

PLATUNJI ANUOLUWAP TEMIJOPE MAT-104
COMPUTER ENGINEERING

19/ENG 02/050

~~Practice~~ Questions Assignment

① ~~$x = 3x$
 $2x^2 - 2x - 3$~~

② y = $t^3 - \frac{t^2}{2} - 2t + 4$

At Stationary point $\frac{dy}{dt} = 0$.

$$\frac{dy}{dt} = 3t^2 - t - 2 = 0$$

$$= (3t + 2)(t - 1) = 0$$

$$3t + 2 = 0 \quad \text{or} \quad t - 1 = 0$$

$$3t = -2 \quad \text{or} \quad t = 1$$

$$t = \frac{-2}{3} \quad \text{or} \quad 1$$

③ For Coordinating stationary point.

$$\text{At } t = \frac{-2}{3} = -0.7$$

$$y = (-0.7)^3 - \frac{(-0.7)^2}{2} - 2(-0.7) + 4$$

$$y = 5.30$$

At $t = 1$.

$$y = (1)^3 - \frac{1^2}{2} - 2(1) + 4$$

$$y - \frac{5}{2} = 2.5$$

∴ $(-0.7, 5.30)$ and $(1, 2.5)$

(iii) $\frac{d^2y}{dt^2} = 6t - 1$

at $t = -0.7$

$$\frac{d^2y}{dt^2} = 6(-0.7) - 1$$

$$\frac{d^2y}{dt^2} = -5.2$$

At $t = -0.7$, we have a maximum point.

at $t = 1$.

$$\frac{d^2y}{dt^2} = 6(1) - 1$$

$$\frac{d^2y}{dt^2} = 5$$

At $t = 1$, we have a minimum point.

$$(2) \quad 2y^2 - 5x^4 - 2 - 7y^3 = 0, \text{ find } \frac{dy}{dx}$$

Solution.

$$4y \cdot \frac{dy}{dx} - 20x^3 - 21y^2 \cdot \frac{dy}{dx} = 0.$$

$$\frac{dy}{dx} (4y - 21y^2) - 20x^3 = 0.$$

$$\frac{dy}{dx} (4y - 21y^2) = 20x^3$$

$$\frac{dy}{dx} = \frac{20x^3}{(4y - 21y^2)}$$

$$(3) (i) \quad 4x^2 + 2xy^3 - 5y^2 = 0.$$

$$8x + 2x \cdot 3y^2 \cdot \frac{dy}{dx} + 2y^3 - 10y \cdot \frac{dy}{dx} = 0.$$

$$2x \cdot 3y^2 \cdot \frac{dy}{dx} - 10y \cdot \frac{dy}{dx} + 8x + 2y^3 = 0.$$

$$\frac{dy}{dx} (2x \cdot 3y^2 - 10y) = -8x - 2y^3$$

$$\frac{dy}{dx} = \frac{-8x - 2y^3}{2x \cdot 3y^2 - 10y}$$

$$(ii) \quad \text{When } x = 1 \text{ and } y = 2$$

$$\frac{dy}{dx} = \frac{-8(1) - 2(2)^3}{2(1)3(2)^2 - 10(2)}$$

$$\frac{dy}{dx} = \frac{-8 - 16}{6 - 20}$$

$$\frac{dy}{dx} = \frac{-24}{-14}$$

$$\frac{dy}{dx} = \frac{12}{7}$$