بردیا نراقی ۱۵٫۷۵ گروه بسم A دوازدهم تکلیف شماره ۲۳

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

$g'(\frac{\pi}{4}) = (\cancel{\frac{4}{3}} - 1) f'(2) = \sqrt{3} \Rightarrow f'(2) = \frac{\sqrt{3}}{3}$ ✓ ۲

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

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

$\Rightarrow f'(x) - 2g'(x) = \sin x \Rightarrow f'(\frac{7\pi}{6}) - 2g'(\frac{7\pi}{6}) = -\frac{1}{2}$ ✓ ۲

۳- $-f'_-(\frac{5}{4})$

$8\sqrt{\frac{3}{4}a} = 2\sqrt{6} \rightarrow \sqrt{\frac{3}{4}a} = \frac{\sqrt{6}}{4} \rightarrow \frac{3}{4}a = \frac{6}{16} \rightarrow a = \frac{1}{2}$ ۱٫۷۵

$f'_+(x) - f'_-(x) = 4\sqrt{ax} + 4\sqrt{ax} = 8\sqrt{ax}$

$f'_+(\frac{3}{4}) - f'_-(\frac{3}{4}) = 8\sqrt{\frac{3}{4}a} = 2\sqrt{6} \Rightarrow 2\sqrt{3a} = \sqrt{2}\times\sqrt{3}$

$\Rightarrow a = \frac{\sqrt{2}}{2}$

۴- $f(4) = 2 - 4a$, $f'(4) = -a \Rightarrow 2 - 4a \cancel{+a} = -1 \Rightarrow a = 1$ ۱

$-3a$

$\Rightarrow f'(4) = -1$

$f(4) + f'(4) = -4a + 2 - a = -1 \rightarrow a = \frac{3}{5} \rightarrow f'(4) = -a = -\frac{3}{5} = -0.6$

۵- $\frac{a+3}{(3x+1)^2} = \frac{1}{7}$, $\frac{ax-1}{3x+1} = \frac{2}{7}x + \frac{5}{7}$

$\Rightarrow 7ax - 7 = 3x^2 + 16x + 5 \Rightarrow 3x^2 + (16-7a)x + 12 = 0$

$\Delta = 0$

$\Rightarrow (16-7a)^2 = 144 \Rightarrow 16 - 7a = \pm 12 \Rightarrow a = \frac{4}{7}$ × [illegible] ۲

$\boxed{a = 4}$ ✓

$3x^2 + a = f'(x) \Rightarrow f'(2) = 12 + a = 0 \Rightarrow a = -12$ ۱-۶

$f(2) = 8 - 24 - b = 0 \Rightarrow b = 16 \Rightarrow b - a = 28$

$\rightarrow 2a - b = -8 \xrightarrow{a=-12} b = -16 \qquad b - a = -16 - (-12) = -4$

$\left.\begin{array}{l} \sin^n(x^2) \sim x^{2n} \\ 1 - \cos x \sim \frac{x^2}{2} \end{array}\right\} \Rightarrow \lim_{x \to 0} \frac{f f'}{(1-\cos x)^m} = 2^{m+1} \times n \times x^{4n-1-2m}$ -۷

$= 32\sqrt{2}$

$\Rightarrow 4n - 1 - 2m = 0 \Rightarrow m = \frac{4n-1}{2} \Rightarrow 2^{m+1} \times n = 32\sqrt{2}$

$\Rightarrow n = 2 \Rightarrow m = \frac{7}{2} \Rightarrow 2m + n = 9$ ✓ ۴

$y = \frac{\sqrt{x}+1}{\sqrt{x}-1} \Rightarrow \sqrt{x} = \frac{-y-1}{y-1} \Rightarrow f^{-1}(x) = \left(\frac{-x-1}{x-1}\right)^2$ -۸

$\Rightarrow f^{-1\prime}(x) = 2\left(\frac{-x-1}{x-1}\right) \times \frac{2}{(x-1)^2} = -12$ ✓ ۲

$\frac{f(0) - f(-1)}{0 - (-1)} = \frac{8a - 7}{1} = -11 \Rightarrow a = -\frac{1}{2} \Rightarrow -2a =$ -۹

$f'(x) = 3(x^2+1)^2(2x)\left(-\frac{1}{2}x + 1\right) + (x^2+1)^3\left(-\frac{1}{2}\right)$ ۲

$f'(1) = 3 \times 4 \times \cancel{2} \times \frac{1}{\cancel{2}} \cdot 4 = 8$ ✓

$\frac{f(\frac{\pi}{2}) - f(\frac{\pi}{4})}{\frac{\pi}{4}} = \frac{1}{\frac{\pi}{4}}$ -۱۰

$\begin{cases} y_1(\frac{\pi}{4}) = \sin(\frac{\pi}{4})\cos(\frac{\pi}{2}) = 0 \\ y_1(\frac{\pi}{2}) = \sin(\frac{\pi}{2})\cos(\pi) = -1 \end{cases} \rightarrow \frac{\Delta y_1}{\Delta x} = \frac{-1-0}{\frac{\pi}{2}-\frac{\pi}{4}} = \frac{-4}{\pi}$ ۰

یک برابرند

$\frac{y_2 - y_1}{\frac{\pi}{4}} = \frac{1}{\frac{\pi}{4}}$

$\rightarrow \frac{\frac{\Delta y_1}{\Delta x}}{\frac{\Delta y_2}{\Delta x}} = \frac{-\frac{4}{\pi}}{\frac{4}{\pi}} = -1$

$y_2 = \sin^4 x - \cos^4 x = -\cos 2x$

$\begin{cases} y_2(\frac{\pi}{4}) = -\cos(\frac{\pi}{2}) = 0 \\ y_2(\frac{\pi}{2}) = -\cos(\pi) = 1 \end{cases} \rightarrow \frac{\Delta y_2}{\Delta x} = \frac{1-0}{\frac{\pi}{2}-\frac{\pi}{4}} = \frac{4}{\pi}$