۱۱/۲۷ ۱۸٫۲۵ تکلیف ۲۳ نام: ... قنبری

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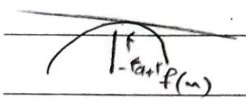
$g'(x) = f'(\tan^2 x + \sqrt{2}\cos x) \times 2\tan x \times \frac{1}{\cos^2 x} \times -\sqrt{2}\sin x$ —۱

$\xrightarrow{x=\frac{\pi}{4}} \sqrt{2} = f'(2)\times 2\times 2\times -1 \Rightarrow f'(2) = \frac{-\sqrt{2}}{4}$ ۱٫۵

$f(x) = \frac{4-2\cos x+\cos^2 x}{2-\cos x} = -\cos x + \frac{4}{2-\cos x} \Rightarrow f'(x) = \sin x - \frac{4\sin x}{(2-\cos x)^2} \Rightarrow f'(\frac{7\pi}{4}) = -\frac{1}{\sqrt{2}} + \frac{8}{(4+\sqrt{2})^2}$ —۲

$g'(x) = 2(-1)(2-\cos x)^{-2}\times \sin x \longrightarrow g'(\frac{7\pi}{4}) = \frac{4}{(4+\sqrt{2})^2} \Rightarrow f'-2g' = -\frac{1}{\sqrt{2}} + \frac{8}{(4+\sqrt{2})^2} - \frac{8}{(4+\sqrt{2})^2} = -\frac{1}{\sqrt{2}}$ ۲

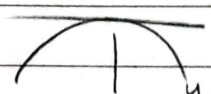
$\lim_{x\to\frac{3}{4}} \frac{|4x-3|\sqrt{ax}}{x-\frac{3}{4}}$ $\xrightarrow{\frac{3}{4}^+} 4\sqrt{4a}$, $\xrightarrow{\frac{3}{4}^-} -4\sqrt{4a}$ $\Big\}$ $8\sqrt{4a} = 2\sqrt{9}$, $\sqrt{64a} = \sqrt{9} \Rightarrow a = \frac{9}{64} = \frac{3^2}{2^6}$ ۱٫۵ —۳



$y = -ax+2$

$f'(4) = -a,\ f(4) = -4a+2 \Rightarrow -5a+2 = -1 \Rightarrow a = \frac{3}{5}$ —۴

$f'(4) = -\frac{3}{5}$ ۲



$y_2 = \frac{x}{7} + \frac{5}{7}$, $y_1 = \frac{ax-1}{3x+1}$

[illegible] $\Rightarrow \frac{ax-1}{3x+1} = \frac{x}{7} + \frac{5}{7}$

$\Rightarrow 3x^2 + (14-7a)x + 12 = 0 \xRightarrow{\Delta=0} (14-7a)^2 - 4(3)(12) = 0$ —۵

$\Rightarrow \begin{cases} a = 4 \ \checkmark \\ a = \frac{4}{7} \Rightarrow \times \end{cases}$ [illegible] ۲

$f'(2) = 0 \Rightarrow 3x^2 + a = 0 \xrightarrow{x=2} a = -12,\ f(2) = 0 \Rightarrow 8 - 24 - b = 0,\ b = -16$ —۶

$b - a = -16 + 12 = -4$ ۲

$f'(x) = n\sin^{n-1}(x^2)\times\cos(x^2)\times 2x,\ f(x) = \sin^n(x^2) \sim x^{2n}$ —۷

$f'(x) \sim n x^{2n-2}\times 2x = 2n x^{2n-1} \Rightarrow f(x)f'(x) = 2n x^{4n-1}$

$(1-\cos x)^m \sim (\frac{x^2}{2})^m \Rightarrow \lim \frac{ff'}{(1-\cos x)^m} \sim \frac{2n\times 2^m \times x^{4n-1-2m}}{}$

[illegible] $\Rightarrow m = 2n - \frac{1}{2},\ 2^{m+1}\times n = 32\sqrt{2} \longrightarrow 2^{(2n-\frac{1}{2})+1} n = 32\sqrt{2}$

$= 2^{\frac{11}{2}} \Rightarrow \frac{1}{2} + 2n = \frac{11}{2} \longrightarrow n = \frac{5}{2},\ m = \frac{9}{2},\ 2m + n = 11.5$ ۱٫۷۵

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$\frac{\sqrt{x}+1}{\sqrt{x}-1}=2 \longrightarrow x=9 \longrightarrow f'(9)=\frac{-2\sqrt{9}}{(\sqrt{9}-1)^2}=\frac{-3}{2} \longrightarrow (f^{-1})'(2)=-\frac{2}{3}$ ـ۸

۱,۵

آهنگ متوسط تغییر $=\frac{f(0)-f(-1)}{1}=1-(8\times(a+1))=-8a-7=-11 \longrightarrow a=-\frac{1}{2}$ ـ۹

