

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

$$f(x) = ax + b$$

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

$$2ax + 3a + 2b = 2x + 2a$$

$$2a = 2 \Rightarrow a = 1 \quad b = 0$$

$$\rightarrow R = \sqrt{(-\infty, \frac{1}{2}]} = [-\frac{1}{2}, \frac{1}{2}]$$

$$y = \sqrt{-x^2 + x} \xrightarrow{\text{max } x = \frac{-b}{2a}} \frac{-b}{2a} = \frac{-1}{-2} = \frac{1}{2} \rightarrow y = \sqrt{-\frac{1}{4} + \frac{1}{4}}$$

$$f(x) = \frac{x(x^2 - 1)}{x + 2} = \frac{x(x-1)(x+1)}{x+2} \xrightarrow{x+2} x^2 - 2x \xrightarrow{x = -\frac{b}{2a}} x = -\frac{(-2)}{2} = 1$$

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

$$f\left(\frac{1-2}{-1}\right) = f(-1) = (-1)^2 - 2(-1) = 3$$

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

$$(x-1)(x+2) \neq 0$$

$$\begin{matrix} x-1 \neq 0 & x+2 \neq 0 \\ x \neq 1 & x \neq -2 \end{matrix}$$

$$\begin{matrix} a=1 & a=-2 \\ b=-2 & b=1 \end{matrix}$$

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

$$\sqrt{x^3 - 4x^2 + 8x - 1}$$

$$a = -4 \quad b = 8$$

$$\rightarrow D = [-4, 12]$$

$$f(x) = ax + b$$

$$\Rightarrow -4 \leq x \leq 12$$

$$-1 \leq x-2 \leq 1 \rightarrow R = [-1, 1]$$

$$y_1 = \left(\frac{x+1}{1-x}\right)^{\frac{1}{2}}$$

$$\rightarrow y_1 = \sqrt{\frac{x+1}{1-x}}$$

$$\xrightarrow{\text{مخرج نامعین}} \frac{-x+1=0}{1-x}$$

$$D = R - \{1\}$$

$$\rightarrow \frac{ay+b}{cx+d}$$

$$b=1 \quad a=1$$

$$a+b=2$$

$$y_2 = \frac{ax^2-1}{x^2+b}$$

$$\rightarrow y_2 x^2 + b y_2 = ax^2 - 1$$

$$(y-a)x^2 = -1 - by_2$$

$$x^2 = \frac{1+by_2}{a-y_2} \Rightarrow -b = \frac{1}{a} \Rightarrow ab = -1$$

در توان یک کسری باید

باید منفی باشد

$$y \neq a \Rightarrow a = 1 \rightarrow \begin{matrix} a=1 \\ b=-1 \\ a+b=0 \end{matrix}$$

$$\frac{x+1}{1-x} > 0 \rightarrow D_f = [-1, 1]$$

$$-1 \leq x < 0 \rightarrow [x] = -1 \quad |x| = -x$$

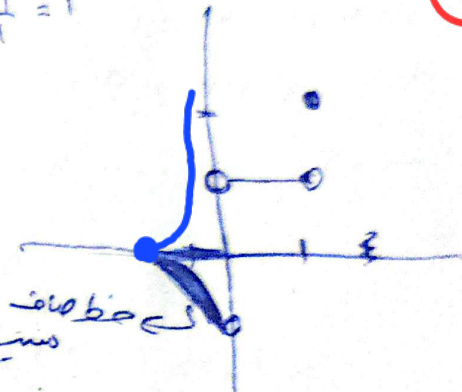
$$y = [x] + \frac{|x|}{x} \rightarrow x \neq 0$$

$$\frac{[x]}{x} + \frac{|x|}{x} = \frac{-1}{x} = -1$$

$$0 \leq x < 1 \rightarrow [x] = 0 \rightarrow |x| = x$$

$$x = 1 \rightarrow \frac{1}{1} + \frac{1}{1} = 2$$

$$\frac{[x]}{x} + \frac{|x|}{x} = 1$$



سے جوں $-\frac{1}{x}$ اور

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

$$\frac{1}{x} \leq x < 1 \rightarrow [x] = 0$$

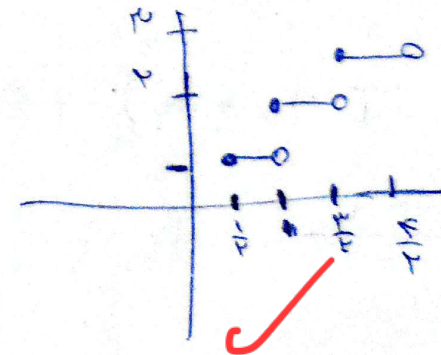
$$\frac{1}{x} \leq x + \frac{1}{x} < 2 \rightarrow [x + \frac{1}{x}] = 1 \rightarrow y = 0 + 1 = 1$$

$$1 \leq x < \frac{x}{2} \rightarrow [x] = 1$$

$$\frac{1}{x} \leq x + \frac{1}{x} < \frac{3}{2} \rightarrow [x + \frac{1}{x}] = 1 \rightarrow y = 1 + 1 = 2$$

