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مسئله ۱۰۰

مسئله ۱۰۱

$$\sqrt{f(n) - n} \geq 0$$

الف)  $n \geq 1$ 

$$\begin{aligned} r(n-r-n) &\geq 0 \\ r(n-r) &\geq 0 \\ rn &\geq r \\ n &\geq 1 \end{aligned}$$

(n &lt; 1)

$$\begin{aligned} rn+r-n &= n+r \\ n+r &\geq 0 \\ n &\geq -r \\ -r \leq n < 1 \end{aligned}$$

$$D_f = [-r, +\infty)$$

مسئله ۱۰۲

$$\begin{aligned} r(a+r)(a+r) &= ra-r+a \\ f(a+r) &= fa-r \end{aligned}$$

$$f(a-1) = f(a-1)$$

$$10a = -11 \rightarrow a = -\frac{11}{10} = -1.1$$

مسئله ۱۰۳

$$\begin{aligned} n > 0 \\ \sqrt{r+r} &= \frac{\sqrt{r+1}}{\sqrt{r}} \quad \sqrt{r-r} = \frac{\sqrt{r}-1}{r} \quad \begin{aligned} f(r+\sqrt{r}) &= \sqrt{r}+r \\ f(r-\sqrt{r}) &= \sqrt{r}+r \end{aligned} \\ \sqrt{r} + \frac{1}{\sqrt{r}} &= \frac{\sqrt{r}+\sqrt{r}}{r} + \frac{\sqrt{r}-\sqrt{r}}{r} = \sqrt{r} \quad f(r+\sqrt{r}) + f(r-\sqrt{r}) = 2(\sqrt{r}+r) = 2\sqrt{r}+2r \end{aligned}$$

$$\begin{aligned} \begin{cases} rf(n) - rf(-n) = rn^2 - n \\ rf(-n) - rf(n) = rn^2 + n \end{cases} \quad \begin{aligned} rf(n) - rf(-n) &= rn^2 - n \\ rf(-n) - rf(n) &= rn^2 + n \end{aligned} \\ \begin{aligned} rf(n) - rf(-n) &= rn^2 - n \\ rf(-n) - rf(n) &= rn^2 + n \end{aligned} \quad \begin{aligned} rf(n) - rf(-n) &= rn^2 - n \\ rf(-n) - rf(n) &= rn^2 + n \end{aligned} \end{aligned}$$

مسئله ۱۰۴

$$\begin{aligned} n \rightarrow (r)f(n) &= rn-1 \rightarrow rf(0) = rn-1 \\ n \rightarrow r \rightarrow f(0) &= r+rn+rn-1 \quad f(0) = \frac{rn-1}{r} \end{aligned}$$

مسئله ۱۰۵

$$\begin{aligned} f\left(\frac{1}{n}\right) + f\left(\frac{1}{n}\right) &= (an+b) + \left(a \cdot \frac{1}{n} + b\right) = an+b + \frac{a}{n} + b = an + \frac{a}{n} + 2b \\ an + \frac{a}{n} + 2b &= rn^2 - 1rn + r \end{aligned}$$

مسئله ۱۰۶

$$rn = r \neq 0$$

$$f(-1) + f(-1) = r(-1)^2 - 1r(-1) + r \rightarrow rf(-1) = r+1r+r = 1r \rightarrow f(-1) = \frac{1}{2}r$$

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تکلیف

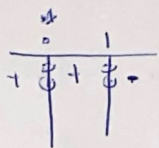
در مسائل

$$f(x) = \sqrt{\frac{x-1}{x}} - \frac{x}{x-1} \geq 0$$

$$D_f = (-\infty, 0) \cup (0, 1)$$

مسئله

$$\frac{x^2 - x - 1}{x(x-1)} \geq 0$$



$$\frac{1}{x+1} - \frac{2}{x} \geq 0$$

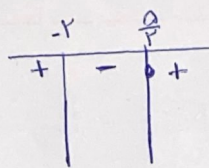
$$D_f = \mathbb{R} - \{-1, 0, 1, -2\}$$

$$f(x) = \sqrt{\left(\frac{1}{x} - 9\right)(xy - x^2)} \geq 0$$

الف)

$$\frac{1}{x} - 9 \geq 0$$

$$xy - x^2 \geq 0$$



$$(-\infty, -2] \cup \left[\frac{1}{9}, +\infty\right)$$

$$\sqrt{x-1} + \sqrt{y+1} = 3$$

$$\sqrt{y+1} = 3 - \sqrt{x-1} \geq 0$$

$$x-1 \geq 0$$

$$y+1 \geq 0$$

$$\sqrt{x-1} \leq 3 \rightarrow x-1 \leq 9 \rightarrow x \leq 10$$

$$x \geq 1$$

$$y \geq -1$$

$$x = [1, 10]$$

$$x^2 - x - 2 > 0$$

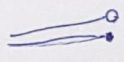
$$(x+1)(x-2) > 0$$

$$(-\infty, -1) \cup (2, +\infty)$$

مسئله

$$\sqrt{x-1} + 1 \neq 0$$

$$\sqrt{x-1} \neq -1$$



$$\frac{-1}{x-1} \geq 0$$

$$\sqrt{x-1} \geq 0$$

$$x-1 \geq 0$$

$$x \geq 1$$

$$x \leq 1$$

$$D_f = (-\infty, -1) \cup (2, +\infty)$$

مسئله

$$\sqrt{4ax - 2x} \geq 0$$

$$x + ax - 2x \geq 0$$

$$1 + a - 2 = 0$$

$$1 = 2a$$

$$a = \frac{1}{2}$$

$$x \neq \frac{1}{a} - 2x \geq 0$$

$$(x+2)(x-1) \geq 0$$

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

$$= \frac{-\frac{1}{2} + \frac{\sqrt{2}}{2}}{x} = \frac{\sqrt{2} - 1}{x} = \frac{\sqrt{2} - 1}{2} = 0$$

$$\left(\frac{\sqrt{2}}{2} - \frac{1}{2} = 1\right)$$