① $g(x)=f(\tan^2 x+\sqrt{2}\cos x)$ $\quad g'(\frac{\pi}{4})=\sqrt{2}$ $\quad f'(2)=?$

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

$g'(\frac{\pi}{4})=$

$2\times f'(2)=\sqrt{2} \to f'(2)=\frac{\sqrt{2}}{2}=\frac{1}{\sqrt{2}}$

۲۰ آفرین

$f'(2)=\frac{\sqrt{2}}{2}=\frac{1}{\sqrt{2}}$

ص

② $f(x)=\frac{8+\cos^2 x}{4-\cos^2 x}$ و $g(x)=\frac{2}{2-\cos x}$ $\quad f'(\frac{7\pi}{6})-2g'(\frac{7\pi}{6})=?=\frac{-1}{2}$

ص

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

$y=-\cos x \to y'=\sin x \to \sin\frac{7\pi}{6}=-\frac{1}{2}$

$\sin\frac{7\pi}{6}=-\frac{1}{2}$

③ $f(x)=|4x-3|\sqrt{ax}$ $\quad x=\frac{3}{4}$

$f'_-(\frac{3}{4})=\lim_{x\to\frac{3}{4}^-}\frac{f(x)-f(\frac{3}{4})}{x-\frac{3}{4}}=\frac{(3-4x)\sqrt{ax}}{x-\frac{3}{4}}=-4\sqrt{ax}_{\frac{3}{4}}=-2\sqrt{3a}$

$f'_+(\frac{3}{4})=\lim_{x\to\frac{3}{4}^+}\frac{f(x)-f(\frac{3}{4})}{x-\frac{3}{4}}=\frac{(4x-3)\sqrt{ax}}{x-\frac{3}{4}}=+4\sqrt{ax}_{\frac{3}{4}}=2\sqrt{3a}$

ص

$4\sqrt{3a}=2\sqrt{6} \to 12a=6 \to a=\frac{1}{2}$ $\qquad a=\frac{1}{2}$

④ $y+ax=2$ $\quad f(4)+f'(4)=-1$ $\quad f'(4)=?$

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

$y=-xa+2$

$-5a=-3 \to 5a=3 \to a=\frac{3}{5}$

ص

$y'=-a$

⑤ $7y-x=5$ $\quad y=\frac{ax-1}{3x+1}$ $\quad a=?$ $\quad \frac{a+3}{9x^2+6x+1}$

$y=\frac{x+5}{7}=\frac{x}{7}+\frac{5}{7} \to m=\frac{1}{7}$

$(16-7a)^2=144 \to 16-7a=\pm 12$

$\frac{1}{7}=\frac{a+3}{9x^2+6x+1} \to 7a+21=9x^2+6x+1$

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

ص

$\cancel{a=\frac{4}{7}}$

$a=4$

$3\times4\times12=144=(3x+1)^2 \to 3x+1=7 \to x=2$ $\qquad x=2$

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(۶)

$x^3+ax-b=f(x)$ $\qquad$ $b-a=?$ $\qquad$ -4

$f(2)\to 8+2a-b=0$

$f'(2)=3x^2+a=12+a=0$ $\to a=-12 \to b=-16-b=0\to b=-16$

$-16-(-12)=-4$ $\qquad$ د

(۷)

$f(x)=\sin^n(x^2)$ $\qquad$ $\lim\limits_{x\to 0}\dfrac{f(x)f'(x)}{(1-\cos x)^m}=32\sqrt{2}$ $\qquad$ $2m+n=?$

x^{2n}

$f'(x)=2nx^{2n-1}$

$\dfrac{2nx\times x^{4n-1}}{\left(\frac{x^2}{2}\right)^m}=32\sqrt{2}$ $\qquad$ $x^{4n-2m-1}\times 2^{m+1}\times n=32\sqrt{2}=2$

$2m=4n-1\to m=2n-\frac{1}{2}$ $\qquad$ $2^{2n+\frac{1}{2}}\times n=2$

$\to n=2\to m=4-\frac{1}{2}=\frac{7}{2}$ $\qquad$ $2m+n=7+2=9$ $\qquad$ 9 $\qquad$ د

(۸)

$f(x)=\dfrac{\sqrt{x}+1}{\sqrt{x}-1}\to \sqrt{x}+1=2\sqrt{x}-2\to\sqrt{x}=3\to x=9$

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

$\to -12$ $\qquad$ -12 $\qquad$ د

(۹)

$f(x)=(x^2+1)^3(ax+1)$ $\qquad$ $[-1,0]$ $\qquad$ -11 $\qquad$ $x=-2a$

$\dfrac{1-8+8a}{1}=-11\to 8a=-11+8-1=-4\to a=-\frac{1}{2}\to x=1$

$x=1$ $\qquad$ $3(x^2+1)^2(2x)(ax+1)+(x^2+1)^3\times a$ $\qquad$ 8 $\qquad$ د

$12-4=8$

(۱۰)

$y=\sin x\cos 2x$ $\qquad$ $y=\sin^4 x-\cos^4 x$ $\qquad$ $\left[\frac{\pi}{4},\frac{\pi}{2}\right]$ $\qquad$ د

$\dfrac{f(\frac{\pi}{2})-f(\frac{\pi}{4})}{g(\frac{\pi}{2})-g(\frac{\pi}{4})}=-1$ $\qquad$ -1

تکلیف ۲۳ $\qquad$ بریا حاجی نصرالله

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