

$$y = ax + b \Rightarrow f(2x+1) = a(2x+1) + b \quad f(x+2) = a(x+2) + b \quad f(3) = 3a + b$$

$$2ax + a + b + ax + 2a + b = 3x + 3a + b \Rightarrow 3a = 3 \Rightarrow a = 1$$

$$x(2a+a) + a + b + 2a + b = x(3) + 3a + b$$

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

$$\Rightarrow b = 0 \quad f(x) = x \quad y = \sqrt{x-x^2} \quad \text{رأس } x = -\frac{b}{2a} = \frac{1}{2}$$

$$\text{رأس } y = \frac{1}{4} \xrightarrow{\text{با اعداد رادیکال}} R_f = [0, \frac{1}{4}]$$

$$\frac{n^3 - 4n}{-(n^3 + 2n^2)} \cdot \frac{n+2}{n^2 - 2n}$$

$$\frac{-2n^3 - 4n}{-(-2n^3 - 2n)} = 1$$

$$\frac{(n^2 - 2n)(n+2)}{(n+2)} = n^2 - 2n$$

$$\text{رأس } x = -\frac{b}{2a} = 1$$

$$\text{رأس } y = -1 \Rightarrow [-1, +\infty)$$

$$\begin{cases} n^2 - 2n = 1 \Rightarrow n^2 - 2n - 1 = 0 \\ \Rightarrow (n-4)(n+2) = 0 \\ x = 4, -2 \end{cases}$$

$$R_f = [-1, +\infty) - \{4, -2\}$$

$$f\left(\frac{y}{x}\right) = f(-1) = \frac{3}{1} = 3$$

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \Rightarrow \sqrt[3]{(n-2)^3}$$

$$\Rightarrow \sqrt[3]{n^3 - 6n^2 + 12n - 8} \Rightarrow y = x-2, D_f = [-2, 12]$$

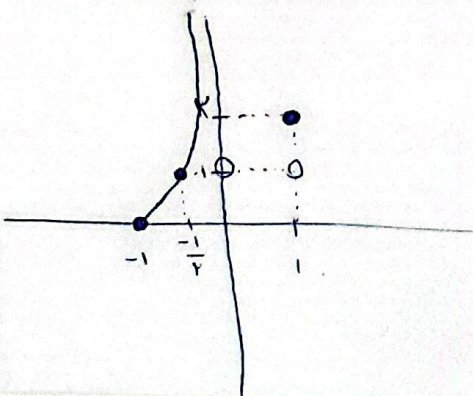
$$\begin{aligned} x = -2 &\leadsto y = -1 \\ x = 12 &\leadsto y = 10 \end{aligned} \Rightarrow R_f = [-1, 10]$$

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

$$g(-x) = g(x) \quad \begin{cases} \lim_{x \rightarrow \pm\infty} g(x) = a = 1 \\ g(0) = -\frac{1}{b} = -1 \end{cases} \Rightarrow a+b=2$$

$$\begin{cases} \lim_{x \rightarrow \pm\infty} g(x) = a = -1 \\ g(0) = -\frac{1}{b} = 1 \end{cases} \Rightarrow b = -1$$

تابع f تابعی با آوال گویاست پس باید $(+)$ باشد
تابع زوج است و می تواند جانب تمام داشته باشد چون برد آن
نامتناهی می شود، پس باید $(+)$ باشد و جانب افقی آن a است پس a یک سمت باره و مقدار تابع دره سمت دیگر باره بود باشد

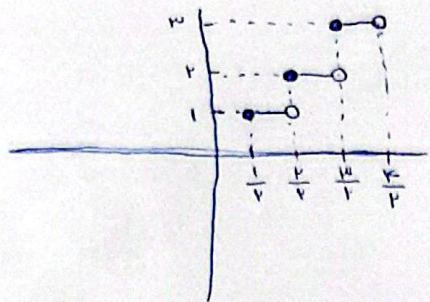


$$x=1 \quad y=2$$

$$0 < x < 1 \quad y=1$$

$$-1 \leq x < 0 \quad y = \frac{-1}{x} - 1$$

$$\frac{-1}{0^-} = +\infty \Rightarrow (0, +\infty)$$



$$\begin{aligned} y=1 & \leftarrow \frac{1}{4} \leq x < \frac{1}{2} \\ y=2 & \leftarrow \frac{1}{2} \leq x < \frac{3}{4} \\ y=3 & \leftarrow \frac{3}{4} \leq x < 1 \end{aligned}$$

۳ بار خط

$$\frac{|x+1|}{|ax+3|} < 1 \Rightarrow |x+1| < |ax+3| \Rightarrow x^2+2x+1 < a^2x^2+9+4ax$$

$$\Rightarrow (a^2-1)x^2 + (4a-2)x + 8 > 0 \Rightarrow a^2-1=0 \Rightarrow a=\pm 1$$

