

سأه كلف: 5

كلاس: يازهم دختر C

نام خانوادگی: فاطمه زهرا جمال زاده

$$الف) f(n) = \sqrt{\frac{n-1}{n} - \frac{n}{n-1}} \rightarrow \frac{n-1}{n} - \frac{n}{n-1} \geq 0$$

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

$$\frac{0}{+} \frac{+}{-} \frac{1}{+} \frac{-}{-} \rightarrow D_f = (-\infty, 0) \cup \left[\frac{1}{2}, +1\right)$$

$$ب) f(n) = \frac{1}{n+1} - \frac{2}{n} \rightarrow n \neq 0, n \neq -1 \quad I$$

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

$$II \quad \frac{2n+4}{(n-1)(n+2)} \neq 0 \xrightarrow{II, I} D_f = \mathbb{R} - \left\{-\frac{2}{3}, -1, 1, 0, -2\right\}$$

$$ان) f(n) = \sqrt{\left(\left(\frac{1}{2}\right)^n - 9\right)(22 - 5^n)} \rightarrow \left(\frac{1}{2}\right)^n = 9 \rightarrow \boxed{n = -2}$$

$$\frac{-x}{+} \frac{2, 5}{-} \frac{+}{+} \rightarrow D_f = (-\infty, -2] \cup [2, +\infty)$$

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

$$\rightarrow 3 - \sqrt[n]{n-1} \geq 0 \rightarrow 3 \geq \sqrt[n]{n-1} \rightarrow |1| \geq n-1 \rightarrow n \leq 12$$

$$\sqrt[n]{n-1} \rightarrow n-1 \geq 0 \rightarrow n \geq 1 \rightarrow D_f = [1, 12]$$

$$f(n) = \log_{\frac{1}{2}}(n^2 - n - 2) \rightarrow n^2 - n - 2 > 0 \rightarrow (n-2)(n+1) > 0 \quad I \quad (n)$$

$$\sqrt{n^2-1} + 1 \rightarrow \sqrt{n^2-1} \neq -1, \sqrt{n^2-1} \rightarrow n^2-1 \geq 0 \quad II$$

$$I \cap II \rightarrow D_f = (-\infty, -1) \cup (2, +\infty)$$

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

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

(r)

$$\begin{aligned} x = -r &\rightarrow -r - r(-r) + r = 0 \\ -ra = 1 &\rightarrow a = -\frac{1}{r} \end{aligned}$$

$$\Rightarrow f(x) = \sqrt{-x^r - \frac{1}{r}x + r} \rightarrow -x^r - \frac{1}{r}x + r \geq 0$$

$$a+b = -\frac{1}{r} + \frac{1}{r} = 1$$

$$-rx^r - x + r \geq 0$$

$$x^r - x - 1 \geq 0$$

$$(x-r)(x+r) \geq 0 \rightarrow x = \frac{r}{-r} = -r$$

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

$$f(x) = \begin{cases} rx - r & x \geq 1 \\ rx + r & x < 1 \end{cases}$$

$$\rightarrow g(x) = \sqrt{\begin{cases} rx - r & x \geq 1 \\ rx + r & x < 1 \end{cases}}$$

(s)

$$rx - r \geq 0 \rightarrow x \geq 1$$

$$rx + r \geq 0 \rightarrow x \geq -r$$

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

$$f(x) = rx^r - rx$$

(y)

$$f\left(\sin \frac{\pi}{r} + \cos \frac{\pi}{r}\right) = f\left(\frac{\sqrt{r}}{r} + 1\right) \rightarrow r\left(\frac{\sqrt{r}}{r} + 1\right)^r - r\left(\frac{\sqrt{r}}{r} + 1\right)$$

$$\rightarrow r\left(\frac{r}{r} + 1 + \sqrt{r}\right) - \frac{r\sqrt{r}}{r} - r = \frac{r}{r} + r + r\sqrt{r} - r\sqrt{r} - r = \frac{-1}{r}$$

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

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

(v)

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

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

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

$$g(x) = \sqrt{x^r - 1}, f(x) = x^r - rx$$

(1)

$$f(g(x)) = -r \rightarrow f(\sqrt{x^r - 1}) = -r \rightarrow \frac{x^r - 1}{r} - r\sqrt{x^r - 1} + r = 0$$

$$+r - r + r = 0 \rightarrow (t-r)^r = 0 \rightarrow t = r \rightarrow \sqrt{x^r - 1} = r \rightarrow x^r - 1 = r^2 \rightarrow x = \pm \sqrt[r]{r^2 + 1}$$

$$f(n+4) = n^2 - 2n + 4$$

$$f(1) \times f(-4) = (1 - 2 + 4) (16 - 8 + 4) = 3 \times 12 = 36 \quad (9)$$

$$f(r \cos^2 \alpha + 2 \cos \alpha) = \tan^2 \alpha \quad (1)$$

$$r \cos^2 \alpha + 2 \cos \alpha = r, 2 \rightarrow (r \cos^2 \alpha + 2 \cos \alpha - r = 0) \times r$$

$$r \cos^2 \alpha + 2 \cos \alpha - r = 0$$

$$\cos^2 \alpha + 2 \cos \alpha - r = 0$$

$$(\cos \alpha - r) (\cos \alpha + 2) = 0$$

$$\tan^2 \left(\frac{\pi}{4} \right) = (\sqrt{r})^2 = r$$

$$\leftarrow n = \frac{r}{r} \leftarrow \cos \alpha = \frac{r}{r} = 1 \rightarrow \cos \alpha = \frac{-2}{r} = -\frac{2}{r}$$

$$-1 \leq \cos \alpha \leq 1 \rightarrow 0 \leq r \leq 2$$