$$\frac{x}{2} \leq x < 2 \rightarrow [x] = 1$$

$$2 \leq x + \frac{1}{x} < \frac{5}{2} \rightarrow [x + \frac{1}{x}] = 2$$



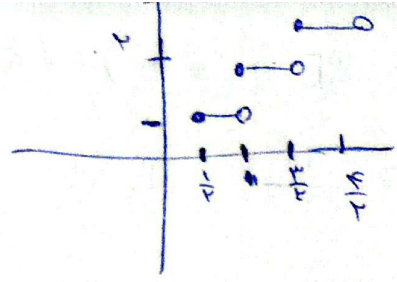
$$x \leq x + \frac{1}{2} \leq x + 1 \rightarrow [x+1] = 1 \rightarrow y = 0 + 1 = 1$$

$$1 \leq x \leq \frac{3}{2} \rightarrow [x] = 1$$

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

$$\frac{3}{2} \leq x \leq 2 \rightarrow [x] = 1$$

$$2 \leq x + \frac{1}{2} \leq \frac{5}{2} \rightarrow [x+1] = 2 \rightarrow y = 1 + 2 = 3$$



$$y = \left| \frac{x+1}{ax+r} \right| \rightarrow \left| \frac{x+1}{ax+r} \right| < 1 \xrightarrow{\text{D.O.B.}} \frac{(x+1)^2}{(ax+r)^2} < 1 \Rightarrow (x+1)^2 < (ax+r)^2$$

$$a^2 = 1 \xrightarrow{\beta_1} a = 1 \rightarrow x^2 + 2x + 1 < x^2 + 4x + 4 \rightarrow -2 < 2x \rightarrow x > -1 \rightarrow (-1, +\infty)$$

$$\xrightarrow{\beta_1} a = -1 \rightarrow x^2 + 2x + 1 < x^2 - 4x + 4 \rightarrow 1x < 1 \rightarrow x < 1$$

$$D = (-\infty, 1) \cup (-1, +\infty)$$

$$\rightarrow a = 1, b = -2 \rightarrow a - b = 1 - (-2) = 3$$

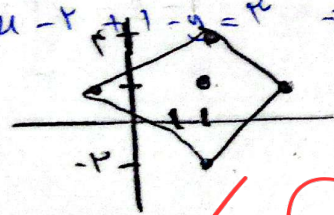
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$$x-2 = x-2, y-1 = y-1$$

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

مربع متساوي الأضلاع

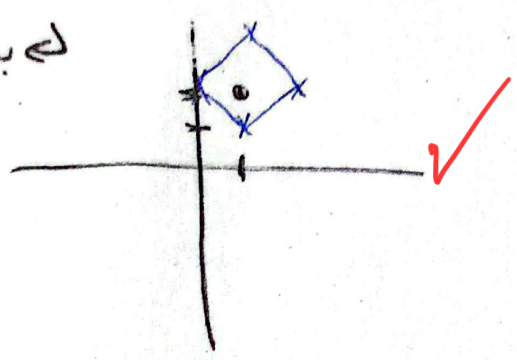
$$\begin{aligned} x > 2, y < 1 &\rightarrow x - 2 + y - 1 = 3 \rightarrow y = -x + 5 \\ x < 2, y > 1 &\rightarrow 2 - x + y - 1 = 3 \rightarrow y = x + 2 \\ x < 2, y < 1 &\rightarrow 2 - x - y + 1 = 3 \rightarrow y = -x \\ x > 2, y > 1 &\rightarrow x - 2 + 1 - y = 3 \rightarrow y = -x + 2 \end{aligned}$$



3

الف) $|x-1| + |y-2| = 1$
 به طرف

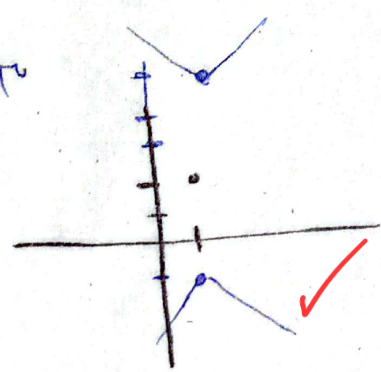
$x=1$
 $y=2$



مجموعه دایره مربع

ب) $|x-1| + |y-2| = -3$

$x=1$
 $y=2$



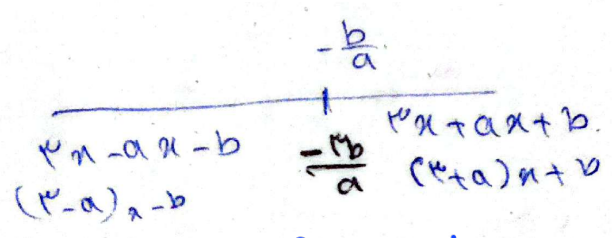
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مجموعه دایره مربع

$y = kx + |ax + b|$

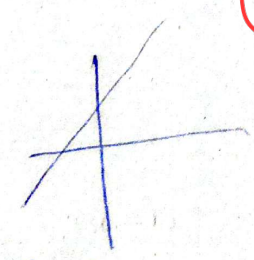
$ax + b = 0$
 $ax = -b \rightarrow x = -\frac{b}{a}$

۱/۱

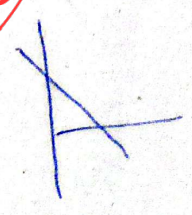


برای آنکه برد R شود شیب ها باید

هم علامت باشند $\leftarrow (a+k)/(ka) > 0$
 $-3 < a < 3$



$ka > 0$
 $a > -k$
 $k - a > 0$
 $k > a$



$ka < 0$
 $a < -k$
 $k - a < 0$
 $k < a$

استخراج نداریم پس $\emptyset$