

نام و نام خانوادگی شماره کلاس پاسنامه تشریحی تکلیف شماره ۲۳ *پروژه*

$$g^{(u)} = f(\tan^2 u + \sqrt{2} \cos u) \rightarrow g'(u) = (\tan^2 u + \sqrt{2} \cos u) \left(f'(\tan^2 u + \sqrt{2} \cos u) \right) = (2 \times (1 + \tan^2 u)(\tan u) - \sqrt{2} \sin u) (f'(\tan^2 u + \sqrt{2} \cos u))$$

$$g'\left(\frac{\pi}{2}\right) = \sqrt{3} = (2(1 + \tan^2 \frac{\pi}{2})(\tan \frac{\pi}{2}) - \sqrt{2} \sin \frac{\pi}{2}) \times f'\left(\tan^2 \frac{\pi}{2} + \sqrt{2} \cos \frac{\pi}{2}\right) \rightarrow (2-1) f'(2) = \sqrt{3} \rightarrow \frac{\sqrt{3}}{1} = f'(2)$$

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

$$g(u) = \frac{u}{1 - \cos u} \rightarrow f(u) - g(u) = \frac{1 - \cos u + \cos^2 u - u}{1 - \cos u} = \frac{\cos^2 u - \cos u - u}{1 - \cos u} = \frac{\cos u (\cos u - 1) - u}{1 - \cos u} = -\cos u \xrightarrow{\text{مشتق}} \sin(u)$$

$$\rightarrow \sin \frac{\pi}{2} = \frac{1}{1} = 1$$

$$|x_2 - 1| \sqrt{a} \rightarrow f(u) = \pm (\cos u - 1) (\sqrt{a} u) \xrightarrow{f'(\frac{\pi}{2})} \pm \sin u \sqrt{a} = \pm \sqrt{3} a \rightarrow \text{افتلاف} = \sin \sqrt{3} a = \sqrt{3} a$$

$$\rightarrow \sin \sqrt{3} a = 1 \rightarrow \sqrt{3} a = \frac{\pi}{2} \rightarrow a = \frac{\pi}{2\sqrt{3}}$$

$$\text{مشتق} \rightarrow f'(x) = -a \rightarrow f'(x) = -\frac{13}{8}$$

$$\text{مشتق} \rightarrow f(x) = -ax + 2$$

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

$$\frac{ax - 1}{2x + 1} = \frac{x + 2}{x} \rightarrow Vax - V = 2x^2 + 14x + 2 \rightarrow 2x^2 + (14 - Va)x + 12 = 0 \xrightarrow{\Delta = 0} A^2 - 4 \times 2 \times 12 = 0$$

$$\rightarrow A = \pm 4 \times 12$$

$$\rightarrow A = \pm 12 \rightarrow$$

$$\rightarrow 14 - Va = -12 \rightarrow Va = 26 \rightarrow a = \frac{26}{V}$$

$$f(x) = x^a + ax - b \rightarrow f'(x) = 0 \rightarrow a x^{a-1} + a = 17 + a = 0 \rightarrow a = -17$$

$$f(x) = 0 \rightarrow 1 + 17a - b = 0 \rightarrow 1 - 17(-17) - b = 0 \rightarrow b = -14$$

$$b - a = -14 + 17 = 3$$

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

$$\lim_{x \rightarrow \frac{\pi}{2}} \cot(x) = 0$$

$$\frac{n \cos(x)}{\sin(x)} \rightarrow \lim_{x \rightarrow \frac{\pi}{2}} \frac{n \cos(x)}{\sin(x)} = \frac{n \cdot 0}{1} = 0$$

$$\rightarrow \frac{n \cos(x)}{\sin(x)} = \frac{n \cos(x)}{\sin(x)} \rightarrow \frac{n \cos(x)}{\sin(x)} = \frac{n \cos(x)}{\sin(x)} \rightarrow \frac{n \cos(x)}{\sin(x)} = \frac{n \cos(x)}{\sin(x)}$$

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

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

★ سوال: اگر $f(x) = \frac{1}{x}$ و $f'(x) = -\frac{1}{x^2}$ باشد، آنگاه $f'(x)$ را در $x=1$ محاسبه کنید.

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$$f(x) = (x+1)^a \rightarrow f'(x) = a(x+1)^{a-1} \rightarrow f'(1) = a(1+1)^{a-1} = a \cdot 2^{a-1} = 11 \rightarrow a \cdot 2^{a-1} = 11 \rightarrow a = 1$$

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$$y = \sin x \cos x \rightarrow f(x) = \sin x \cos x \rightarrow f'(x) = \cos x \cos x - \sin x \sin x = \cos^2 x - \sin^2 x = \cos(2x)$$

$$y = \sin^2 x - \cos^2 x \rightarrow f(x) = \sin^2 x - \cos^2 x \rightarrow f'(x) = 2 \sin x \cos x + 2 \cos x \sin x = 4 \sin x \cos x = 2 \sin(2x)$$

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