

۱۹۵ آزمون

ارسطو ایزدی با ۱۰ هم سر B

$$f(x) \Rightarrow \sqrt{x + \sqrt{x-4}} \Rightarrow \sqrt{(\sqrt{x-4} + 2)^2} \xrightarrow{x \geq 4} \sqrt{x-4} + 2 \quad -1$$

$$g(x) \Rightarrow \sqrt{x-4}\sqrt{x-4} \Rightarrow \sqrt{(\sqrt{x-4} - 2)^2} \xrightarrow{x \geq 4} \sqrt{x-4} - 2$$

$$f(x) + g(x) = a + b\sqrt{x+c} = 0 + 2\sqrt{x-4} \Rightarrow \begin{cases} a=0 \\ b=2 \\ c=-4 \end{cases} \quad \left. \begin{matrix} \frac{a+b}{c} = \frac{2}{-4} = -\frac{1}{2} \end{matrix} \right\} \quad \frac{1}{2}$$

$$\frac{g}{f} = \left\{ \left(2, \frac{1}{-4} \right), \left(0, \frac{-4}{2} \right) \right\}$$

$$\frac{2+2}{2-1+2} = -1$$

$$f(x) = \frac{x+2}{x^2-4} \Rightarrow x^2 - (x+2) \neq 0 \Rightarrow (x-2)(x-1) \Rightarrow x \neq 1, 2$$

$$f(2x) = \left\{ \left(\frac{1}{2}, 2 \right), \left(\frac{x}{2}, -1 \right), \left(\frac{2}{x}, 2 \right), \left(-\frac{1}{2}, 2 \right) \right\}$$

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

$$2g^2(x)+1 = \left\{ (-2, 1), (1, 3), (2, 9), (-1, 1) \right\}$$

$$\frac{2f}{g} = \left\{ \left(1, \frac{2}{-1} \right), \left(-1, \frac{2}{1} \right), \left(2, \frac{2}{2} \right) \right\} = \left\{ (1, -2), (2, 1) \right\}$$

$$h = 2f + g = \left\{ (2, 5), (3, 5), (-2, 5) \right\}$$

$$f(x) = \frac{\sqrt{x^2-1}}{x-2} \Rightarrow x \neq 2 \quad \left(\frac{f}{g+1} \right)(x) \Rightarrow g \neq -1 \Rightarrow [x] + [-x] = -1$$

$$g(x) = [x] + [-x]$$

$$\Rightarrow D_g = \mathbb{Z}$$

$$D_f \Rightarrow \left. \begin{matrix} \sqrt{x^2-1} - x \geq 0 \\ x \geq 0 \\ x \neq 2 \end{matrix} \right\} D_f = [0, 2] - \{2\}$$

$$\Rightarrow D\left(\frac{f}{g+1}\right) = \{0, 1, 2\}$$

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$$f(n) = \sqrt{4n - n^2 - 4} \Rightarrow -(n^2 - 4n + 4) \geq 0 \Rightarrow -(n^2 - 4) \geq 0$$

$$\begin{array}{c} 1 \quad 4 \\ - \quad + \quad - \end{array} \Rightarrow Df = [1, 4]$$

$$h(n) = \frac{f(n)}{g(n)} = \left\{ (1, 0), (2, \frac{\sqrt{2}}{2}), (4, 0) \right\}$$

$$\sqrt{16 - 4 - 4} = \sqrt{8}$$

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$$\begin{aligned} \text{الف) } y &= n^3 - 3n^2 + 3n = n^3 - 3n^2 + 3n - 1 + 1 = (n-1)^3 + 1 \Rightarrow y-1 = (n-1)^3 \\ \Rightarrow \sqrt[3]{y-1} &= n-1 \Rightarrow \sqrt[3]{y-1} + 1 = n \Rightarrow R_y = \mathbb{R} \end{aligned}$$

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$$\text{ب) } y = \frac{1}{n^2 - 2n} \Rightarrow y = \frac{1}{n^2 - 2n + 1 - 1} \Rightarrow y = \frac{1}{(n-1)^2 - 1} \Rightarrow y((n-1)^2 - 1) = 1$$

$$\Rightarrow (n-1)^2 - 1 = \frac{1}{y} \Rightarrow (n-1)^2 = \frac{y+1}{y} \Rightarrow n = \sqrt{\frac{y+1}{y}} + 1$$

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$$\Rightarrow \frac{y+1}{y} \geq 0 \Rightarrow \begin{array}{c} -1 \quad 0 \\ + \quad - \quad + \end{array} \Rightarrow R_y = (-\infty, -1] \cup (0, +\infty)$$

$$\text{الف) } y = n^2 - 4n + 4 \quad \text{ext} \mid \frac{1}{2} \Rightarrow R = [0, +\infty)$$

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$$\text{ب) } y = -n^2 + 4n + 3 \quad \text{ext} \mid \frac{1}{2} \Rightarrow R = \left[\frac{16}{4}, +\infty \right) \cup (-\infty, 12]$$

$$\text{ج) } y = \sqrt{n^2 - 4n - 3} \quad \text{ext} \mid \frac{1}{2} \Rightarrow R = [0, +\infty)$$

$$\text{د) } y = \sqrt{4n - n^2} \quad \text{ext} \mid \frac{1}{2} \Rightarrow R = [0, 2]$$

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$$\text{الف) } R_y = \mathbb{R}$$

$$\text{ب) } R_y = \mathbb{R}$$

$$\text{ج) } R_y = [0, +\infty)$$

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$$\text{د) } R_y = [0, +\infty)$$

⊙

$$\text{الف) } y = \frac{2n+1}{n-2}$$

$$R_y = \mathbb{R} - \{2\}$$

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$$\text{ب) } y = \frac{2n+1}{n+1}$$

$$R_y = \mathbb{R} - \{2\}$$

$$f(x) = \left\{ \left(\frac{1}{2}, 2 \right) \left(\frac{\sqrt{2}}{2}, -1 \right) (2, 2) \left(-\frac{1}{2}, 4 \right) \right\} \quad \text{۳} \quad x \text{ های } f \text{ باید حتم بر ۲ بیوند!}$$

$$f(x) = \left\{ (1, 2) (-1, 2) (\sqrt{2}, -1) (-\sqrt{2}, -1) (2, 2) (-2, 2) \right\} \quad \text{هر کدام از } x \text{ های } f \text{ را برابر } x^2 \text{ قرار دهیم!}$$

$$g(x) + 1 = \left\{ (-2, 19) (1, 3) (3, 9) (-1, 1) \right\} \quad \text{این عمل روی } y \text{ های } g \text{ اعمال می شود!}$$

$$\frac{f}{g} = \left\{ \left(1, \frac{2 \times 2}{-1} \right) \left(3, \frac{2 \times -1}{2} \right) \text{ و } \left(-1, \frac{2 \times 4}{2} \right) \right\} = \left\{ (1, -4) (3, -1) \right\}$$