

تکلیف سب سے پہلے

زحرار حقایق

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

$$x^2 - 2x + 1 - x^2$$

$$(x-1)^2 - x^2$$

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

$$x = \frac{1}{x}$$

$$x=0 \quad x=1$$

$$+ \frac{0}{0} - \frac{1}{0} + \frac{1}{0} -$$

$$D_f = (-\infty, 0) \cup \left[\frac{1}{x}, 1\right)$$

$$x \neq -1 \rightarrow f(x) = \frac{1}{x+1} - \frac{x}{x} \rightarrow x \neq 0$$

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

$$x \neq 1 \quad x \neq -1$$

$$x \neq -\frac{\omega}{\varepsilon}$$

$$\left(\frac{x}{x-1} + \frac{1}{x+1}\right) \neq 0 \rightarrow \frac{\varepsilon x + \omega}{(x-1)(x+1)} \neq 0$$

$$D_f = \mathbb{R} - \left\{-1, -\frac{\omega}{\varepsilon}, -1, 0, 1\right\}$$

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

$$\left(\frac{1}{x}\right)^x - 9 = 0 \rightarrow x = -2$$

$$x^x - \varepsilon^x = 0 \rightarrow x = \frac{\omega}{\varepsilon}$$

$$x = \frac{\omega}{\varepsilon}$$

$$+ \frac{0}{0} - \frac{\omega}{\varepsilon} + \frac{\omega}{\varepsilon} -$$

$$D_f = (-\infty, -2] \cup \left[\frac{\omega}{\varepsilon}, +\infty\right)$$

$$\Rightarrow \sqrt{x-1} + \sqrt{y+1} = \sqrt{r}$$

$$\textcircled{1} \begin{array}{l} x-1 > 0 \\ x > 1 \end{array}$$

$$\textcircled{2} \sqrt{y+1} = \sqrt{r} - \sqrt{x-1}$$

$$\sqrt{r} - \sqrt{x-1} > 0$$

$$\sqrt{x-1} \leq \sqrt{r}$$

$$x-1 \leq r$$

$$x \leq r+1$$

$$\textcircled{1} \cap \textcircled{2} \rightarrow D_f = [1, r+1]$$

$$f(x) = \frac{\log_e (x^2 - x - r)}{\sqrt{x^2 - 1} + 1} \rightarrow x^2 - x - r > 0 \quad \textcircled{3}$$

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

$$x = -1 \quad x = r$$

$$\begin{array}{c} -1 \quad r \\ + \quad - \quad + \end{array}$$

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

$$\textcircled{1} \quad x^2 - 1 > 0$$

$$x^2 > 1 \rightarrow \begin{cases} x > 1 \\ x \leq -1 \end{cases}$$

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

$$\textcircled{2} \sqrt{x^2 - 1} \neq -1 \rightarrow \mathbb{R}$$

همیشه بزرگتر از 0

$$\textcircled{1} \cap \textcircled{2} \cap \textcircled{3} \rightarrow (-\infty, -1) \cup (r, +\infty)$$

$$f(x) = \sqrt{r + ax - x^2}$$

$$[-a, b]$$

$$a+b = r$$

$$\frac{r}{x} - \frac{1}{x} = \frac{b}{x}$$

مساوی

$$\begin{aligned} & -(x+r)(x-b) \\ & \rightarrow -x^2 + (b-r)x + rb \end{aligned}$$

$$-x^2 + (b-r)x + rb = r + ax - x^2$$

$$rb = r \rightarrow b = \frac{r}{r}$$

$$a = b - r \rightarrow \frac{r}{r} - r \Rightarrow a = -\frac{r}{r}$$

$$g(x) = \int f(x) - x, 0 \rightarrow \begin{cases} x > 0 \\ 2x - 4 - x > 0 \end{cases}$$

$$\textcircled{v} \text{ Case : } \begin{cases} x < -1 \\ 4x + 3 - x > 0 \end{cases}$$

$$x + 3 > 0$$

$$x > -3$$

$$[-3, 1) \leftarrow x < 1 \text{ boundary}$$

$$2x - 4 > 0$$

$$x > 1$$

$$\frac{1}{-1} + x > 0 \rightarrow [1, +\infty)$$

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

$$f\left(\sin \frac{\pi}{3} + \cos 4\pi\right) = f \quad f(x) = 4x^4 - 8x$$

$$4\left(\sin \frac{\pi}{3} + \cos 4\pi\right)^4 - 8\left(\sin \frac{\pi}{3} + \cos 4\pi\right) =$$

