

$$g(x) = x^2 - 1, \quad f(x) = c \tan x \quad (5)$$

$$g'(x) = 2x, \quad f'(x) = c \sec^2 x$$

$$g'\left(f\left(\frac{\pi}{4}\right)\right)f'\left(\frac{\pi}{4}\right) = 4$$

$$g'(c) \times 2c = 4$$

$$2c \times 2c = 4 \rightarrow c^2 = 1$$

$$c = 1, -1 \quad (b)$$

$$f'(x) = 3(1 + \sin x)^2 \cos x \quad (6)$$

$$f'\left(\frac{\pi}{2}\right) = 3(1 + 1)^2(0) = 0 \quad (a)$$

(7) نجد قيمة x

$$x^3 - 4 = 4 \rightarrow x^3 = 8 \rightarrow x = 2$$

$$f'(x^3 - 4)(3x^2) = 12x$$

نعوض $x = 2$

$$f'(4) \times 12 = 24 \rightarrow f'(4) = 2 \quad (b)$$

$$f'(x) = \cos x e^{\sin x} + \frac{2 \times 5}{5x+1} \quad (8)$$

$$f'(0) = 1 + \frac{10}{1} = 11 \quad (a)$$

حل ورقة عمل (3)

حل السؤال الأول:

$$f'(g(-1))g'(1) \quad (1)$$

$$= f'(2) \times -3 = -12 \quad (a)$$

$$L'(x) = 2(2g(x)) \times 2g'(x) \quad (2)$$

$$L'(2) = 8g(2)g'(2)$$

$$= 8 \times 1 \times -5 = -40 \quad (a)$$

$$m'(x) = 2g(x)g'(x) \quad (3)$$

$$m'(2) = 2g(2)g'(2)$$

$$= 2 \times 1 \times -5 = -10 \quad (c)$$

$$f'(x) = 2 \sin 3x \cos 3x \times 3 \quad (4)$$

$$= 6 \sin 3x \cos 3x$$

$$f'\left(\frac{\pi}{12}\right) = (6) \left(\frac{1}{\sqrt{2}}\right) \left(\frac{1}{\sqrt{2}}\right) = 3 \quad (a)$$

حل السؤال التاسع:

$$0 = 2 \sin 2t$$

$$2t = 0, \pi, 2\pi, 3\pi, 4\pi$$

$$t = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$$

$$3 \cos t = 0$$

$$t = \frac{\pi}{2}, \frac{3\pi}{2}$$

$$\frac{dy}{dx} = \frac{-3 \sin t}{4 \cos 2t}$$

$$t = \frac{3\pi}{2}$$

$$t = \frac{\pi}{2}$$

$$\begin{array}{cc} & | \\ \hline & \\ \hline = \frac{3}{-4} & \qquad \qquad \qquad = \frac{-3}{-4} = \frac{3}{4} \end{array}$$

حل السؤال السادس:

$$f'(x)$$

$$= 3 \tan^2 \left(\left(\frac{\pi}{3} \sec(\pi \cos x) \right) \right) \cdot \sec^2 \left(\left(\frac{\pi}{3} \sec(\pi \cos x) \right) \right) \\ \cdot \left(\frac{\pi}{3} \sec(\pi \cos x) \right) (\tan(\pi \cos x)) \cdot -\pi \sin x$$

$$f'(0) = 0$$

حل السؤال السابع:

$$f(x) = (x+2)(\sin x + \cos x + 15)^{-\frac{1}{4}}$$

$$f'(x) = (x+2) \left(\frac{-1}{4} \right) (\sin x + \cos x + 15)^{-\frac{5}{4}} \\ \cdot (\cos x - \sin x) + (\sin x + \cos x + 15)^{-\frac{1}{4}}$$

$$f'(0) = \frac{-1}{2} (16)^{-\frac{5}{4}} (1) + (16)^{-\frac{1}{4}} \\ = \frac{-1}{64} + \frac{1}{2} = \frac{31}{64}$$

حل السؤال الثامن:

$$y = \ln 3 [\log_3(x+1) - \log_3(x-1)]$$

$$y' = \ln 3 \left[\frac{1}{(x+1) \ln 3} - \frac{1}{(x-1) \ln 3} \right]$$

$$y' = \frac{1}{x+1} - \frac{1}{x-1} \\ = \frac{x-1-x-1}{x^2-1} = \frac{-2}{x^2-1}$$

$$= \frac{2 \sec^2 x}{2} \times \frac{1}{1 - \tan^2 x}$$

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

$$= \frac{1}{\cos^2 x - \sin^2 x} = \frac{1}{\cos 2x} = \sec 2x$$

حل السؤال الخامس:

$$x_1 = 1 \quad (a)$$

$$y_1 = 1 \ln 1 = 0$$

$$f'(x) = x \cdot \frac{1}{x} + \ln x$$

$$f'(x) = 1 + \ln x$$

$$f'(1) = 1 = m_{\text{المماس}}$$

معادلة المماس

$$y - 0 = 1(x - 1)$$

$$y = x - 1$$

$$1 + \ln x = 2 \rightarrow \ln x = 1 \quad (b)$$

$$x = e \rightarrow (e, e)$$

حل السؤال الثاني:

$$\begin{aligned}\frac{dy}{dx} &= (a^x)(ax^{a-1}) + (x^a)(a^x)(\ln a)(1) \\ &= (a^{(x+1)})(x^{a-1}) + (x^a)(a^x)(\ln a)\end{aligned}$$

حل السؤال الثالث:

$$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}} = \frac{-2 \sin t}{2 \sin t \cos t} = -\sec t$$

$$-\sec t = \sqrt{2} \rightarrow \sec t = -\sqrt{2}$$

$$\cos t = \frac{-1}{\sqrt{2}} \rightarrow t = \frac{3\pi}{4}$$

$$\rightarrow x_1 = \left(\frac{1}{\sqrt{2}}\right)^2 = \frac{1}{2}$$

$$y_1 = 2 \cos \frac{3\pi}{4} = -\sqrt{2}$$

$$y + \sqrt{2} = \sqrt{2} \left(x - \frac{3\pi}{4}\right)$$

حل السؤال الرابع:

$$y = \frac{1}{2} \ln(1 + \tan x) - \frac{1}{2} \ln(1 - \tan x)$$

$$\frac{dy}{dx} = \left(\frac{1}{2}\right) \left(\frac{\sec^2 x}{1 + \tan x}\right) - \left(\frac{1}{2}\right) \left(\frac{-\sec^2 x}{1 - \tan x}\right)$$

$$\frac{dy}{dx} = \frac{1}{2} \frac{\sec^2 x(1 - \tan x) + \sec^2 x(1 + \tan x)}{1 - \tan^2 x}$$

$$\frac{dy}{dx} = 2ae^{2x} + \frac{\cos(\ln x)}{x} \quad (9)$$

$$\left. \frac{dy}{dx} \right|_{x=1} = 2ae^2 + 1 = e^3 + 1$$

$$a = \frac{e}{2} \quad (d)$$

$$f(x) = 2\ln(e^{2x}) - 2\ln x \quad (10)$$

$$f(x) = 4x - 2\ln x$$

$$f'(x) = 4 - \frac{2}{x}$$

$$f'(1) = 4 - 2 = 2 \quad (c)$$

$$f'(x) = e^{3x} \frac{2}{2x+1} + 3e^{3x} \ln(2x+1) \quad (11)$$

$$f'(0) = \frac{2}{1} + (3)(1)(0) = 2 \quad (c)$$

$$f'(x) = \frac{\frac{1}{x}}{\ln 3(1 + \ln x)} \quad (12)$$

$$f'(1) = \frac{1}{\ln 3} \quad (c)$$

(13)

$$f'(x) = \frac{(1+10^x)(-10^x \ln 10) - (1-10^x)(10^x \ln 10)}{(1+10^x)^2}$$

$$f'(0) = \frac{(2)x(-\ln 10) - 0}{4} = \frac{-\ln 10}{2}$$

$$= -\frac{1}{2} \ln 10 = \ln \frac{1}{\sqrt{10}} \quad (d)$$