

۱۹/۷۵ آئین عالی بنویس

۱. $\lim_{n \rightarrow \infty} \frac{1}{n} = 0$

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

$$\frac{1}{n+1} + \frac{1}{n+1} = \frac{2}{n+1} > \frac{1}{n+1} > 0$$

$$\frac{(n+4)(n-1)}{(n-1)(n+1)} = \frac{5n+3}{(n-1)(n+1)} > 0 \Rightarrow n \in [1, 1] \frac{d}{dx}$$

$$y = \sqrt{\frac{n-1}{n}} = \frac{(n-1)^{\frac{1}{2}} (n)^{\frac{1}{2}}}{n(n-1)} \quad (2)$$

$$\frac{n^{\frac{1}{2}} - (n+1) - n^{\frac{1}{2}}}{n(n-1)} > 0 \Rightarrow \frac{1 - 2n}{n(n-1)} > 0$$

$$+ \frac{1}{n} - \frac{1}{n+1} + \frac{1}{n+1} = \frac{1}{n} > 0 \Rightarrow \frac{1}{n} > 0$$

جواب: $n \neq -1, n \neq 0$
 $D_f = \mathbb{R} - \{1, -1, 0, -\frac{1}{2}\}$

$$\sqrt{x-1} + \sqrt{y+1} = 2 \quad (1)$$

$$y = 1 + \sqrt{x-1} - \sqrt{x-1} \Rightarrow x \geq 1 \quad (2)$$

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

$$\Rightarrow x-1 \leq x \Rightarrow x \leq 1 \quad (3)$$

$$\cap (2) \Rightarrow D_f = [1, 1]$$

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

$$\Rightarrow \frac{(n-1)^2 - 1}{(n+1)^2 - 1} > 0 \Rightarrow \frac{n^2 - 2n}{n^2 + 2n} > 0$$

$$n > 2 \Rightarrow n > 2 \Rightarrow n > 2$$

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

$$f(n) = \frac{\log(n^2 - n - 1)}{\sqrt{n^2 - 1} + 1} \Rightarrow n^2 - n - 1 > 0 \quad (1)$$

$$\Rightarrow n > 1 \Rightarrow n > 1 \Rightarrow n > 1$$

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

$$f(n) = \begin{cases} n^2 & n \geq 1 \\ n^2 & n < 1 \end{cases} \quad g(n) = \sqrt{f(n)} \Rightarrow y_1 = n^2 \Rightarrow y_1 \in [1, +\infty)$$

$$y_2 = n^2 \Rightarrow y_2 \in (-\infty, 1)$$

$$y_1 \Rightarrow \frac{1}{n^2} \Rightarrow \frac{1}{n^2} \in [1, +\infty)$$

$$y_2 \Rightarrow \frac{1}{n^2} \Rightarrow \frac{1}{n^2} \in (-\infty, 1)$$

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

$$f(n) = \sqrt{r^2 a n - n^2} \quad D_f = [a, b] \Rightarrow r^2 a - r^2 = 0$$

$$\Rightarrow -a^2 - \frac{1}{r^2} a + r^2 = 0 \Rightarrow -\frac{1}{r^2} = \frac{-r^2 \pm \sqrt{r^4 + 4r^2}}{2r^2}$$

$$a+b \Rightarrow \frac{r^2}{r^2} = 1$$

$$f(n) = 2n^2 - 5n$$

$$f\left(\sin \frac{a}{p} + \cos \frac{a}{p}\right) \Rightarrow \sin \frac{a}{p} + \cos \frac{a}{p} = \sqrt{\frac{p}{p} + 1}$$

$$f\left(\sqrt{\frac{p}{p} + 1}\right) = 2\left(\sqrt{\frac{p}{p} + 1}\right)^2 - 5\left(\sqrt{\frac{p}{p} + 1}\right) \Rightarrow 2\left(\frac{p}{p} + 1 + \sqrt{\frac{p}{p} + 1}\right) - 5\left(\sqrt{\frac{p}{p} + 1}\right)$$

$$\frac{p}{p} + 1 + 2\sqrt{\frac{p}{p} + 1} - 5\sqrt{\frac{p}{p} + 1} - 5 = 1 + \frac{p}{p} - 3\sqrt{\frac{p}{p} + 1} - 5 = -\frac{1}{p}$$

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

$$\frac{\frac{n+1+n-1}{n-1}}{\frac{n+1-n+1}{n-1}} \Rightarrow \frac{2n}{2} = n \Rightarrow a = n$$

بنابراین عبارت مرتبه شد

1, 1, 5

$$f(n) = n^2 - 5n \quad g(n) = \sqrt{n^2 - 1} \quad f(g(n)) = 5$$

$$f(n) = 5 \Rightarrow n^2 - 5n = 5 \Rightarrow n = 4 \Rightarrow g(n) = 3 \Rightarrow \sqrt{n^2 - 1} = 3$$

$$n^2 - 1 = 9 \Rightarrow n^2 = 10 \Rightarrow n = \sqrt{10}$$

$$f(n+c) = n^2 - 5n + 4 \Rightarrow f(n+c) = (n-c)(n-c) \Rightarrow f(n) = (n-c)(n-c) = 4$$

$$f(c) = (-c)(-c) = 4$$

$$f(c) = (-c)(-c) = 4 \Rightarrow c = 2$$

$$f(\cos^2 n + \sin^2 n) = \tan^2 n \Rightarrow \cos^2 n + \sin^2 n = \frac{1}{p} \Rightarrow (\cos^2 n + \sin^2 n) = \frac{1}{p}$$

$$\cos^2\left(\frac{1}{p}\right) = \frac{1}{p} \Rightarrow \cos\left(\frac{1}{p}\right) = \frac{1}{\sqrt{p}}$$

مجموعه از دست

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

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

پس برای تمامی نقاط در دایره f بهر است ✓