$$= 4\left(\frac{\sqrt{3}}{2} + 1\right)^4 - 8\left(\frac{\sqrt{3}}{2} + 1\right) = \frac{4}{2} + 4 + 4\sqrt{3} - 4\sqrt{3} - 8 = \frac{4}{2} - 4 = -\frac{1}{2}$$

$$f(f(a)) = a$$

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

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

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

بنابر این رابطه برای هر a به جز مقاری که مخرج صفر شود برقرار است

$$a \neq 1$$

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

$$f(g(a)) = -\varepsilon \quad g(x) = \sqrt{x^2 - 1} \quad h(x) = x^2 - \varepsilon x \quad 1$$

$$f(\sqrt{a^2 - 1}) = -\varepsilon \rightarrow (\sqrt{a^2 - 1})^2 - \varepsilon(\sqrt{a^2 - 1}) = -\varepsilon$$

$$\sqrt{a^2 - 1} = t \quad \begin{cases} a^2 - 1 - \varepsilon \sqrt{a^2 - 1} = -\varepsilon \\ t^2 - \varepsilon t + \varepsilon = 0 \end{cases}$$

$$(t - \varepsilon)^2 = 0$$

$$\hookrightarrow t = \varepsilon \rightarrow \sqrt{a^2 - 1} = \varepsilon$$

$$a^2 - 1 = \varepsilon$$

$$\textcircled{2} \quad a = \pm \sqrt{a^2} = \pm \sqrt{1 + \varepsilon} \quad a^2 = 1 + \varepsilon$$

$$f(\varepsilon) \times f(-\varepsilon) = ? \quad f(x + \varepsilon) = x^2 - \varepsilon x + \varepsilon \quad 4$$

$$x + \varepsilon = \varepsilon \rightarrow x = 0 \rightsquigarrow f(\varepsilon) = (0)^2 - \varepsilon(0) + \varepsilon$$

$$= 0 - 0 + \varepsilon$$

$$\boxed{f(\varepsilon) = \varepsilon}$$

$$x + \varepsilon = -\varepsilon \rightarrow x = -2\varepsilon \rightsquigarrow f(-\varepsilon) = (-2\varepsilon)^2 - \varepsilon(-2\varepsilon) + \varepsilon$$

$$= 4\varepsilon^2 + 2\varepsilon^2 + \varepsilon = 6\varepsilon^2 + \varepsilon$$

$$\textcircled{2} \quad \boxed{f(-\varepsilon) = 6\varepsilon^2 + \varepsilon}$$

$$f(\varepsilon) \times f(-\varepsilon) = \varepsilon \times (6\varepsilon^2 + \varepsilon) = 6\varepsilon^3 + \varepsilon^2$$

$$f(v/a) = \beta \quad f(\epsilon \cos^2 \alpha + \omega \cos \alpha) = \tan^2 \alpha \quad 10$$

$$\epsilon \cos^2 \alpha + \omega \cos \alpha = \mu_1 \omega$$

$$\cos \alpha = t$$

$$\text{or } \epsilon t^2 + \omega t - \mu_1 \omega = 0$$

$$1t^2 + 10t - 10 = 0$$

$$(t - \frac{\epsilon}{1})(t + \frac{10}{1}) = 0 \rightarrow (t - \frac{1}{4})(t + \frac{10}{\epsilon}) = 0$$

$$t = \frac{1}{4}$$

$$t = -\frac{10}{\epsilon}$$

بسیار چون $1 \leq \cos \alpha \leq 1$ و $0 \leq \cos \alpha \leq 1$ پس $\frac{1}{4}$ و $-\frac{10}{\epsilon}$ را می بینیم

$$t = \frac{1}{4} \rightarrow \cos \alpha = \frac{1}{4}$$

$$\tan^2 \alpha = \frac{\sin^2 \alpha}{\cos^2 \alpha}$$

$$\sin^2 \alpha = 1 - \cos^2 \alpha$$

$$1 - \frac{1}{16} = \frac{\mu}{\epsilon}$$

$$\rightarrow \tan^2 \alpha = \frac{\frac{\mu}{\epsilon}}{\frac{1}{16}} = \frac{16\mu}{\epsilon}$$

جواب آخر