پارمیس نبی زاده ، دوازدهم دفتر B　　　　　　　　تکلیف شماره ۲۴

(۱)

$$f(3) = 5 \qquad f'(3) = \frac{f(3) - 1}{3 - 0} = \frac{4}{3}$$

(۲)

$$f'(x_A) = \frac{a}{2\sqrt{a x_A - 1}} = \frac{1}{3} \qquad \frac{a}{2\left(\frac{x+4}{3}\right)} = \frac{1}{3}$$

$$f(x_A) = \sqrt{a x_A - 1} = \frac{x+4}{3} \qquad 3a = \frac{2x+8}{3} \rightarrow 2x_A + 8 = 9a$$

$$3a = 2\sqrt{a x_A - 1}$$

$$x_A = \frac{9a - 8}{2}$$

$$9a^2 = 4 a x_A - 4 \longrightarrow 9a^2 - 16a - 4 = 0 \rightarrow a = \frac{16 \pm 20}{18} = 2, -\frac{2}{9}$$

$a > 0 \rightarrow$ + چون شیب $\Rightarrow a = 2$　　$f(5) = \sqrt{10 - 1} = 3$

(۳)

$$f'(1) = \frac{(2x + m)(4) - (1)(2 + m)}{16} = \frac{3}{4}$$

$$8 + 4m - 2 - m = 6 + 3m = 12 \qquad m = 2$$

$$f(1) = \frac{4}{4} = \frac{3}{4}(1) + \frac{n}{4} \qquad n = 1 \qquad m + n = 3$$

(۴)

$$f(x) = \frac{(3 - \sin x)(9 + \sin^2 x + 3\sin x)}{(\sin x + 3)(3 - \sin x)} = \frac{\sin^2 x + 3\sin x + 9}{\sin x + 3}$$

$$3g(x) - f(x) = \frac{9}{3 + \sin x} - \frac{\sin^2 x + 3\sin x + 9}{\sin x + 3} = \frac{-\sin^2 x - 3\sin x}{\sin x + 3}$$

$$= \frac{-\sin x(\sin x + 3)}{\sin x + 3} = -\sin x$$

مشتق $\rightarrow -\cos\left(\frac{5\pi}{3}\right) = -0.5$

(۵)

$$fog(\sqrt[5]{3}) = \frac{-1}{\sqrt[5]{\frac{1}{2x^5} + \left|\frac{1}{2x^5}\right|}} = \frac{-1}{\sqrt[5]{\frac{1}{x^5}}} = -x$$

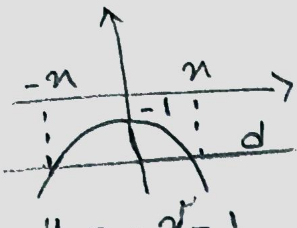
$$(fog(\sqrt[5]{3}))' = g' \times f'(g) = -1$$

(۶)

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

$$= \frac{-4\sin x}{x(\sin x + 1)^2} \xrightarrow{\sin x = x} \frac{-4}{(\sin 0 + 1)^2} = -4$$

(۷)



$y = -x^2 - 1$

$$(-2x) \times (-2(-x)) = -4x^2 = -1$$

$$x = \pm\frac{1}{2} \qquad y = -\frac{1}{4} - 1 = \frac{-5}{4}$$

$$d = -\frac{5}{4}$$

فاصله d از مبدا $= \frac{5}{4}$

(۸)

$$f'(x) = \frac{f(x)-0}{x-0} \rightarrow \frac{1}{\sqrt{x}}(4x^2+3) + 2\sqrt{x}(8x) = \frac{f(x)}{x}$$

$$\frac{4x^2+3+16x^2}{\sqrt{x}} = \frac{20x^2+3}{\sqrt{x}} = \frac{2\sqrt{x}(4x^2+3)}{x}$$

$$20x^2 + 3 = 8x^2 + 6 \qquad 12x^2 = 3 \qquad x = \pm\frac{1}{2}$$

$$\xrightarrow{x>0} x = \frac{1}{2} \qquad m_d = \frac{20(\frac{1}{4}) + 3}{\sqrt{\frac{1}{2}}} = 8\sqrt{2}$$

(۹)

$$f'(x) = \frac{f(x)}{x}$$

$$\frac{\frac{1}{2\sqrt{x}}(-2x^2+x+1) - (\sqrt{x})(-4x+1)}{(-2x^2+x+1)^2} = \frac{\sqrt{x}}{(-2x^2+x+1)\,x}$$

$$\frac{6x^2 - x + 1}{(2\sqrt{x})(-2x^2+x+1)} = \frac{\sqrt{x}}{x} \rightarrow 6x^2 - x + 1 = -4x^2 + 2x + 2$$

$$10x^2 - 3x - 1 = 0$$

$$x = \frac{3 \pm 7}{20} = 0.5, \frac{-1}{5} \xrightarrow{x>0} x = 0.5 \qquad y = \frac{\sqrt{\frac{1}{2}}}{-\frac{1}{2} + \frac{1}{2} + 1} = \frac{\sqrt{2}}{2}$$

(۱۰)

$x < \frac{\sqrt{5}}{2}$ $\qquad x^2 - 1 < \frac{1}{4}$ $\qquad \frac{1}{\sqrt{x^2-1}} > 2$

$$fog\left(\frac{\sqrt{5}}{2}\right) = \left(\frac{1}{\sqrt{x^2-1}} \times 2\right)^3$$

$$(fog)'\left(\frac{\sqrt{5}}{2}\right) = 3 \times (4)^2 \times -8\sqrt{5} = 48\sqrt{5} \times -8$$

$$\frac{-48\sqrt{5} \times 8}{-48\sqrt{5}} = 8$$

۸ برابر