نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ..... کلاس .....

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

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

$f(x) = \frac{1+\cos^2 x}{4 - \cos^2 x} = \frac{(\cos^2 x + 2\cos x + 4)}{-(\cos x - 2)} \longrightarrow$

۲

$\left| f'_{-}\left(\frac{\pi}{4}\right) - f'_{+}\left(\frac{\pi}{4}\right) \right| = 2\sqrt{2}$

$\left(-4x + 2\right)\left(\sqrt{ax}\right) - \left(4x - 2\right)\left(\sqrt{ax}\right) \xrightarrow{\text{شتن}} \left|\left(-4\sqrt{ax}\right) - \left(4\sqrt{ax}\right)\right| = 8\sqrt{a \times \frac{\pi^2}{4}} = 2\sqrt{2}$

$\sqrt{a \times \frac{\pi^2}{4}} = \sqrt{2} \times \frac{1}{\sqrt{16}} \qquad \frac{\pi^2 a}{4} = \frac{2}{\sqrt{16}} \qquad 16a = 2 \Rightarrow \boxed{a = \frac{1}{2}}$

۳

$f(x) = -4a + 2 \qquad f'(x) = a \qquad -4a + 2 + a = -1 \qquad -3a = -3$

$a = 1$

$\boxed{f'(x) = a = 1}$

۴

$y - x - 5 = 0 \longrightarrow y = x + 5 \qquad y = \frac{x}{7} + \frac{5}{7}$

$\frac{x+5}{7} = \frac{ax - 1}{2x + 1} \quad , \quad \frac{1}{7} = \frac{a + 2}{(2x+1)^2}$

۵

$f(x) = x^3 + ax - b$ $\quad f(2) = 0 \quad 8 + 2a - b = 0 \quad 2a - b = -8$

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

$-24 - b = -8 \rightarrow -16 = b$

$b - a = (-16) - (-12) = \boxed{-4}$

$f(x) = \dfrac{\sqrt{x}+1}{\sqrt{x}-1} \longrightarrow \sqrt{x}^{-1} = -\dfrac{-y-1}{y-1} = \dfrac{y+1}{y-1} \rightarrow x = \left(\dfrac{y+1}{y-1}\right)^2$

$f^{-1}(x) = \left(\dfrac{x+1}{x-1}\right)^2 \quad (f^{-1}(x))' = 2\left(\dfrac{x+1}{x-1}\right)\left(\dfrac{(1)(x-1) - (1)(x+1)}{(x-1)^2}\right) = 2 \times 2 \times \left(\dfrac{-2}{1}\right) =$

$\boxed{-12}$

$f(x) = (x^2+1)^3(ax+1) \qquad -11 = \dfrac{(8)(1-a) - (1)(1)}{(0) - (-1)} = 8 - 8a - 1 = \dfrac{7 - 8a}{1}$

$7 - 8a = -11 \quad 18 = 8a \quad a = \dfrac{18}{8} = \dfrac{9}{4} \qquad -2a = -2 \times \dfrac{9}{4} = -\dfrac{9}{2}$

$f'(x) = (3)(2x)(x^2+1)^2\left(\dfrac{9}{4}x+1\right) + \left(\dfrac{9}{4}\right)(x^2+1)^3 \xrightarrow{x = -\frac{9}{2}}$

$y = \sin x \times \cos 2x$ $\qquad \dfrac{\sin\pi \times \cos 2\pi}{-\cos 2\pi} = -\sin\pi$

$y = \sin^4 x - \cos^4 x = \sin^2 - \cos^2 x = -\cos 2x$

$-\sin\dfrac{\pi}{2} - \left(-\sin\dfrac{\pi}{4}\right) =$

$-1 + \dfrac{\sqrt{2}}{2} = \dfrac{\sqrt{2}}{2} - 1 = \boxed{\dfrac{\sqrt{2}-2}{2}}$