

نام و نام خانوادگی شماره ۲۳ کلاس A جویدار
 تاریخ
 پاسخنامه تشریحی تکلیف شماره ۲۳ کلاس A
 نام و نام خانوادگی
 تاریخ

$$g'(x) = f'(\tan^2 x + \sqrt{2} \cos x) (2(1 + \tan^2 x)(\tan^2 x) - \sqrt{2} \sin x)$$

$$\Rightarrow f'(2) = g'(x) = \sqrt{2} \rightarrow f'(2) = \frac{\sqrt{2}}{2}$$

(۲)

$$f(x) = \frac{(1 + \cos x)(\cos^2 x - 2 \cos x + 1)}{(1 - \cos x)(1 + \cos x)} = \frac{\cos^2 x - 2 \cos x + 1}{1 - \cos x}$$

$$f(x) - 2g(x) = \frac{\cos^2 x - 2 \cos x}{1 - \cos x} = -\cos x \rightarrow f'(x) - 2g'(x) = \sin x$$

$$x = \frac{3\pi}{2} \rightarrow \sin\left(\frac{3\pi}{2}\right) = -1$$

(۱۵)

$$\lim_{x \rightarrow \left(\frac{3}{\sqrt{2}}\right)^+} \frac{(\varepsilon x - \sqrt{2})\sqrt{ax} - 0}{x - \frac{3}{\sqrt{2}}} = \lim_{x \rightarrow \left(\frac{3}{\sqrt{2}}\right)^+} \frac{\varepsilon \sqrt{ax}}{1} = 2\sqrt{3a}$$

$$\lim_{x \rightarrow \left(\frac{3}{\sqrt{2}}\right)^-} \frac{(3 - \varepsilon x)\sqrt{ax} - 0}{x - \frac{3}{\sqrt{2}}} = \lim_{x \rightarrow \left(\frac{3}{\sqrt{2}}\right)^-} -\varepsilon \sqrt{ax} = -2\sqrt{3a}$$

$$2\sqrt{3a} - (-2\sqrt{3a}) = \varepsilon \sqrt{3a} = 2\sqrt{3} \rightarrow 12a = 4 \rightarrow a = \frac{1}{3}$$

$$y = 2 - ax \xrightarrow{x=\varepsilon} f(\varepsilon) = 2 - \varepsilon a \quad f'(\varepsilon) = -a$$

$$f(\varepsilon) + f'(\varepsilon) = 2 - a\varepsilon = -1 \rightarrow a = \frac{3}{\varepsilon}$$

$$f'(\varepsilon) = a\varepsilon = -\frac{3}{\varepsilon} \quad \checkmark$$

(۲)

$$y = \frac{a+x}{\sqrt{x}} \Rightarrow \frac{a+x}{\sqrt{x}} = \frac{ax-1}{3x+1} \rightarrow 3x^2 + (1-3a)x + 1 = 0 \rightarrow \Delta = 0 \rightarrow$$

$$(1-3a)^2 - 4 = 0 \rightarrow 1-3a = \pm 2 \rightarrow a = \frac{1}{3} \quad \checkmark$$

$$x = \frac{-b}{2a} = \frac{-(1-3a)}{2 \cdot 3} = \frac{3a-1}{6}$$

$$\begin{aligned} & \text{if } a = \frac{1}{3} \rightarrow x = 2 \quad \checkmark \\ & \text{if } a = \frac{1}{3} \rightarrow x = -2 \quad \checkmark \end{aligned}$$

(۲)

۵

$$f(x) = 0 \rightarrow 1 + 2a - b = 0 \rightarrow b = -1 \quad f'(x) = y' \rightarrow 2x^2 + a = 0$$

$$\rightarrow a = -1 \quad b - a = -1 - (-1) = 0$$

2

$$\lim_{n \rightarrow \infty} \frac{(\sin^n x)^n (n \sin^{(n-1)} x) (2n \cos x)}{(1 - \cos x)^n} \Rightarrow \lim_{n \rightarrow \infty} \frac{2n x^{2n} x^{2(n-1)} (2n \cos x)}{n^{2n}}$$

$$\rightarrow \lim_{n \rightarrow \infty} \frac{2^{n+1} x^{2n+1} n^{(n-1)}}{n^{2n}} = 2\sqrt{x} \Rightarrow \begin{cases} 2n-1 = 2m \\ 2^{m+1} x^{2m+1} = 2\sqrt{x} = 2^{\frac{1}{2}} x^{\frac{1}{2}} \end{cases}$$

$$\rightarrow m = \frac{1}{2} \quad n = 1$$

$$2m+1 = 1+1 = 2 \quad \checkmark$$

$$f'(x) = \frac{1}{2\sqrt{x}} (\sqrt{x}-1) - \frac{1}{2\sqrt{x}} (\sqrt{x}+1) = \frac{-1}{\sqrt{x}(\sqrt{x}-1)^2} \rightarrow (f'(x))^{-1}$$

$$= -\sqrt{x}(\sqrt{x}-1)^2 = -\sqrt{x}(\sqrt{x}-1)^2 = \varepsilon - 2\sqrt{x}$$

$$f(u) = \frac{\sqrt{u}+1}{\sqrt{u}-1} \rightarrow \sqrt{u}y - y = \sqrt{u}+1 \rightarrow \sqrt{u}(y-1) = y+1 \rightarrow \sqrt{u} = \frac{y+1}{y-1} \rightarrow u = \left(\frac{y+1}{y-1}\right)^2 \rightarrow y = \left(\frac{u+1}{u-1}\right)^2$$

$$f^{-1}(u) = \left(\frac{u+1}{u-1}\right)^2 \rightarrow (f^{-1})' = 2\left(\frac{u+1}{u-1}\right) \times \frac{-2}{(u-1)^3} \rightarrow (f^{-1}(1))' = 2 \times 2 \times (-1) = -4$$

$$\Delta f = \frac{f(0) - f(-1)}{0 - (-1)} = 1 - (1 - a) = 1 - 1 + a = a = -\frac{1}{2}$$

$$x = -2a = 1 \quad f'(x) = 2(x^2+1)^2(2x)(a x+1) + a(x^2+1)^2 \rightarrow$$

$$f'(1) = 2 \times 2 + 2 \times 1 = 4 - 1 = 3 \quad \checkmark$$

$$\frac{[f_1(\frac{\pi}{4}) - f_1(\frac{\pi}{6})] \times [\frac{\pi}{4} - \frac{\pi}{6}]}{[\frac{\pi}{4} - \frac{\pi}{6}] \times [f_2(\frac{\pi}{4}) - f_2(\frac{\pi}{6})]} = \frac{(-1-0)}{1-0} = -1$$