

نام و نام خانوادگی: کوروش شیرانی فراسخنامه تشریحی تکلیف شماره ۲۳ کلاس دوازدهم A

$$g(x) = f(\tan^2 x + \sqrt{2} \cos x) \rightarrow u(x) = \tan^2 x + \sqrt{2} \cos x$$

$$g(x) = f(u(x)), \quad g'(x) = u'(x) \cdot f'(u(x)), \quad u'(x) = 2 \tan x \cdot \sec^2 x - \sqrt{2} \sin x$$

$$u'(\frac{\pi}{4}) = 2(1)(\sqrt{2})^2 - \sqrt{2}(\frac{\sqrt{2}}{2}) = 2(2) - 1 = 3 \quad u(\frac{\pi}{4}) = 1^2 + \sqrt{2}(\frac{\sqrt{2}}{2}) = 2$$

$$g'(\frac{\pi}{4}) = 3 \cdot f'(2) \Rightarrow \sqrt{3} = 3 \cdot f'(2) \Rightarrow f'(2) = \frac{\sqrt{3}}{3}$$

$$1 + \cos^2 x = (1 + \cos x)(1 - \cos x + \cos^2 x) / 1 - \cos^2 x = (1 - \cos x)(1 + \cos x) / (1 - \cos x)(1 + \cos x)$$

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

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

$$g(x) = \frac{1}{1 - \cos x} \rightarrow \frac{1}{1 - \cos x} = \frac{1}{2} \left(\frac{1 + \cos x}{1 - \cos x} + \frac{1 - \cos x}{1 - \cos x} \right) \Rightarrow f(x) = -\cos x + \frac{1}{2} \left(\frac{1 + \cos x}{1 - \cos x} + \frac{1 - \cos x}{1 - \cos x} \right)$$

$$x = \frac{\pi}{4} \rightarrow \sqrt{a} = \frac{\sqrt{2a}}{2}$$

مشتق راست $\rightarrow \sqrt{2a}$
مشتق چپ $\rightarrow -\sqrt{2a}$

$$\sqrt{2a} - (-\sqrt{2a}) = \frac{1}{2} \sqrt{2a} \Rightarrow \sqrt{2a} = \frac{1}{4} \sqrt{2a} \Rightarrow \sqrt{2a} = \frac{1}{3} \sqrt{2a} \Rightarrow \frac{1}{2} \sqrt{2a} = \frac{1}{3} \sqrt{2a} \Rightarrow \frac{1}{2} = \frac{1}{3} \Rightarrow a = \frac{4}{9}$$

$$f'(x) = -a$$

$$f(x) = -a(x) + 1 = -ax + 1 \quad \left. \begin{array}{l} f'(x) = -a \\ f(x) = -ax + 1 \end{array} \right\} f'(x) + f(x) = -1$$

$$\Rightarrow (-a) + (-ax + 1) = -1 \Rightarrow -ax + 1 = -1 \Rightarrow -ax = -2 \Rightarrow a = \frac{2}{x}$$

$$f'(x) = -0/4 = -\frac{1}{2}$$

$$y = \frac{1}{x} + \frac{a}{x}$$

$$\Rightarrow \frac{1}{x} + \frac{a}{x} = \frac{(1+a)}{x}$$

$$y' = \frac{a+1}{(x+1)^2} \Rightarrow \frac{a+1}{(x+1)^2} = \frac{1}{x}$$

$$\frac{ax-1}{x+1} = \frac{x+a}{x} \Rightarrow xam - v = (x+a)(x+1)$$

$$\Rightarrow xam - v = x^2 + 1 + ax + a \Rightarrow xam = x^2 + 1 + ax + a \Rightarrow a = \frac{x^2 + 1}{x} - 1 = \frac{x^2 + 1 - x}{x} = \frac{x^2 - x + 1}{x}$$

$$x = \frac{1}{2} \quad V(a+1) = (1+1)^2 = 4 \Rightarrow a+1 = 4 \Rightarrow a = 3$$

$$f'(x) = 3x^2 + a \quad x=2 \rightarrow 3(2)^2 + a = 0 \Rightarrow 12 + a = 0 \Rightarrow a = -12$$

$$f(2) = (2)^3 + (-12)(2) + b = 0 \Rightarrow 8 - 24 + b = 0 \Rightarrow -16 + b = 0 \Rightarrow b = 16$$

$$-16 - (-12) = -16 + 12 = -4 = b - a$$

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$$(f^{-1})'(b) = \frac{1}{f'(a)} \quad \frac{\sqrt{a}+1}{\sqrt{a}-1} = 2 \Rightarrow \sqrt{a}+1 = 2(\sqrt{a}-1) \Rightarrow \sqrt{a} = 3$$

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

$$f'(9) = \frac{-1}{\sqrt{9}(\sqrt{9}-1)^2} = \frac{-1}{3 \cdot 4} = -\frac{1}{12} \rightarrow \frac{1}{12} = \boxed{-12}$$

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$$\frac{f(0) - f(-1)}{0 - (-1)} = -11 \Rightarrow f(0) = (0^2 + 1)^3 (a(0) + 1) = 1 \times 1 = 1$$

$$f(-1) = ((-1)^2 + 1)^3 (a(-1) + 1) = 2^3 \times (-a + 1) = 8(1 - a)$$

$$\frac{1 - (8(1 - a))}{1} = -11 \Rightarrow 1 - 8 + 8a = -11 \Rightarrow a = -\frac{1}{2} \Rightarrow -2a = 1$$

$$f'(x) = 3(x^2 + 1)^2 (2x) (ax + 1) + (x^2 + 1)^3 (a) \quad \frac{x=1}{a=-\frac{1}{2}} \rightarrow f'(1) = \boxed{1}$$

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$$\frac{f(b) - f(a)}{b - a} \quad f(x) = \sin x \cos x \quad \left. \begin{array}{l} x = \frac{\pi}{4} \rightarrow \sin \frac{\pi}{4} \cos \frac{\pi}{4} = 1 \times 1 = 1 \\ x = \frac{\pi}{2} \rightarrow \sin \frac{\pi}{2} \cos \frac{\pi}{2} = 1 \times 0 = 0 \end{array} \right\} \rightarrow -1 = -1$$

$$y = \sin^2 x - \cos^2 x \quad \left. \begin{array}{l} x = \frac{\pi}{4} : -\cos^2 \frac{\pi}{4} = -(-1) = 1 \\ x = \frac{\pi}{2} : -\cos^2 \frac{\pi}{2} = 0 \end{array} \right\} \rightarrow 1 - 0 = 1$$

چون $b > a$ برآید $\rightarrow$ $\frac{f(b) - f(a)}{b - a} = \frac{-1 - 1}{1 - 0} = \boxed{-2}$

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