(سارا امینی راد)

① $m = \frac{a-1}{2-0} = \frac{4}{2}$ $\quad f'(2) = \frac{4}{3}$

$m = \frac{2-1}{2-(-1)} = \frac{1}{3}$ $\quad y-1 = \frac{1}{3}(x+1) \Rightarrow y = \frac{1}{3}x + \frac{4}{3}$

② $f'(x) = \frac{a}{2\sqrt{ax-1}} = \frac{1}{3}$ مقطع عاس $\Rightarrow 3a = 2(\frac{1}{3}x + \frac{4}{3})$

$ax-1 = (\frac{1}{3}x + \frac{4}{3})^2 \Rightarrow a = 1$ $\quad f(3) = \sqrt{a-1} = 2$

$y = \frac{3}{4}x + \frac{5}{4}$

③ شیب مماس $= \frac{3}{4}$ $\quad$ مشتق $\rightarrow \frac{(2x+m)(x+4) - (x^2+mx+1)}{(x+4)^2}$

$\Rightarrow y'(1) = \frac{3}{4}$ $\quad (2+m)(5) - (1+m) \Rightarrow 9+4m$

مماس $(1+4)^2 = 25$ $\quad y(1) = \frac{9+4m}{25} = \frac{3}{4} \longrightarrow m = 2$

$y(1) = \frac{3}{4} = 1$ $\quad (1,1) \Rightarrow f(1) - 2(1) = n \longrightarrow n = 1$ $\quad m+n = 2+1 = 3$

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④ $g(x) = 3(2+\sin x)^{-1} = 3(-1)(2+\sin x)^{-2}\cos x \longrightarrow g(x) = \frac{-3\cos x}{(2+\sin x)^2}$

$\mapsto g = \frac{-3(\frac{1}{2})}{(\frac{\sqrt{3}}{2}-2)^2} \Rightarrow 3g = -\frac{12}{(4-\sqrt{3})^2}$

صورت $= -3\sin^2 x \cos x = 4$ $\quad \frac{4-8h}{h^2} \Rightarrow f(\frac{\pi}{6}) = 0$ $\quad 3g = -4 \Rightarrow -\frac{12}{(4-\sqrt{3})^2}$

مخرج $= -2\sin x \cos x = 2$

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⑤ $x + |x| = 2x$

$x^a + |x^a| = 2x^a$

$f(x) = -(2x)^{-\frac{1}{a}}$

$g(x) = \frac{1}{2x^a} = \frac{1}{2}x^{-a}$

$g'(x) = \frac{1}{2}(-a)x^{-a-1} = -\frac{a}{2}x^{-a-1} \Rightarrow x^{\frac{a}{2}} = 2x$ $\quad g = -\frac{a}{(2x)2} = \frac{-a}{4\sqrt[a]{2^{a-1}}}$

$g(\sqrt[a]{2}) = \frac{1}{4}$

$f'(x) = -(2x)^{-\frac{a}{a}-1} \longrightarrow -(-\frac{1}{a})(2x)^{-\frac{a}{a}-1} \times 2 \rightarrow f(x) = \frac{a}{2}(2x)^{-\frac{a}{a}}$

$x = \frac{1}{4}$ $\quad f(\frac{1}{4}) = \frac{a}{2}2^{\frac{a}{a}}$ $\longrightarrow$ $\frac{-a}{4\sqrt[a]{2^{a-1}}} \times \frac{2}{a}2^{\frac{a}{a}} = -1$

$g(x) = \frac{f(x)-1}{x}$ $\quad h(x) = \frac{(\cos x)(1+\sin x) - (-1+\sin x)(\cos x)}{(1+\sin x)^2}$ (مشتق تابع)

④

$\lim g(x) = \lim \frac{f(x)-1}{x}$ $\quad = \frac{2\cos x}{(1+\sin x)^2}$

$\lim g(x) = f(0)$

$f(x) = 2h(x)h(x)$ $\quad h(0) = -1$ $\quad f(0) = 2(-1)(2) = -4$

$h(0) = 2$

⑤

$y = x^2 + 1$ $\quad x^2 + 1 = 5$ $\quad x^2 = 4$ $\quad x = \pm\sqrt{4}$

$x = 2$ $\quad m_1 = 4\sqrt{4}$ $\quad m_2 = -4\sqrt{4}$

$m_1 m_2 = -1$ $\quad (4\sqrt{4})(-4\sqrt{4}) = -1$ $\quad -4(4-1) = -1$ $\quad c = \frac{3}{4}$

⑦

$f(x) = 15x^{\frac{4}{5}} + 4x^{\frac{1}{2}} \Rightarrow \frac{15}{8}x^{\frac{7}{8}} + 3x^{\frac{1}{2}}$

$\frac{14a^{\frac{7}{8}} + 3a^{\frac{1}{2}}}{a} = \frac{15}{8}a^{\frac{7}{8}} + 4a^{\frac{1}{2}}$ $\quad a^{\frac{1}{2}}\left(\frac{3}{8}a^{\frac{3}{4}} + 2\right) = 0$

$\rightarrow a = 0$ $\quad m = f(0) = 0$

⑨

$f'(x) = \frac{\frac{1}{2\sqrt{x}}(-2x^2+x+1) - \sqrt{x}(-4x+1)}{(-2x^2+x+1)^2}$ $\quad \frac{f(a)}{a} = f(a) = \frac{1}{\sqrt{a}(-2a^2+a+1)}$

$-2a+1 = 0 \rightarrow a = \frac{1}{2}$ $\quad 3a^2 - 3a + 1 = 0$ $\quad (2a-1)^2 = 0 \rightarrow a = \frac{1}{3}$

$x = \frac{\sqrt{9}}{8} = 1.125$ $\quad [x] = 1$ $\quad f(x) = x^2$ مشتق ناپذیر

⑩

$f \circ g(x) = f(g(x)) \Rightarrow \frac{1}{\sqrt{\frac{3}{9}-1}} = 2$ $\quad f(g(x)) = (g(x))^2$

$f \circ g = (g(x))^2 = g(x)^2 g(x)$ $\quad g(x) = \frac{-x}{\frac{2}{3}(1-x^2)}$ $\quad g(x) = -\frac{\sqrt{9}}{\frac{2}{3}}$

$f \circ g = 2(2)^2(-3\sqrt{9}+3) = -3\sqrt{9}$

$f'(1) = \frac{-3\sqrt{9}}{-3\sqrt{9}}$