[illegible]

فاطمه رستمیان - دوازدهم ریاضی

سوال ۱

نقطه (۳،۵)

نقطه تماس

(۰،۱)

شیب خط $\frac{5-1}{3-0} = \frac{4}{3}$

$y - 1 = \frac{4}{3}(x - 0) \rightarrow y = \frac{4}{3}x + 1$

$f'(3) = \frac{4}{3}$

سوال ۲

$f(5)$ ؟ $(3,2)(-1,1)$

$f(x) = \sqrt{ax-1}$

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

$y = \frac{1}{4}x + \frac{5}{4}$

$f(5) = \sqrt{9} = 3$

سوال ۳

$4y - 2x = n$ $\quad y = \frac{x^2 + mx + 1}{x+3}$

$m + n = ?$

$y(1) = 1$ $\quad 1 = \frac{2+n}{4}$ $\quad n = 1$

$y' = \frac{(2x+m)(x+3) - 1(x^2+mx+1)}{(x+3)^2}$

$y' = \frac{3m+6}{16} = \frac{1}{2}$ $\quad m = 2$

$m + n = 3$

سوال ۳

$g(x) = \frac{2}{3 + \sin x}$ $f(x) = \frac{27 - \sin^3 x}{9 - \sin^2} - 4$

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

$(2g - f)(x) = -\sin$

$(2g - f)'(x) = -\cos \to (2g - f)'\left(\frac{5\pi}{2}\right) = -\cos\frac{5\pi}{2}$

$\left(\frac{-\sin(\sin x + 3)}{\sin x + 3}\right)'\left(\frac{5\pi}{2}\right) = (-\sin x)'\left(\frac{5\pi}{2}\right) = -\frac{1}{2}$

$-\cos\frac{5\pi}{2} = -\frac{1}{2}$

سوال

$x > 0 \quad g(x) = \frac{1}{x^7 + |x^7|}$

$f(x) = \frac{-1}{\sqrt[7]{x + |x|}} \quad f(x) = \frac{-1}{\sqrt[7]{2x}}$

$g'(\sqrt[7]{2})\, f'(g(\sqrt[7]{2}))$

$(f \circ g)'(\sqrt[7]{2}) = -1$

$f \circ g = \frac{-1}{\sqrt[7]{2 \cdot \frac{1}{2x^7}}} = -x$

سوال

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

$$f(x) = x\,g(x) + 1$$

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

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

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

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

$$= -4 \times 1 = -4$$

سوال

$$y = x^2 + 1 \xrightarrow[\text{محور } x]{\text{قرینه}} -x^2 - 1$$

$$y' = -2x$$

سوال ۸

$$f'(x) = \frac{2}{2\sqrt{x}}(4x^2+2) + 8x\frac{(2\sqrt{x})}{14x\sqrt{x}}$$

$$4x\sqrt{x} + \frac{2}{\sqrt{x}} \qquad = 2x\sqrt{x} + \frac{2}{\sqrt{x}}$$

$(\alpha, d\alpha)$

$$f(\alpha) = 8\alpha^2\sqrt{\alpha} + 6\sqrt{\alpha} = d\alpha$$

$$f'(\alpha) = 20\alpha\sqrt{\alpha} + \frac{3}{\sqrt{\alpha}} = d$$

$$20\alpha^2\sqrt{\alpha} + 3\sqrt{\alpha} = d\alpha$$

$$d\alpha = 20\alpha^2\sqrt{\alpha} + 3\sqrt{\alpha} = 8\alpha^2\sqrt{\alpha} + 6\sqrt{\alpha}$$

$$f'(+\tfrac{1}{4}) = 8\left(\tfrac{1}{4}\right)^2\sqrt{\tfrac{1}{4}} + 6\sqrt{\tfrac{1}{4}} = \frac{d}{4} - 1$$

$$\frac{8}{\sqrt{2}} = \frac{d}{4} \rightarrow d = 8\sqrt{2}$$

سوال (۹)

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

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

$(\alpha, a\alpha)$

$$\frac{\sqrt{\alpha}}{-2\alpha^2 + \alpha + 1} = a\alpha$$

$$a\sqrt{\alpha}(-2\alpha^2 + \alpha + 1) = 1$$

$$-2a\alpha^{\frac{5}{2}} + a\alpha^{\frac{3}{2}} + a\alpha^{\frac{1}{2}} = 1$$

$$-5a\alpha^{\frac{3}{2}} + \frac{3}{2}a\alpha^{\frac{1}{2}} + \frac{1}{2}a\alpha^{-\frac{1}{2}} = 0$$

$$\div \frac{a}{\alpha\, 2\sqrt{\alpha}} \qquad -10\alpha^2 + 3\alpha + 1 = 0$$

$\alpha = -\frac{1}{5}$ غیر قابل قبول

$\alpha = \frac{1}{2}$

$$f(\alpha) = \frac{\sqrt{\frac{1}{2}}}{-2\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 1} = \frac{\sqrt{2}}{2}$$

(حل)

$g(x) = \frac{-1}{\sqrt{x^٢ - ١}}$ $\qquad f(x) = (x\sqrt{x})^٢$

$\left(\frac{\sqrt{٥}}{٢}\right) = \sqrt{x} \rightarrow \sqrt{x} = ٢٣ \rightarrow f(x) = (\sqrt{x})^٢$

$(f \circ g)' = \left(\frac{-٣}{\sqrt{x^٢ - ١}}\right)'$

$\frac{٠ - \frac{٣x}{\sqrt{x^٢-١}}(-٢)}{x^٢ - ١} = \frac{\frac{٤x}{\sqrt{x^٢-١}}}{x^٢ - ١} \rightarrow x = \sqrt{\frac{٥}{٤}} =$

$\frac{\frac{٢\sqrt{٥}}{\frac{١}{٢}}}{\frac{١}{٤}} = ١٤\sqrt{٥}$

$\frac{١٤\sqrt{٥}}{-٤٢\sqrt{٥}} = -\frac{١}{٣}$