

نام و نام خانوادگی علی جسیان پاسخنامه تشریحی تکلیف شماره ۷۰ کلاس ۱۴, ۱۷, ۵ بسر

اگر $f(x) = \sqrt{x+4\sqrt{x-4}}$ و $g(x) = \sqrt{x-4\sqrt{x-4}}$ برای $x \geq 4$ داشته باشیم و $f(x) + g(x) = a + b\sqrt{x+c}$ باشد،

$$\text{if } x=4 \rightarrow f(4) + g(4) = \underbrace{\sqrt{4+4\sqrt{0}}}_4 + \underbrace{\sqrt{4-4\sqrt{0}}}_0 = 4 = a + b\sqrt{4+c}$$

حاصل $\frac{a+b}{c}$ را بدست آورید.

$$\text{if } x=13 \rightarrow f(13) + g(13) = \underbrace{\sqrt{13+4\sqrt{9}}}_5 + \underbrace{\sqrt{13-4\sqrt{9}}}_1 = 6 = a + b\sqrt{13+c}$$

باید حاصل تشریف بدی!

$$(a+b\sqrt{13+c}) - (a+b\sqrt{4+c}) = 2$$

$$b(\sqrt{13+c} - \sqrt{4+c}) = 2$$

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$$f(x) = \frac{x+2}{x^2-4x+3} \quad g(x) = \{(2,1), (1,0), (3,5), (0,4)\}$$

$$\frac{g}{f} : \{(2, -\frac{1}{4}), (1, 0), (3, 5), (0, 4)\} \rightarrow \frac{g}{f} : \{(2, -\frac{1}{4}), (0, 4)\}$$

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$$g(x) = \{(-2,3), (1,-1), (3,2), (-1,0)\} \quad f(x) = \{(1,2), (3,-1), (4,2), (-1,6)\}$$

$$\text{الف) } f(2x) = \{(0,2), (1,0), (2,2), (-2,6)\}$$

$$\text{ب) } f(x^2) = \{(1,2), (\sqrt{3}, -1), (2,2), (-\sqrt{6}, 6)\} \rightarrow \begin{cases} n^2=1 \rightarrow n=\pm 1 \\ n^2=3 \rightarrow n=\pm\sqrt{3} \\ n^2=4 \rightarrow n=\pm 2 \end{cases}$$

$$\text{ج) } 2g^2(x)+1 = \{(-2,11), (1,2), (3,9), (-1,1)\}$$

$$\text{د) } \frac{2f}{g} = \{(1,-4), (3,-1), (-1,6)\}$$

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$$g = \{(5,1), (2,3), (-2,6), (-1,2), (3,3)\} \quad f(x) = \{(2,1), (3,1), (4,9), (-2,0)\}$$

$$h = f+g \Rightarrow h = \{(2,5), (-2,9), (3,5)\}$$

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$$h = \frac{\sqrt{3x}-x}{(x-2)([x]+[-x])+1} \rightarrow 3x \geq 0 \Rightarrow x \geq 0 \quad \sqrt{3x}-x \geq 0 \quad \sqrt{3x} \geq x \rightarrow 3x \geq x^2 \rightarrow 3 \geq x \quad x \neq 0$$

$$\Rightarrow D_f = [0, 1, 3]$$

$$(x-2) \cdot x$$

$$(x-2)=1$$

$$\rightarrow x=3 \rightarrow [x]+[-x] \neq -1 \Rightarrow \text{مخرج صفر نمی شود}$$

$$g+1 \rightarrow \begin{cases} n \in \mathbb{Z} \rightarrow g(n)+1 = 1 \checkmark \\ n \notin \mathbb{Z} \rightarrow g(n)+1 = 0 \times \end{cases}$$

