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Program: Bsc in CSE
course : 115 Diffrential Calculus/coordinate geometry

Ans to the q: NO: 5

$$w = \cos(x^2+2y) - e^{4x-z^4y} + y^3$$

$$\frac{\partial w}{\partial x} = -\sin(x^2+2y).2x - e^{4x-z^4y} + 0$$

$$= -2x\sin(x^2+2y) - 4e^{4x-z^2y}$$

$$\frac{\partial w}{\partial y} = -\sin(x^2+2y).2 - e^{4x-z^4y} + 3y$$

$$= -2\sin(x^2+2y) - z^4 e^{4x-z^4y} + 3y$$

$$\frac{\partial w}{\partial z} = 0 - e^{4x-z^4y}(-4z^3y) + 0$$

$$= 4z^3ye^{4x-z^4y}$$

Ans 1.(2)

$$y = \log x + ax$$

$$y' = \frac{1}{x} + a$$

$$y^2 = \frac{-1}{x^2} + 0$$

* Ans NO 2

$$f(x) = 3x^2 - 2x + 4$$

$$f'(x) = 6x - 2$$

at $x = 0$, $f(x) = 4$ and $f'(x) = 2$

tangent Line, $y - y_1 = m(x - x_1)$

$$\Rightarrow y - 4 = -2(x - 0)$$

$$\Rightarrow 2x + y = 4$$

at $x = 3$; $f(x) = 25$, $f'(x) = 16$

Tangent line $y - y_1 = m(x - x_1)$

$$\Rightarrow y - 25 = 16(x - 3)$$

$$\Rightarrow y - 25 = 16x - 48$$

$$\Rightarrow 16x - y = 23$$

* Ans NO 4

$$y = x^2 - 2x + 3$$

$$y' = 2x - 2$$

for stationary point.

$$y' = 0$$

$$\Rightarrow 2x - 2 = 0$$

$$\Rightarrow x = 1$$

Ans 01. (i)

$$y = e^{3x+2}$$

$$y' = \frac{d}{dx} e^{3x+2}$$

$$= e^{3x+2} \frac{d}{dx}(3x+2)$$

$$= 3e^{3x+2}$$

$$y^2 = \frac{d}{dx}\{3e^{3x+2}\}$$

$$= 3e^{3x+2} \frac{d}{dx}(3x+2)$$

$$= 9e^{3x+2}$$

Ans 01. (ii)

$$y = \log x + a^x$$

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

$$y^2 = -x^{-2} + a^x \cdot 0 + \log a \frac{d}{dx}(a^x)$$

$$= -\frac{1}{x^2} + \log a \cdot a^x \log a$$

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

Since $\frac{dy}{dx} < 0$ for $x < 1$

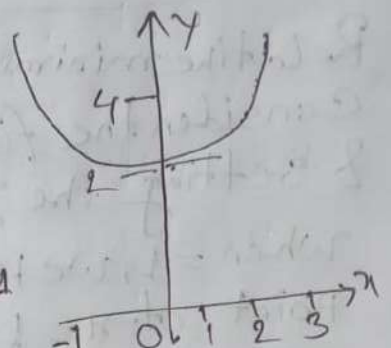
$\frac{dy}{dx} = 0$ for $x = 1$

and $\frac{dy}{dx} > 0$ for $x > 1$

we have a Relative minimum at $x = 1$

Again and can summarise this in a table

x	< 1	1	> 1
y'	-ve	0	+ve
y	↘	1	↗



the graph of $y = x^2 - 2x + 3$