

$$f(x) = \frac{x^2 - 2x + 2}{x + a}, b \xrightarrow{x(x+a)} x^2 - 2x + 2 + b(x+a) = x(x+a) \rightarrow x^2 - 2x + 2 + bx + ab = x^2 + ax$$

در طرفین $y = x$

$$\rightarrow (-2+b)x + (2+ab) = ax$$

$$\rightarrow -2+b = a \rightarrow b = a+2$$

$$\rightarrow 2+ab = 0 \rightarrow 2+a(a+2) = 0$$

$$\rightarrow a^2 + 2a + 2 = 0 \rightarrow a = -1 \pm i$$

$$\rightarrow b = 1 \pm i$$

$$\Rightarrow a-b = -1-i - (-1-i) = 0$$

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$$f(x) = \begin{cases} \frac{x^2 + 2x - 2}{x^2 - 1} & x \neq \pm 1 \\ \frac{a}{x+b} & x = \pm 1 \end{cases} \xrightarrow{\text{تقسیم}} \frac{(x^2 + 2x - 2)(x-1)}{(x^2 - 1)(x-1)} = \frac{(x+1)(x+2)(x-1)}{(x+1)(x-1)} = x+2$$

$$\rightarrow \text{if } x \neq 1, -1 \rightarrow f(x) = x+2, f(x) = g(x) \rightarrow x+2 = x+c \rightarrow c=2$$

$$\left\{ \begin{array}{l} x=1 \rightarrow \frac{a+2}{1+b} = 2+2=4 \rightarrow a+2b = a+2 \rightarrow a-2b = 0 \\ x=-1 \rightarrow \frac{-a+2}{-1+b} = (-1)+2=1 \rightarrow -a+2 = -1+b \rightarrow a+b = 3 \end{array} \right. \rightarrow \begin{cases} a-2b = 0 \\ a+b = 3 \end{cases} \rightarrow \begin{cases} a = 2b \\ 2b+b = 3 \end{cases} \rightarrow \begin{cases} a = 2 \\ b = 1 \end{cases}$$

$$f-g(x) = 2(\sqrt{x-2a} + k - 1) - \sqrt{b-x} - 2k$$

$$= -k + 2\sqrt{x-2a} - \sqrt{b-x} - 2 = -k \rightarrow 2a - k = 2\sqrt{x-2a} - \sqrt{b-x} - 2$$

$$k = 2 - 2a \rightarrow \frac{-2+2a}{2} = a, k \geq 0; S = b - x \rightarrow b = S + x, S \geq 0 \Rightarrow 2\left(\frac{-2+2a}{2}\right) - \frac{S+x}{2} = 2 - S - 2$$

$$\rightarrow \frac{-2+2a}{2} - \frac{S+x}{2} = 0 \rightarrow S - 2S + (2a + x - 2) = 0 \rightarrow S = \frac{2a + x - 2}{1} \rightarrow 1 - (2a + x - 2) \geq 0$$

$$\rightarrow 2a + x - 2 \leq 1 \rightarrow x \leq \frac{2 - 2a + 1}{2} \rightarrow x \leq \frac{3 - 2a}{2}$$

$$f(x) = \sqrt{m-x} + n \rightarrow m-x \geq 0 \rightarrow m \geq x \rightarrow D_f = (-\infty, m]$$

$$g(x) = \sqrt{2x+2} \rightarrow 2x+2 \geq 0 \rightarrow x \geq -1 \rightarrow D_g = [-1, +\infty)$$

$$D_{f \cap g} = [-1, 7] = D_f \cap D_g = (-\infty, m] \cap [-1, +\infty) = [-1, m] \rightarrow m=7$$

$$f-g(x) = \sqrt{m-x} + n - \sqrt{2x+2} \xrightarrow{m=7} \sqrt{7-x} + n - \sqrt{2x+2} = 4\sqrt{x} \rightarrow n = 4\sqrt{x} - \sqrt{7-x}$$

$$m+n = 7 + 4\sqrt{x} - \sqrt{7-x} = 11 + 4\sqrt{x}$$

$$y = (-1)^x (2 - [x]) = \frac{1}{2} \rightarrow 2 - [x] = \frac{1}{2}$$

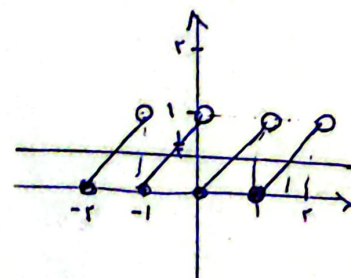
باقی شکل نمودار $2 - [x]$ در بازه $[-2, 2]$ خط $y = \frac{1}{2}$

در ۵ نقطه نمودار قطع می‌کند.

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

بنابراین معادله ۵ جواب دارد

$$x = -1.5, -0.5, 0.5, 1.5$$



خط $y = \frac{1}{2}$ را ۵ بار قطع می‌کند