UDECHUKWU CHINONSO IFENNA
COMPUTER ENGINEERING
MATRIC NO:- 19/ENG02/067

MAT 104
S.N: 32

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

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

At stationary points, $dy/dt = 0$

$3t^2 - t - 2 = 0$

$3t^2 - 3t + 2t - 2 = 0$

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

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

$3t = -2 \qquad t = 1$

$t = -2/3$

When $t = -2/3$

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

$y = {}^{130}/_{27}$

When $t = 1$

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

$y = {}^{5}/_{2}$

The coordinates of the stationary points are $(-2/3, {}^{130}/_{27})$ and $(1, {}^{5}/_{2})$

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

When $t = -2/3$

$\frac{d^2y}{dt^2} = 6(-2/3) - 1 = -5$

At $(-2/3, {}^{130}/_{27})$ we have a maximum point

When $t = 1$

$\frac{d^2y}{dt^2} = 6(1) - 1 = 5$

At $(1, 5/2)$ we have a minimum point.

2) $2y^2 - 5x^4 - 2 - 7y^3 = 0$

$4y \cdot dy/dx - 20x^3 - 21y^2 \cdot dy/dx = 0$

$4y \cdot dy/dx - 21y^2 \cdot dy/dx = 20x^3$

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

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

3) $4x^2 + 2xy^3 - 5y^2 = 0$

$8x + 6xy^2 \cdot dy/dx + 2y^3 - 10y \cdot dy/dx = 0$

$6xy^2 \cdot dy/dx - 10y \cdot dy/dx = -8x - 2y^3$

$\frac{dy}{dx}(6xy^2 - 10y) = -8x - 2y^3$

$$\frac{dy}{dx} = \frac{-8x - 2y^3}{6xy^2 - 10y}$$

when $x = 1$ and $y = 2$

$$\frac{dy}{dx} = \frac{-8(1) - 2(2)^3}{6(1)(2)^2 - 10(2)}$$

$$\frac{dy}{dx} = \frac{-8 - 16}{24 - 20}$$

$$\frac{dy}{dx} = -6$$