$f'(1)=?$ $f(x)=(x^2+1)^3(\frac{-x}{2}+1) \longrightarrow$

$f'(x)=3(x^2+1)^2\times 2x(\frac{-x}{2}+1)+(x^2+1)^3(-\frac{1}{2}) \xrightarrow{x=1} 12\times 1-4=8$

۲

آهنگ متوسط تغییر ① $=\frac{f(\frac{\pi}{2})-f(\frac{\pi}{4})}{\frac{\pi}{4}}=\frac{-1-(0)}{\frac{\pi}{4}}=\frac{-4}{\pi}$ ـ۱۰

$y=\sin^2 x-\cos^2 x=-\cos 2x \longrightarrow$ آهنگ متوسط تغییر ② $=\frac{f(\frac{\pi}{2})\,f(\frac{\pi}{4})}{\frac{\pi}{4}}=\frac{+1-(0)}{\frac{\pi}{4}}=\frac{4}{\pi}$

$\frac{①}{②}=-1$

۲

$g(x) = f'(\tan^{۲}x + \sqrt{۲}\cos x) \times (۲\tan x(۱+\tan^{۲}x) - \sqrt{۲}\sin x)$ ۱

$g'(\frac{\pi}{۴}) = f'(۱ + \sqrt{۲} \times \frac{\sqrt{۲}}{۲}) \times ۲ \times ۱ \times (۱ + ۱^{۲}) - (\sqrt{۲} \times \frac{\sqrt{۲}}{۲})$

$\underbrace{\cancel{g'(\frac{\pi}{۴})}}_{\sqrt{۳}} = f'(۲) \times [\underbrace{\cancel{۲(۲)}}_{۳} - ۱] \longrightarrow f'(۲) = \frac{\sqrt{۳}}{۳}$

$x \to \frac{۳}{۴}^{+} \rightsquigarrow f(x) = ۴x - ۳\sqrt{\frac{۳a}{۴}} \xrightarrow[\text{صفرشونده}]{\text{مشتق عبر}} f'(x) = \frac{۴\sqrt{۳a}}{۲} = ۲\sqrt{۳a}$ ۳

$x \to \frac{۳}{۴}^{-} \rightsquigarrow f(x) = -۴x + ۳\sqrt{\frac{۳a}{۴}} \xrightarrow[\text{صفرشونده}]{\text{مشتق عبر}} f'(x) = \frac{-۴\sqrt{۳a}}{۲} = -۲\sqrt{۳a}$

$۴\sqrt{۳a} = ۲\sqrt{۶} \longrightarrow \sqrt{۳a} = \frac{\sqrt{۶}}{۲} \longrightarrow \boxed{a = \frac{۱}{۲}}$

$\lim_{x \to ۰} \frac{\sin^{n}(x^{۲}) \times ۲x\sin^{n-۱}(x^{۲}) \times \cos x^{۲}}{(۲\sin^{۲}\frac{x}{۲})^{m}} \xrightarrow{\text{هم‌ارزی}} \lim_{x \to ۰} \frac{(x^{۲})^{n} \times n \times (x^{۲})^{n-۱} \times ۲x}{(۲(\frac{x}{۲})^{۲})^{m}} = \frac{(x)^{۲n+۲n-۲+۱} \times ۲n}{(x)^{۲m} \times \frac{۱}{۲}}$ ۷

$= \frac{۲nx^{۴n-۱}}{\frac{۱}{۲^{m}} \times x^{۲m}} = ۲^{m+۱} \times n \times x^{۴n-۲m-۱}$

$\hookrightarrow ۴n - ۲m - ۱ = ۰ \longrightarrow n = \frac{۲m+۱}{۴}$

$\hookrightarrow ۲^{m+۱} \times \frac{۲m+۱}{۴} = ۳۲\sqrt{۲} \longrightarrow m = \frac{۷}{۲}, \; n = ۲ \longrightarrow \boxed{۲m + n = ۹}$

$f^{-۱}(۲) = t \rightarrow f(t) = ۲ \longrightarrow \sqrt{t} + ۱ = ۲\sqrt{t} - ۲ \longrightarrow \sqrt{t} = ۳ \longrightarrow t = ۹$ ۸

$(f^{-۱})'(۲) = \frac{۱}{f'(۹)} \quad , \quad f'(x) = \frac{-۲}{(\sqrt{x}-۱)^{۲}} \times \frac{۱}{۲\sqrt{x}}$

$f'(۹) = \frac{-۲}{(۲)^{۲}} \times \frac{۱}{۶} = -\frac{۱}{۱۲} \longrightarrow \boxed{(f^{-۱})'(۲) = -۱۲}$