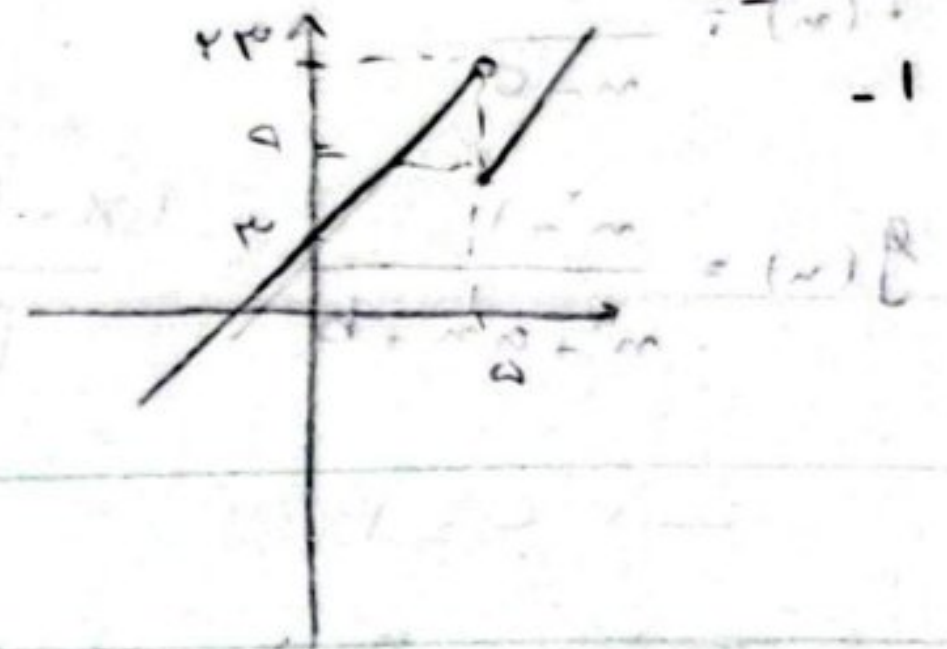


۱. بناس مورد زاد دوازدهم صد A کتف ۳ :



$$f(x) = \begin{cases} x-1 & ; x > 1 \rightarrow x > 0 \\ x+1 & ; x \leq 1 \rightarrow x < a \end{cases}$$

$$y = \sqrt{f(x) - x + 1} \rightarrow f(x) = x + 1$$

$$I) x \geq 0 \quad x-1-x+1 \geq 0 \rightarrow x \geq 0 \Rightarrow x \geq 0$$

$$II) x < a \quad x+1-x+1 \geq 0 \rightarrow x \geq 1 \rightarrow x \geq \frac{1}{1} \Rightarrow \frac{1}{1} \leq x < a$$

$$\Rightarrow D_f = \left[\frac{1}{1}, +\infty \right)$$

$$y = \frac{x^2 + 2x + 1}{(x^2 + 1)^2} = \frac{x(x^2 + 1) + 1}{(x^2 + 1)^2} = \frac{x(x^2 + 1)}{(x^2 + 1)^2} = \frac{x}{x^2 + 1}$$

$$y = \frac{x}{x^2 + 1} \rightarrow D_y = \mathbb{R} - \left\{ \pm \frac{1}{\sqrt{2}} \right\}$$

$$f(x) = \begin{cases} \frac{x^2 + 2x - 1}{x^2 - 1} & ; x \neq \pm 1 \\ \frac{a+b}{1+b} & ; x = \pm 1 \end{cases} \quad g(x) = x + c$$

$$x^2 + 2x - 1 = x^2(x+c) - (x+c) = (x+c)(x^2 - 1) \Rightarrow c = 1$$

$$\rightarrow g(x) = f(x) = 1 \rightarrow \frac{a+1}{1+b} = 1 \rightarrow a+1 = 1+b \rightarrow a = b$$

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

$$a+b+c = 2 + \frac{1}{1} = \frac{3}{1}$$

$$f(n) = \frac{n+1}{n-5}$$

$$g(n) = \frac{n^2-1}{n^2+an+b} = \frac{(n-1)(n+1)}{(n-1)^2}$$

$$\rightarrow c=1$$

$$\rightarrow x^2 - 2x + 1 \rightarrow a = -2, b = 1$$

$$a+b+c = -2+1+1=0$$

$$f(n) = (n-3)^2(n-1)$$

$$g(n) = f(n+1) + f(1-n) = (n+1-3)^2(n+1-1) + (1-n-3)^2(1-n-1)$$

$$= (n-2)^2(n) + (n+2)^2(-n) = n((n-2)^2 - (n+2)^2)$$

$$= n((n-2+n+2)(n-2-n-2)) = n(2n)(-4) = -8n^2$$

$$f(1-2n) = \sqrt[3]{1-2n} + 2 \quad n \leq 0$$

$$1-2n = -1 \rightarrow n = 1$$

$$1-2n = 3 \rightarrow n = -1$$

$$f(-1) + f(1) = \sqrt[3]{-1} + \sqrt[3]{1} + 2 = -1 + 1 + 2 = 2$$

$$f(x+\sqrt{n}) = n^{\frac{1}{4}} + \sqrt{n}$$

$$x+\sqrt{n} = 4 \rightarrow \sqrt{n} = 4-x \rightarrow n = 16$$

$$f(4) = \sqrt[4]{16} + \sqrt{16} = 2 + 4 = 6$$

$$f(n) = n^{\frac{1}{4}} + n$$

$$f\left(\frac{1}{n}\right) + f(1-n) = n^{\frac{1}{4}} + n - n^{\frac{1}{4}} - n = 0$$

$$f(n) = \sqrt{kn - ka + k - 1} \rightarrow D_f = \{x \mid x \geq \frac{ka}{k}\} \quad \frac{ka}{k} = 1 \rightarrow a = \frac{k}{k} = 1$$

$$g(n) = \sqrt{b - kn + k} \rightarrow D_g = \{n \mid n \leq \frac{b}{k}\} \quad \frac{b}{k} = 1 \rightarrow b = k$$

$$f-g = \{(1, k)\} \rightarrow ka - c - k = k \rightarrow -k - c = k \rightarrow k = -1$$

$$-ka - \frac{b}{k} - k = -1 - 1 - 1 = -3$$

$$f(x) = \sqrt{x-2} + x \rightarrow x \leq 2 \rightarrow x = 2$$

$$g(x) = \sqrt{2x+2} \rightarrow x \geq -1$$

$$D_{f \wedge g} = [-1, 2]$$

$$f-g(x) = 4\sqrt{2} \Rightarrow \sqrt{2-x} + x - \sqrt{2} = 4\sqrt{2} \rightarrow x = 4\sqrt{2} + \sqrt{2} - 2 = 5\sqrt{2} - 2$$

$$m+n = 2 + 5\sqrt{2} - 2 = 5\sqrt{2}$$

$$m+n = ? \quad -1. \quad \checkmark$$