$$n \notin \mathbb{Z} \rightarrow g(n)+1 = 0 \times$$

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$g(x) = \{(1, 3), (2, 2), (4, 6), (5, 1)\} \text{ , } f(x) = \sqrt{5x - x^2} - 4 \text{ , } h(x) = \frac{f(x)}{g(x)}$ $h(x) = \{(1, \frac{3\sqrt{5}}{4}), (2, 1), (4, 0), (\cancel{5, 0})\}$ $D_f \rightarrow 5x - x^2 - 4 \geq 0 \rightarrow x^2 - 5x + 4 \leq 0 \rightarrow \boxed{1 \leq x \leq 4}$ $f(2) = \sqrt{10 - 4 - 4} = \sqrt{2} \rightarrow \frac{f}{g}(2) = \frac{\sqrt{2}}{2}$	٦
الف) $y = x^3 - 3x^2 + 3x$ $(x-1)^3 = x^3 + 1 + 3x - 3x^2 = x^3 - 3x^2 + 3x + 1 \Rightarrow y = (x-1)^3 + 1$ $y-1 = (x-1)^3 \Rightarrow \sqrt[3]{y-1} = x-1 \rightarrow x = \sqrt[3]{y-1} + 1 \Rightarrow R_f = \mathbb{R}$ ب) $y = \frac{1}{x^2 - 2x}$ $y = \frac{1}{(x-1)^2 - 1} \rightarrow y(x-1)^2 - y = 1$ $(x-1)^2 = \frac{1+y}{y} \rightarrow x-1 = \sqrt{\frac{1+y}{y}} \rightarrow x = \sqrt{\frac{1+y}{y}} + 1 \Rightarrow y \neq 0$ $R_f = (-\infty, -1] \cup (0, +\infty)$	٧
الف) $y = x^2 - 4x + 10 \rightarrow \min \rightarrow x_{\min} = -\frac{b}{2a} = \frac{4}{2} = 2 \Rightarrow y_{\min} = 6 \Rightarrow R_f = [6, +\infty)$ ب) $y = -x^2 + 6x + 3 \rightarrow \max \rightarrow x_{\max} = -\frac{b}{2a} = -\frac{6}{-2} = 3 \Rightarrow y_{\max} = 12 \Rightarrow R_f = (-\infty, 12]$ ج) $y = \sqrt{x^2 - 4x - 3} \rightarrow \min \rightarrow x_{\min} = -\frac{b}{2a} = \frac{4}{2} = 2 \Rightarrow y_{\min} = -1 \Rightarrow R_f = \sqrt{[-1, +\infty)} = [0, +\infty)$ د) $y = \sqrt{6x - x^2} \rightarrow \max \rightarrow x_{\max} = -\frac{b}{2a} = -\frac{6}{-2} = 3 \Rightarrow y_{\max} = 3 \Rightarrow R_f = \sqrt{(-\infty, 9]} = [0, 3]$	٨
الف) $y = x^3 - 5x^2 + 2x + 1 \rightarrow R_f = \mathbb{R}$ ب) $y = x^3 - 6x^2 + 3x + 2 \rightarrow R_f = \mathbb{R}$ ج) $y = \sqrt{x^3 - 6x^2 + 5x + 1} \rightarrow R_f = \sqrt{\mathbb{R}} = [0, +\infty)$ د) $y = (x^3 - 4x^2 + 3x + 1)^2 \rightarrow R_f = \mathbb{R}^+ = [0, +\infty)$	٩
الف) $y = \frac{3x+1}{x-2} \rightarrow R_f = \mathbb{R} - \{\frac{a}{b}\} = \mathbb{R} - \{3\}$ ب) $y = \frac{2x+1}{x+1} \rightarrow R_f = \mathbb{R} - \{1\}$	١٠

$$f(n) = \sqrt{x-r+r\sqrt{n-r}+r} = \sqrt{(\sqrt{n-r}+r)^2} = |\sqrt{n-r}+r| = \sqrt{n-r}+r \quad (1)$$

$$g(n) = \sqrt{x-r-r\sqrt{n-r}+r} = \sqrt{(\sqrt{n-r}-r)^2} = |\sqrt{n-r}-r| \xrightarrow{n \geq 1} \sqrt{n-r}-r$$

$$f(n)+g(n) = \sqrt{n-r}+r+\sqrt{n-r}-r = 2\sqrt{n-r} \xrightarrow{\begin{matrix} a=0 \\ b=r \\ c=-r \end{matrix}} \frac{a+b}{c} = \frac{r}{-r} = -\frac{1}{r}$$

$$f(2n) = \left\{ \left(\frac{1}{r}, 2\right) \left(\frac{r}{r}, -1\right) (2, r) \left(-\frac{1}{r}, 4\right) \right\} \quad n \text{ های } f \text{ باید حتمی بر ۲ بیفتند!} \quad (2)$$

$$f(5) = \left\{ (1, 2) (-1, 2) (\sqrt{3}, -1) (-\sqrt{3}, -1) (2, 2) (-2, 2) \right\} \quad \text{هرگاه } n \text{ های } f \text{ را برابر } n^2 \text{ قرار دهیم!}$$

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

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

$$f(n) = \frac{\sqrt{\sqrt{3n}-n}}{n-r} \rightarrow \begin{cases} n \neq 2 \\ n \geq 0 \end{cases} (\sqrt{3n}) \rightarrow Df = [0, 3] - \{2\} \quad (3)$$

$$\begin{cases} \sqrt{3n}-n \geq 0 \rightarrow 3n \geq n^2 \rightarrow 0 \leq n \leq 3 \end{cases}$$

$$g(n)+1 \neq 0 \rightarrow g(n) \neq -1 \rightarrow [n] + [-n] \neq -1 \rightarrow n \in \mathbb{Z}$$

$$D \frac{f}{g+1} = \left\{ Df \cap Dg, g(n) \neq -1 \right\} = \left\{ 0, 1, 3 \right\}$$

$$\begin{matrix} \downarrow \\ [0, 3] - \{2\} \cap \mathbb{Z} \end{matrix}$$

$$Df \rightarrow \Delta u - u^r - \varepsilon \geq \cdot \rightarrow u^r - \Delta u + \varepsilon \leq \cdot \rightarrow 1 \leq n \leq 2$$

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$$Df \cap Dg = \{1, 2, 3\}$$

$$\frac{f}{g} = h = \left\{ (1, 0) \left(2, \sqrt{\frac{2}{r}} \right) (3, 0) \right\}$$