

14, 25 باقی حل کن!

(به کمک خدا)

عالمه سیفی - یازدهم دختر

1) $f(n) = \sqrt{\frac{n-1}{n} - \frac{n}{n-1}}$ (1)

$\hookrightarrow \frac{1-2n}{n(n-1)} \geq 0$

n	0	1	∞
y	+	-	-

$(-\infty, 0) \cup [1, \infty)$

2) $f(n) = \frac{1}{n+1} - \frac{2}{n}$

$\frac{1}{n+1} + \frac{1}{n+2} \hookrightarrow n \neq -1, 0, 1, -2$

$P = R - \{-2, -\frac{3}{2}, -1, 0, 1\}$ $\frac{3}{n-1} + \frac{1}{n+2} = 0 \rightarrow n \neq \frac{3}{2}$

(2) $f(n) = \sqrt{[(\frac{1}{n})^2 - 9] (22 - 5^n)}$ (2)

$(\frac{1}{n})^2 = 9 \rightarrow n = \pm \frac{1}{3}$

$[-\frac{1}{3}, \frac{1}{3}]$

n	-2	0	15
y	+	+	+

3) $\sqrt{n-1} + \sqrt{y+1} = 3 \rightarrow \sqrt{n-1} = 3 - \sqrt{y+1}$

$\hookrightarrow n-1 \geq 0$ $\hookrightarrow \sqrt{y+1} = 3 - \sqrt{n-1} \rightarrow \sqrt{y+1} \leq 3 \rightarrow y+1 \leq 9 \rightarrow y \leq 8$

$n^2 - 1 > 0 \rightarrow n > 1$

$I \cap II \rightarrow n \leq -1 \cup n \geq 2$

Ⓐ $n \geq 2$ $n \leq -1$

$n^2 - n - 2 > 0$ $(n-2)(n+1) > 0$

$\sqrt{-n^2 + an + 3} \sim -n^2 + an + 3 > 0$ (4)

$-(n+2)(n+3)$ $n = -2$ $y = 0 \rightarrow -8 - 2a + 3 = 0$ $-2a - 5 = 0 \rightarrow a = -\frac{5}{2}$

$= -n^2 - (5a+2)n - 6$

$-2b = +3 \rightarrow b = -\frac{3}{2}$ $b = +\frac{3}{2}$

چون b در بازه گفته شده است پس هر شش این را طبقه اول است

$f(n) - n \geq 0$ $\begin{cases} 3n - 2 - n = 2n - 2 & n \geq 1 \\ 2(n-1) \rightarrow n \geq 1 \end{cases}$ (5)

$3n + 3 - n = 2n + 3$ $n < 1$ $n + 3 \geq 0 \rightarrow n \geq -3$ $\hookrightarrow n \geq -3$

PAPCO

$D_f = [-3, +\infty)$

$$f\left(\sqrt{\frac{x}{x+1}}\right) = \sqrt{\left(\frac{\sqrt{x+1}}{x}\right)^2} - \sqrt{\frac{x}{x+1}} \quad (6)$$

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

5

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

$$f(a) = \frac{a+1}{a-1} \rightarrow f(f(a)) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = a \quad (7)$$

10

بناشہ سے \$a \neq 1\$ قابل قبول است!

$$\frac{a+1+a-1}{a-1} = \frac{a(a+1+a-1)}{a-1} \rightarrow 2a = 2a^2$$

$$2(a^2 - a) = 0$$

$$2a(a-1) = 0$$

یہاں \$a \neq 1\$

15

$$n^2 - 5n = -5 \rightarrow n = 2 \quad (8)$$

$$\sqrt{n^2 - 1} = 2 \rightarrow n^2 - 1 = 4 \rightarrow n = \pm \sqrt{5}$$

20

$$f(x) \Rightarrow n = 1 \rightarrow 1 - 5 + 6 = 2$$

$$f(-x) \rightarrow n = -1 \rightarrow 1 - 5 + 6 = 2$$

اصل میں منفی

$$x + 3 = -3 \rightarrow x = -6 \rightarrow 3 + 3 + 6 = 12$$

$$f(x) \neq f(-x) = 2 \times 6 = 12$$

25

$$t \cos n + a \cos n = 3.0 \quad (10)$$

$$t = \cos n \rightarrow t + a \cos n = 3.0$$

$$1 + 1.0t - 3 = 0 \rightarrow \Delta = 3.2$$

$$t = \frac{-1.0 \pm \sqrt{1.0}}{1.0} = \frac{-1.0 \pm 1.0}{1.0}$$

$$\cos n = \frac{1}{2}$$

30

$$\tan n = \frac{\sin n}{\cos n}$$

$$\frac{1 - \cos n}{\cos n} = \frac{1 - \frac{1}{2}}{\frac{1}{2}} = \frac{\frac{1}{2}}{\frac{1}{2}} = 1$$

(۲-الف) $((\frac{1}{x})^n - 4)(32 - x^n) \geq 0 \rightarrow \frac{-2}{+0} - \frac{2}{-0} + \rightarrow Df = (-\infty, -2] \cup [\frac{5}{2}, +\infty)$

$(\frac{1}{x})^n = 4 \rightarrow x = -2 \quad 32 = x^n \rightarrow x = \frac{5}{2}$

(۲-ب) $\sqrt[n]{x-1} + \sqrt{y+1} = 3$, $\sqrt{y+1} = 3 - \sqrt[n]{x-1} \rightarrow 3 - \sqrt[n]{x-1} \geq 0 \rightarrow \sqrt[n]{x-1} \leq 3 \rightarrow x \leq 82$

$\downarrow$
 $x-1 \geq 0 \rightarrow x \geq 1$ I

I, II $\rightarrow 1 \leq x \leq 82 \rightarrow Df = [1, 82]$

$f(n) - n = \begin{cases} 3n-2-n & n \geq 1 \\ 2n+3-n & n < 1 \end{cases} = \begin{cases} 2n-2 & n \geq 1 \\ n+3 & n < 1 \end{cases}$ -Δ

$f(n) - n \geq 0 \rightarrow \begin{cases} 2n-2 \geq 0 \rightarrow n \geq 1 \checkmark \\ n+3 \geq 0 \xrightarrow{n < 1} -3 \leq n < 1 \checkmark \end{cases} \rightarrow Df = [-3, +\infty)$

باید به شکل زیر مشخص است!

$f(f(a)) = \frac{f(a)+1}{f(a)-1} = a \rightarrow \frac{\frac{a+1}{a-1}+1}{\frac{a+1}{a-1}-1} = \frac{\frac{a+1+a-1}{a-1}}{\frac{a+1-a+1}{a-1}} = \frac{2a}{2} = a$ -V

$x \in Df \rightarrow x \in \mathbb{R} - \{1\}$

پس به ازای تمامی نقاط در دامنه f بهتر است ✓

$x+3=2 \rightarrow x=-1 \rightarrow f(x) = 1^2 - 2 + 4 = 3$ -9

$x+3=-5 \rightarrow x=-8 \rightarrow f(-8) = (-4)^2 - 2(-4) + 4 = 16 + 8 + 4 = 28$

$f(x) \times f(-x) = 3 \times 28 = 84$