باتوجه به اینکه $(b, +\infty)$ است
مقدارهای x را به دست می آوریم
دامنه x به صورت $[-\infty, a] \cup [b, +\infty)$ یا $[a, b]$

$$\begin{aligned} a=1 & \Rightarrow \frac{|x+1|}{|x+3|} < 1 \Rightarrow x+1 < x+3 \Rightarrow -2 < x \Rightarrow (-2, +\infty) \Rightarrow b=-2 \\ a=-1 & \Rightarrow \frac{|x+1|}{|-x+3|} < 1 \Rightarrow x+1 < -x+3 \Rightarrow x < 1 \Rightarrow (-\infty, 1) \Rightarrow a=1 \end{aligned}$$

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$a-b=3$

$$\begin{aligned} x-y+1 &= 3 \\ y &= x-2 \end{aligned}$$

$$\begin{aligned} x-2+y-1 &= 3 \\ y &= -x+6 \end{aligned}$$

$$\begin{aligned} (2, 4) \\ (-1, 1) \end{aligned}$$

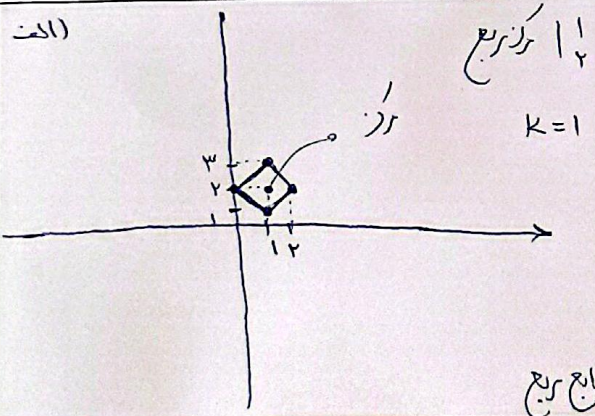
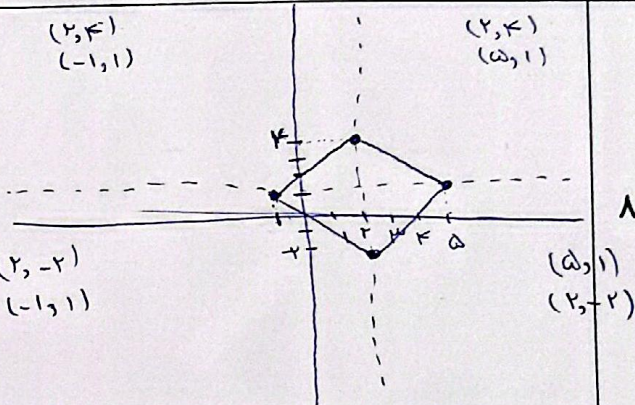
$$\begin{aligned} (2, 4) \\ (5, 1) \end{aligned}$$

$$\begin{aligned} x-y+1 &= 3 \\ y &= -x \end{aligned}$$

$$\begin{aligned} x-2+y-1 &= 3 \\ x-4 &= y \end{aligned}$$

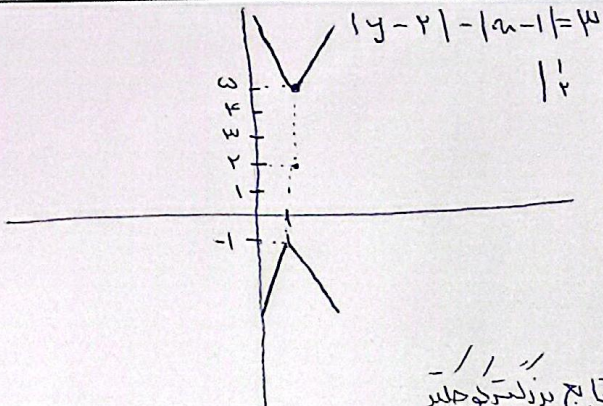
$$\begin{aligned} (2, -2) \\ (-1, 1) \end{aligned}$$

$$\begin{aligned} (5, 1) \\ (2, -2) \end{aligned}$$



$$\begin{aligned} |x| &= 1 \\ k &= 1 \end{aligned}$$

تابع زوج



تابع فرد

$$y = |x| + |ax+b| \begin{cases} \textcircled{1}: ax+b > 0 \Rightarrow y = (1+a)x+b \\ \textcircled{2}: ax+b < 0 \Rightarrow y = (1-a)x-b \end{cases}$$

$$b=0$$

$$\Rightarrow y = |x| + |ax| \begin{cases} x > 0 \Rightarrow x(1+|a|) \\ x < 0 \Rightarrow x(1-|a|) \end{cases}$$

$$R_y = \mathbb{R}$$

شماره اول

$$1+|a| > 0 \quad 1-|a| > 0 \Rightarrow -1 < a < 1$$

$$(-1, 1)$$