

$$f(2n+1) + f(n+2) = 3n + f(3) \xrightarrow{n=1} 2f(3) = 3 + f(3) \rightarrow f(3) = 3$$

$$f(2n+1) + f(n+2) = 3n + 3 \rightarrow f(n) = n$$

$$y = \sqrt{x - x^2} \Rightarrow S: \left[\frac{1}{2}, \frac{1}{4} \right] \Rightarrow R = \left(-\infty, \frac{1}{4} \right] \overset{A}{=} \left[0, \frac{1}{2} \right]$$

۱

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

$$x^2 - 2x \neq 8 \Rightarrow x^2 - 2x - 8 \neq 0 \Rightarrow x \neq 4, x \neq -2$$

$$a = -2$$

$$b = 4$$

$$c = -1$$

$$f\left(\frac{a+b}{2c}\right) = f\left(\frac{4-2}{-2}\right) = f(1) = 1$$

$$R = [S, +\infty)$$

$$S = \left[\frac{1}{-1} \right]$$

چون تابع زوج است:

۲

$$y = \sqrt[3]{x^3 + 6x^2 + 12x - 8} \Rightarrow \sqrt[3]{(x-2)^3} \Rightarrow \sqrt[3]{x^3 - 6x^2 + 12x - 8} \xrightarrow{a=-6, b=12}$$

$$-6 \leq x \leq 12 \rightarrow -8 \leq x-2 \leq 10 \rightarrow \sqrt[3]{-8} \leq \sqrt[3]{x-2} \leq \sqrt[3]{10}$$

۳

$$\left(\frac{x+1}{1-x} \right)^{\frac{1}{5}} \quad 1-x \neq 0 \rightarrow x \neq 1$$

$$\frac{x+1}{1-x} > 0 \Rightarrow \frac{-1}{-1+x} > 0 \Rightarrow \frac{1}{x-1} > 0$$

$$D_y = [-1, 1)$$

$$\frac{ax^2+1}{x^2+b} \xrightarrow{\text{در صورتی که}} \frac{x^2 \leq 0 \Rightarrow -\frac{1}{b}}{x^2 \rightarrow +\infty = a} \Rightarrow R = \left[-\frac{1}{b}, a \right) \quad a=b=1$$

$$a+b=2$$

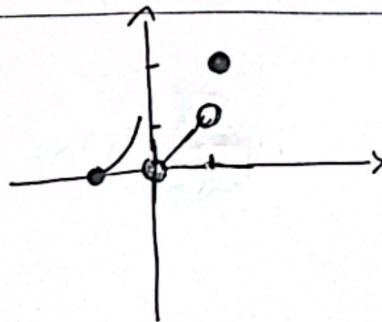
۴

$$\left[\frac{x}{n} + \frac{1}{n} \right]$$

$$[-1, 0] = -\frac{1}{n} - 1$$

(ر) $x=0$ تعریف نشده است

$$I_1 = 2$$



۵

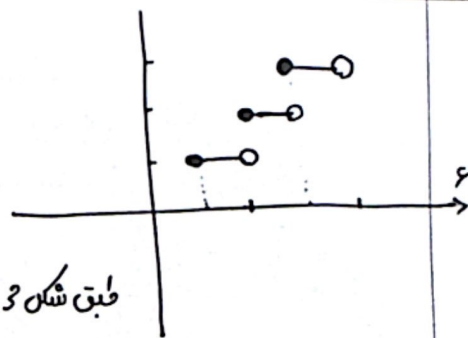
$$[\frac{1}{2}, 1) \quad \frac{1}{2} \leq x < 1, \quad 1 \leq x + \frac{1}{2} < \frac{3}{2} \Rightarrow [x] = 0$$

$$[1, \frac{3}{2}) \quad 1 \leq x < \frac{3}{2}, \quad \frac{3}{2} \leq x + \frac{1}{2} < \frac{4}{2} \quad [x + \frac{1}{2}] = 1$$

$$[\frac{3}{2}, 2) \quad \frac{3}{2} \leq x < \frac{4}{2}, \quad \frac{4}{2} \leq x + \frac{1}{2} < \frac{5}{2} \quad [x] = 1$$

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

طبق شکل زیر خط



۷

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

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

$$y=x+2$$

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

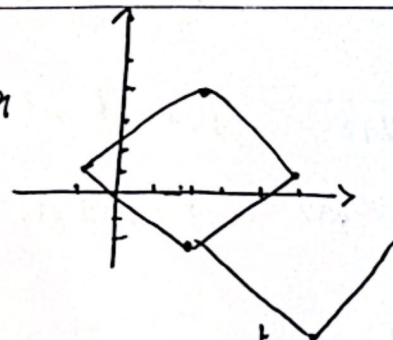
$$y=6-x$$

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

$$y=-x$$

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

$$y=x-4$$

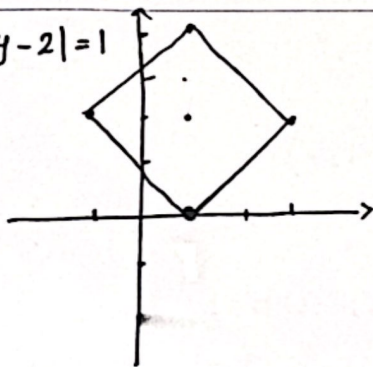


۸

$$الف) |x-1| + |y-2| = 1$$

$$\text{مرکز (میدان): } \left(\frac{1}{2}, \frac{1}{2}\right)$$

$$\text{قطر} = 2$$

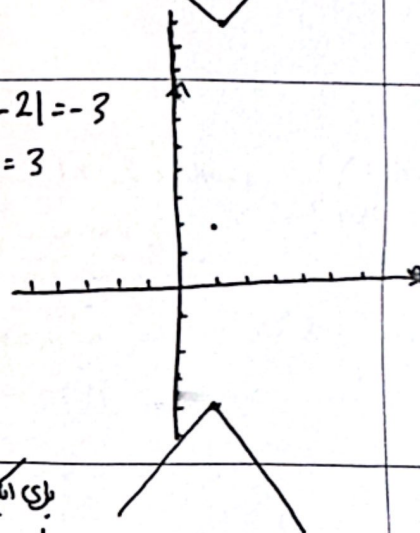


$$ب) |x-1| - |y-2| = -3$$

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

$$\text{مرکز: } \left(\frac{1}{2}, \frac{1}{2}\right)$$

$$\text{قطر} = 6$$



$$\left. \begin{aligned} a+b > 0 &\rightarrow 3a+a+b \rightarrow (3+a)a+b \\ a+b < 0 &\rightarrow 3a-a-b \rightarrow (3-a)a-b \end{aligned} \right\}$$

برای اینکه بر تابع R باشد.
باید $|a| < 3$ باشد تا شیب هر دو
ضرایب مثبت باشد.

$$|a| < 3 \rightarrow -3 < a < 3$$

۱۰