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B. زنگنه

حورا کبایعی زاده کسوف

Name.

$$f(x) = \sqrt{x+5} \sqrt{x-5}$$

 $x > 5$

$$\rightarrow \sqrt{x+5} \sqrt{x-5} + \sqrt{x-5} \sqrt{x-5} = \quad (1 \text{ سوال})$$

$$g(x) = \sqrt{x-5} \sqrt{x-5}$$

$$f(x) + g(x) = a + b \sqrt{x+c}$$

$$-a + b \sqrt{x+c}$$

$$\rightarrow \sqrt{x-5} = t \rightarrow x-5 = t^2 \rightarrow x = t^2 + 5$$

$$\frac{a+b}{c} = ?$$

$$\rightarrow \sqrt{t^2 + 5 + 5t} + \sqrt{t^2 + 5 - 5t} = \sqrt{(t+5)^2} + \sqrt{(t-5)^2} = |t+5| + |t-5|$$

$$\rightarrow t + \sqrt{x-5} \geq \sqrt{1-5} = 2 \rightarrow t \geq 0 \rightarrow t+5 + t-5 = 2t = 2\sqrt{x-5}$$

$$\rightarrow a + b \sqrt{x+c} = 2\sqrt{x-5} \rightarrow a=0, b=2, c=-5$$

$$\frac{a+b}{c} = \frac{0+2}{-5} = -\frac{2}{5}$$

$$f(x) = \frac{x+2}{x^2-5x+3}$$

$$\rightarrow \frac{x+2}{(x-3)(x-1)}$$

$$\rightarrow x+2 \neq 0 \rightarrow x \neq -2$$

$$(x-3)(x-1) \neq 0 \rightarrow x \neq 1, x \neq 3$$

(2 سوال)

$$g(x) = \{(2, 1), (1, 0), (3, 0), (0, 4)\}$$

$$\frac{g}{f} = ?$$

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

$$\rightarrow \frac{g}{f} = \{(2, -\frac{1}{f}), (0, 6)\}$$

$$f(x) = \{(1, 2), (3, -1), (4, 2), (-1, 4)\}$$

$$g(x) = \{(-2, 3), (1, -1), (3, 2), (-1, 0)\}$$

$$f(x) = \{(4, 2), (3, -1), (2, 2), (-4, 4)\}$$

باید تقسیم بدیم

(3 سوال)

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ب) $f(n^2) = \{(1, 2), (\sqrt{3}, 2-1), (2, 2)\} \leadsto \sqrt{-1} = \text{قصه نشده}$

ج) $2g^r(n)+1 = \{(-2, 19), (1, 23), (3, 9), (-1, 1)\}$

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

$f(n) = \{(2, 1), (3, 1), (4, 9), (-2, 0)\}$

(سوال 4)

$g(n) = \{(0, 1), (2, 3), (-2, 4), (-1, 2), (3, 3)\}$

$h = f + g \rightarrow h = \{(2, 0), (3, 0), (-2, 4)\}$

(سوال 5)

$f(n) = \sqrt{\frac{3n}{n-2}} - n \leadsto 3n \geq 0 \leadsto n \geq 0 \rightarrow \sqrt{3n} - n \geq 0 \rightarrow \sqrt{3n} \geq n$

$\rightarrow 3n \geq n^2 \rightarrow n^2 - 3n \leq 0 \rightarrow n(n-3) \leq 0 \rightarrow \begin{matrix} 0 \leq n \leq 3 \\ n-2 \neq 0 \\ n \neq 2 \end{matrix} \left\{ D_f = [0, 2) \cup (2, 3] \right\}$

$g(n) = [n] + [-n] \rightarrow D_g = \mathbb{R}$

$D_f = [0, 2) \cup (2, 3] \subset \mathbb{R}$

$\left(\frac{f}{g+1}\right)(n) = \frac{f(n)}{g(n)+1} \neq 0 \rightarrow n \in \mathbb{Z} \leadsto D = D_f \cap \mathbb{Z} = \{0, 1, 3\}$

(سوال 6)

$f(n) = \sqrt{5n - n^2 - 4} \rightarrow n^2 - 5n + 4 \leq 0 \rightarrow (n-1)(n-4) \leq 0 \rightarrow$

$1 \leq n \leq 4 \leadsto D_f = [1, 4]$

$g(n) = \{(1, 3), (2, 2), (3, 4), (0, 1)\}$

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



الف) $y = x^3 - 3x^2 + 3x \rightarrow y-1 = (x-1)^3 \rightarrow \sqrt[3]{y-1} = x-1 \rightarrow x = \sqrt[3]{y-1} + 1$ (سؤال ٧)

$\rightarrow R = (-\infty, +\infty) = \mathbb{R}$

ب) $y = \frac{1}{x^2 - 2x} \rightarrow y(x^2 - 2x) = 1 \rightarrow yx^2 - 2yx - 1 = 0 \rightarrow \Delta = 4y^2 + 4y = 4y(y+1)$
 $4y(y+1) \geq 0 \rightarrow y(y+1) \geq 0$

$\rightarrow y \leq -1 \text{ or } y \geq 0 \rightarrow 2y \pm \frac{\sqrt{\Delta}}{2y} \leq 1 \rightarrow 2y \neq 0 \rightarrow y \neq 0 \rightarrow$

$R = (-\infty, -1] \cup [0, +\infty)$

الف) $y = x^2 - 4x + 10 \rightarrow \text{ext}[\frac{1}{4}](\min) \rightarrow y \geq 6 \rightarrow R = [6, +\infty)$ (سؤال ١١)

ب) $y = -x^2 + 4x + 3 \rightarrow \text{ext}[\frac{1}{4}](\max) \rightarrow y \leq 7 \rightarrow R = (-\infty, 7]$

ج) $y = \sqrt{x^2 - 6x - 4} \rightarrow \text{ext}[\frac{1}{4}](\min) \rightarrow y \geq -1 \rightarrow y \geq 0 \rightarrow R = [0, +\infty)$

د) $y = \sqrt{9x - x^2} \rightarrow \text{ext}[\frac{1}{4}](\max) \rightarrow y \leq 3 \rightarrow 0 \leq y \leq 3 \rightarrow R = [0, 3]$

الف) $y = x^3 - 6x^2 + 9x + 1 \rightarrow R = (-\infty, +\infty) = \mathbb{R}$

(سؤال ٩)

ب) $y = x^3 - 4x^2 + 3x + 2 \rightarrow R = (-\infty, +\infty) = \mathbb{R}$

ج) $y = \sqrt{x^2 - 4x + 5} \rightarrow \sqrt{(-\infty, +\infty)} \rightarrow R = [0, +\infty)$

د) $y = (x^3 - 6x^2 + 9x + 1)^2 \rightarrow ((-\infty, +\infty))^2 \rightarrow R = [0, +\infty)$

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$$\text{a)} \quad y = \frac{r(n+1)}{n-r} \longrightarrow R = R - \{r\}$$

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$$\text{b)} \quad y = \frac{r(n+1)}{n+1} \longrightarrow R = R - \{r\}$$

