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ID No : 2219170041

Batch : 17th

Course Title : Differential Equation and Fourier Analysis

Course Code : MAT 325

Semester : Summer - 2023

Ans to the QUS NO: 01 (i)

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

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

$$= e^{3x+2}(3\cdot 1+0)$$

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

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

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

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

$$= 9y \quad \text{Ans:}$$

Ans to the QUS NO: 01 (ii)

Ans: $y = \log x + ax$

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

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

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

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

$$y_2 = -\frac{1}{x^2} \quad \text{Ans:}$$

Ans to the Qus NO: 02

Ans:

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

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

$$= 3x^2 - 2$$

at, $x = 0$ step.

$$m = f'(0) = 3 \cdot 0^2 - 2$$

$$= -2$$

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

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)

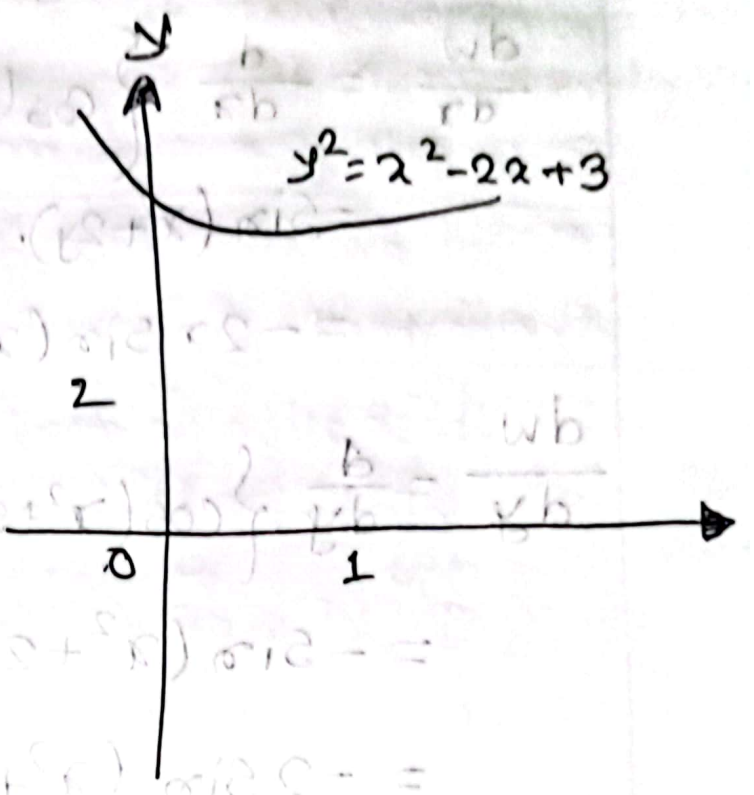
Ans to the Qus No: 04

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

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

Now, $2x - 2 = 0$

$x = 1$



put, $x = 1$ ·aby

$y = 1^2 - 2 \cdot 1 + 3$

$= 1 - 2 + 3$

$= 2$

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

(Ans:)

Ans to the Qus No: 05

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

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

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

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

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

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

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

$$\frac{dw}{dyz} = 4z^3 y e^{(4x-z^4y)}$$

Ans: