Victoria University
OF
Bangladesh

program: BSc in CSE

Course title: Differential calculus and coordinate Geometry

Course code: MAT-115

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Ans To The Q.NO.1

① $y = e^{3x+2}$

$$y_1 = \frac{dy}{dx} = e^{3x+2} \frac{d}{dx}(3x+2)$$

$$= e^{3x+2}(3.1+0)$$

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

$$y_2 = \frac{y_2 y}{dx^2} = 3\left[\frac{y}{dx}(e^{3x+2})\right]$$

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

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

$$= 9y \quad \underline{(Ans)}$$

(11) $y = \log x + ax$

$$\frac{dy}{dx} = \frac{1}{x} + a$$

$$\therefore y_1 = \frac{1}{x} + a$$

$$\frac{y_2 y}{dx^2} = \frac{d}{dx}\left(\frac{1}{x} + a\right)$$

$$= \frac{-1}{x^2}$$

$$y_2 = \frac{-1}{x^2}$$

Ans.

Ans to The Q. NO. 2

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

$$f'(x) = \frac{d}{dx}(3x^2) - \frac{d}{dx}(2x) + \frac{d}{dx} \cdot 4$$

$$= 3x^2 - 2$$

at $v = 0$ slop

$$m = f'(0) = 3.0^2 - 2$$

$$= -2$$

$$f(0) = 3\,0^2 - 2 \cdot 0 + 4$$

So the point is $(0, 4)$

So the equation is

$$y - y_0 = m(x - x_0)$$

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

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

$m = -2$

$x = 0$

$y = 4$

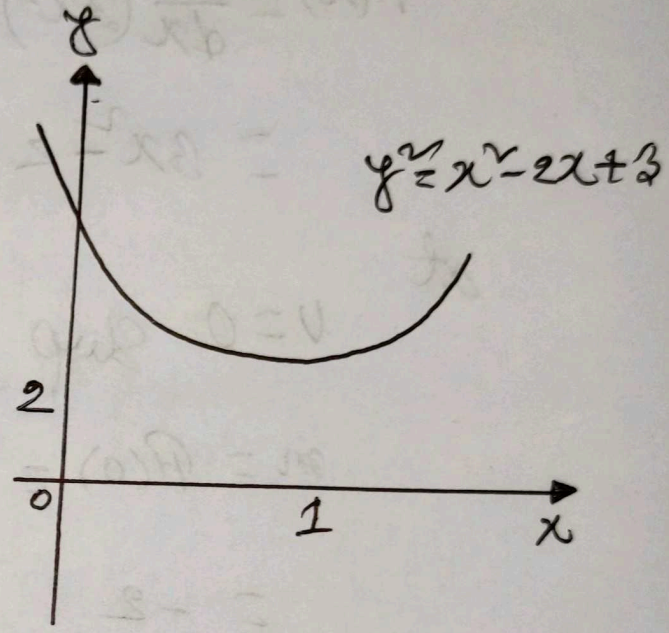
Ans to the Q. NO. 4

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

$\Rightarrow \frac{dx}{dx} = 2x - 2$

Now; $2x - 2 = 0$

$x = 1$



put $x = 1$ at y

$y = 1^2 - 2.1 + 3$

$= 1 - 2 + 3$

$= 2$

$\therefore (x, y) = (1, 2)$

Ans

Ans to the Q.NO. 5

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

$$\frac{dw}{dx} = \frac{d}{dx}\left\{\cos(x^2+2y) - e^{4x} - z^4y + y^3\right\}$$

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

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

$$\frac{dw}{dy} = \frac{d}{dy}\left\{\cos(x^2+2y) - e^{4x} - z^4y + y^3\right.$$

$$= -\sin(x^2+2y)2 + 3y^2$$

$$= -2\sin(x^2+2y) + 3y^2$$

$$\frac{dw}{dz} = 4z^3y\,e\,(yx - z^4y)$$