Day: Month: Year: Subject: مبینا رضایی

۱)

$A(3,5) \qquad B(0,1) \xrightarrow{\text{شیب}} m = \frac{5-1}{3-0} = \frac{4}{3}$

شیب خط برابر است با $f'(x) \longleftarrow f'(3) = \frac{4}{3}$

۲)

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

$\frac{1}{3}x + \frac{4}{3} = \sqrt{ax-1} \xrightarrow{\times 3} x + 4 = 3\sqrt{ax-1} \xrightarrow{\text{توان ۲}} x^2 + 8x + 16 = 9ax - 9$

$\rightarrow x^2 + (8-9a)x + 25 = 0 \xrightarrow{\Delta = 0} (8-9a)^2 - 4(25) = 0$

$f(5) = \sqrt{-\frac{10}{9} - 1}$ غ ق ق $\qquad f(5) = \sqrt{2\times 5 - 1} = \boxed{3}$

$a = \frac{-2}{9}$ یا $a = 2$

۳)

$4y - 3x = n \longrightarrow m = \frac{3}{4}$

مشتق تابع $x=1$ در $= \frac{(2x+m)(4) - (2+m)}{16} = \frac{3(2+m)}{16} = \frac{3}{4} \rightarrow \boxed{m = 2}$

$x = 1 \rightarrow y = 1 \xrightarrow{4y-3x=n} 4 - 3 = 1 \rightarrow n = 1 \qquad m + n = \boxed{3}$

۴)

$(3g - f)'\left(\frac{5\pi}{3}\right) = \frac{9}{3 + \sin x} - \frac{(3 - \sin x)(9 + 3\sin x + \sin^2 x)}{(3 - \sin x)(3 + \sin x)}$

$= \frac{9 - 9 - 3\sin x - \sin^2 x}{3 + \sin x} = \frac{-\sin x\,(3 + \sin x)}{3 + \sin x} = (-\sin x)' = -\cos\frac{5\pi}{3} = \boxed{-\frac{1}{2}}$

$g'(\sqrt[5]{3})\, f'(g(\sqrt[5]{3})) = \left(f(g(\sqrt[5]{3}))\right)'$ (۵

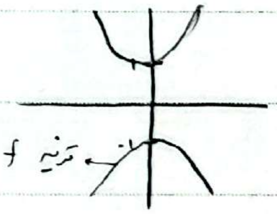
$f\circ g(x) = \dfrac{-1}{\sqrt[5]{\dfrac{1}{2x^5}+\dfrac{1}{2x^5}}} = \dfrac{-1}{\sqrt[5]{\dfrac{2}{2x^5}}} = \dfrac{-1}{\dfrac{1}{x}} = -x \xrightarrow{\text{مشتق}} -1$

$x>0$

$g(x) = \dfrac{f(x)-1}{x} \xrightarrow[\text{هم ارزی}]{\sin x \simeq x} \dfrac{\left(\dfrac{1+x}{1-x}\right)^2 - 1}{x} = \dfrac{\dfrac{x^2+2x+1-x^2-2x-1}{x^2-2x+1}}{x}$ (۶

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

$-1 > k \leftarrow y=k$ خط $\leftarrow$ (۷



$-y = x^2+1 \to x^2 = -k-1 \to x = \pm\sqrt{-k-1}$

$y' = -2x \longrightarrow x = +\sqrt{-k-1} \to y' = -2\sqrt{-k-1}$

$x = -\sqrt{-k-1} \to y' = +2\sqrt{-k-1}$ $\xrightarrow{\text{ضرب}} -4(-k-1) = -1$

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

$k = \frac{5}{4} \leftarrow$ فاصله از مبدا

① $2\sqrt{x}\,(4x^2+3) = ax \longrightarrow a = \dfrac{2\sqrt{x}\,(4x^2+3)}{x}$ (۸

② $\dfrac{\cancel{2}}{\cancel{2}\sqrt{x}} \times (4x^2+3) + 8x\,(2\sqrt{x}) = a \xrightarrow{\sqrt{x}} 4x^2+3+16x^2 = a\sqrt{x}$

a جایگذاری $\longrightarrow 20x^2+3 = \dfrac{2\cancel{x}\,(4x^2+3)}{\cancel{x}} \longrightarrow 20x^2+3 = 8x^2+6 \to x^2 = 4$

① در x جایگذاری $\longrightarrow 2\sqrt{2} \times 19 = 2a \longrightarrow a = 19\sqrt{2}$ $\quad x = \pm 2$

شیب خط d $\quad$ $x = 2$

$y = ax$

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

9) ① $ax = \frac{\sqrt{x}}{-2x^2+x+1} \longrightarrow a = \frac{1}{\sqrt{x}(-2x^2+x+1)}$

② $$a = \frac{\frac{1}{2\sqrt{x}}(-2x^2+x+1) - (-4x+1)\sqrt{x}}{(-2x^2+x+1)^2} \xrightarrow{\times 2\sqrt{x}} \frac{-2x^2+x+1+8x^2-2x}{2\sqrt{x}\,(-2x^2+x+1)^2}$$

$$= \frac{6x^2-x+1}{2\sqrt{x}(-2x^2+x+1)^2} = a \longrightarrow \frac{6x^2-x+1}{2\cancel{\sqrt{x}}(-2x^2+x+1)^{\cancel{2}}} = \frac{1}{\cancel{\sqrt{x}}\cancel{(-2x^2+x+1)}}$$

$6x^2-x+1 = -4x^2+2x+2 \longrightarrow 10x^2-3x-1=0$ $\quad x=\frac{1}{2}$ ✓

$x = \frac{-1}{5}$ غ ق ق

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

10) $$fog(x) = \left(\frac{1}{\sqrt{x^2-1}}\left[\frac{1}{\sqrt{x^2-1}}\right]\right)^2 \longrightarrow fog(x) = \left(\frac{2}{\sqrt{x^2-1}}\right)^2 = \frac{4}{x^2-1}$$

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

$$\longrightarrow \left[\frac{1}{\sqrt{x^2-1}}\right] = 2$$

$$(fog)'(x) = \frac{-8x}{(x^2-1)^2} \xrightarrow{x=\frac{\sqrt{5}}{2}} -64\sqrt{5}$$

$$\frac{-64\sqrt{5}}{-48\sqrt{5}} = \frac{4}{3}$$