

(به نام خدا)

عالمه سیفی - یاقوتی

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

$$\hookrightarrow \frac{1-2n}{n(n-1)} \geq 0 \quad \begin{array}{c|c} n & 0 \quad 1 \quad \infty \\ \hline y & + \quad - \quad - \end{array}$$

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

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

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

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

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

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

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

$$\begin{array}{c|c} n & -\frac{1}{3} \quad \frac{1}{3} \\ \hline y & - \quad + \quad - \end{array}$$

$$3) \sqrt{n-1} + \sqrt{y+1} = 2 \rightarrow \boxed{n \geq 1}$$

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

$$\textcircled{I} \quad \begin{array}{c} n \geq 2 \\ n \leq -1 \end{array}$$

$$\leftarrow \frac{n}{y} + \frac{1}{y} = \frac{2}{y}$$

$$n^2 - 1 \geq 0 \rightarrow n \geq 1 \quad \textcircled{II} \quad n \leq -1$$

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

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

$$-(n+2)(n+3) \quad \begin{array}{l} n = -2 \\ y = 0 \end{array} \rightarrow -8 - 2a + 2 = 0 \rightarrow -2a - 6 = 0 \rightarrow a = -3$$

$$= -n^2 - (b+a)n - 2b$$

$$-2b = +2 \rightarrow b = -1 \rightarrow b = +1$$

$$\frac{3}{2} - \frac{1}{2} = 1$$

چون b در بازه گفته شده است پس هر چند این را تصدیق است

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

$$3n + 3 - n = 2n + 3 \quad n < 1$$

$$\hookrightarrow \boxed{n \geq 1}$$

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

$$\frac{\sqrt{x+r}}{r} - r(\sqrt{x+r}) = \frac{\sqrt{x+r}}{r}$$

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$$\frac{r+\epsilon\sqrt{r}-\epsilon\sqrt{r}-1}{r} = \boxed{-\frac{1}{r}}$$

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

$$\frac{a+1}{a-1}+1 \quad a \neq 1$$

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

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

$$ra(a-1) = 0 \rightarrow \boxed{a=1}$$

i.e. $a=1$

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$$n^r - \epsilon n = -\epsilon \rightarrow n = r \quad (8)$$

$$\sqrt{n^r - 1} = r \rightarrow n^r - 1 = \epsilon \rightarrow \boxed{n = \pm \sqrt{\epsilon}}$$

$$f(\epsilon) \Rightarrow n=1 \rightarrow 1 - \omega + \epsilon = r \quad (9)$$

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$$f(-\epsilon) \rightarrow n=-1 \rightarrow 1 - \omega + \epsilon = \epsilon r$$

$$f(\epsilon) \times f(-\epsilon) = r \times \epsilon \epsilon = \boxed{111}$$

$$\epsilon \cos^r n + \omega \cos n = r.d \quad (10)$$

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$$t = \cos n \rightarrow \epsilon t^r + \omega t = r.d$$

$$1t^r + 1.0t - r = 0 \rightarrow \Delta = r^2 r^2$$

$$t = \frac{-1.0 \pm 1r}{1r} = \frac{-1 \pm 1r}{1r} = \frac{-1 \pm r}{1r}$$

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

cos n = 1/r

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

$$\frac{1 - \cos^r n}{\cos^r n} = \frac{1 - \frac{1}{r^r}}{\frac{1}{r^r}} = \frac{\frac{r^r - 1}{r^r}}{\frac{1}{r^r}} = \boxed{r^r - 1}$$