \frac{1}{b} \quad a$$

$$\rightarrow a=1, b=1 \rightarrow y = \frac{x^k-1}{x^k+1} \rightarrow x^k-1=0 \rightarrow x=\pm 1 \rightarrow y=0 \checkmark$$

$$\rightarrow a=-1, b=-1 \rightarrow y = \frac{-x^k-1}{x^k-1} \rightarrow -x^k-1=0 \rightarrow y \neq 0 \times$$

$$a+b=x$$

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

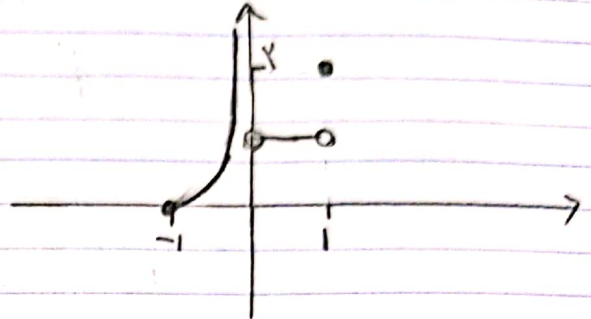
$$[-1, 1]$$

(5)

$$[-1, 0) \rightarrow [x] = -1 \rightarrow y = -\frac{1}{x} - 1$$

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

$$x = 1 \rightarrow y = 2$$

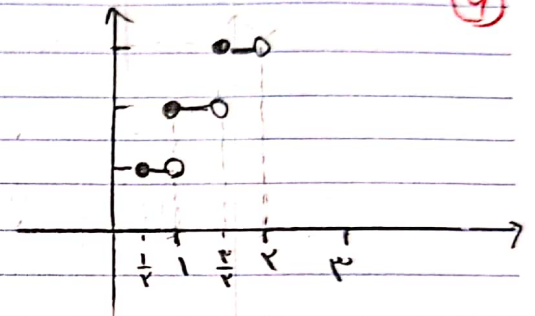


$$y = [x] + [x + \frac{1}{x}] \quad [\frac{1}{x}, 2]$$

$$[\frac{1}{x}, 1) \rightarrow [x] = 0, [x + \frac{1}{x}] = 1 \rightarrow y = 1$$

$$[1, \frac{x}{x}) \rightarrow [x] = 1 \rightarrow [x + \frac{1}{x}] = 1 \rightarrow y = 2$$

$$[\frac{x}{x}, 2) \rightarrow [x] = 1 \rightarrow [x + \frac{1}{x}] = 2 \rightarrow y = 3$$



(9)

$$\left| \frac{x+1}{ax+3} \right| < 1 \rightarrow D_f = (b, +\infty) \quad a-b=?$$

(11)

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

$$II) \frac{-b-1}{ab+3} = 1 \rightarrow -b-1 = ab+3 \rightarrow b = -\frac{4}{a+1}$$

$$\Rightarrow \frac{2}{1-a} = -\frac{4}{a+1} \rightarrow 2a+2 = -4+4a \rightarrow 2a=6 \rightarrow a=3 \rightarrow b=-1$$

$$\Rightarrow a-b = 3+1 = 4$$

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

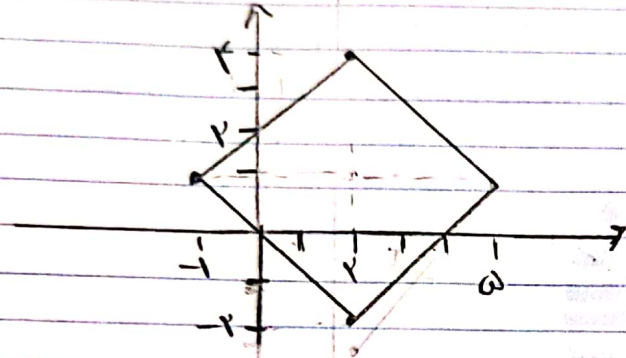
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$$y \geq 1 \rightarrow y = 4 - |x-2| \rightarrow x \geq 2 \rightarrow y = 4 - x$$

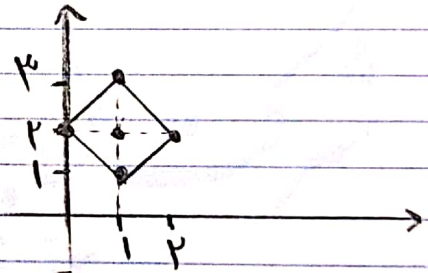
$$\rightarrow x < 2 \rightarrow y = 2 + x$$

$$y < 1 \rightarrow y = |x-2| - 2 \rightarrow x \geq 2 \rightarrow y = x - 4$$

$$\rightarrow x < 2 \rightarrow y = -x$$

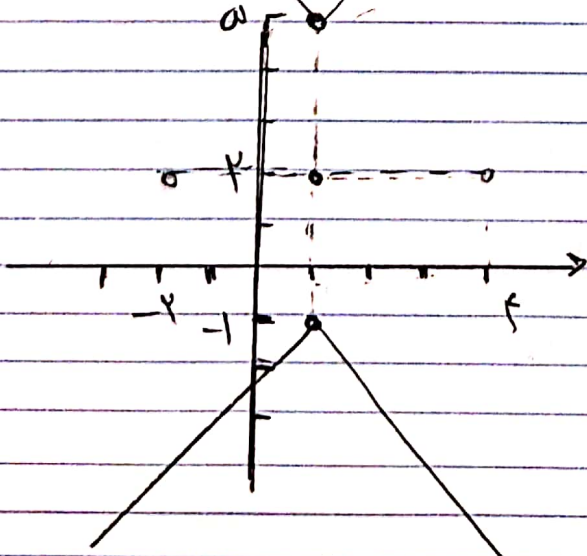


مرکز مربع $|x-1| + |y-2| = 1$ (الف)
 لم نصف قطر = ۱ پس از مرکز ملی
 بالا و نیکی پایین و نیکی چپ و نیکی
 راست می روم



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مرکز مربع $|x-1| + |y-2| = 1$ (ب)
 لم نصف قطر = ۱ پس از مرکز ملی
 بالا و نیکی پایین و نیکی چپ و نیکی
 راست می روم



$$y = \begin{cases} x + a & \text{if } x \geq -b \\ x - a & \text{if } x < -b \end{cases} \quad R_f = \mathbb{R}$$

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$$\left\{ \begin{array}{l} x + a = (x + a) \quad x \geq -b \\ x - a = (x - a) \quad x < -b \end{array} \right\} \rightarrow \frac{-b}{a} = \text{نقطه}$$

$$\frac{-b}{a}$$

$$\begin{array}{c|c} (x - a) & (x + a) \end{array} \quad \begin{array}{l} \rightarrow x + a > 0 \rightarrow a > -x \\ \rightarrow x - a > 0 \rightarrow a < x \end{array}$$

$$\frac{-b}{a}$$

$$\begin{array}{c|c} (x + a) & (x - a) \end{array} \quad \begin{array}{l} \rightarrow x + a < 0 \rightarrow a < -x \\ \rightarrow x - a < 0 \rightarrow a > x \end{array}$$

$$\cap \rightarrow \mathbb{R} - \{x, -x\}$$