NAME: ADEWOLE ADEDAYO JOSHUA

DEPARTMENT: CIVIL ENGINEERING

MATRIC NUMBER: 19/ENG03/003

MATH 104 ASSIGNMENT

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MAT 104 ASSIGNMENT

① $y = t^3 - \frac{t^2}{2} - 2t - 4$ $\frac{dy}{dt} = 3t^2 - t - 2$

At stationary point, $\frac{dy}{dx} = 0$, $\therefore 3t^2 - t - 2 = 0$

using quadratic formular, $t = 1$ or $-2/3$

at $t=1$, $y = 3(1)^2 - 1 - 2 = 0$. At $t = -2/3$, $y = 3\left(\frac{-2}{3} \times \frac{-2}{3}\right) + \frac{2}{3} - 2 = 0$

$\therefore$ the stationary point coordinates are $(1,0)$ and $(-2/3, 0)$

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

at $t=1$ $\frac{d^2y}{dt^2} = 6 - 1 = 5$

$\frac{d^2y}{dt^2} > 0 \therefore$ we have a minimum point.

at $t = -2/3$ $\frac{d^2y}{dt^2} = 6\left(\frac{-2}{3}\right) - 1 =$ -

$\frac{d^2y}{dt^2} < 0 \therefore$ we have a maximum point

② ~~$4x^2 + 2xy^3 - 5y^2 = 0$~~ $2y^2 - 5x^4 - 2 - 7y^3 = 0$

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

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

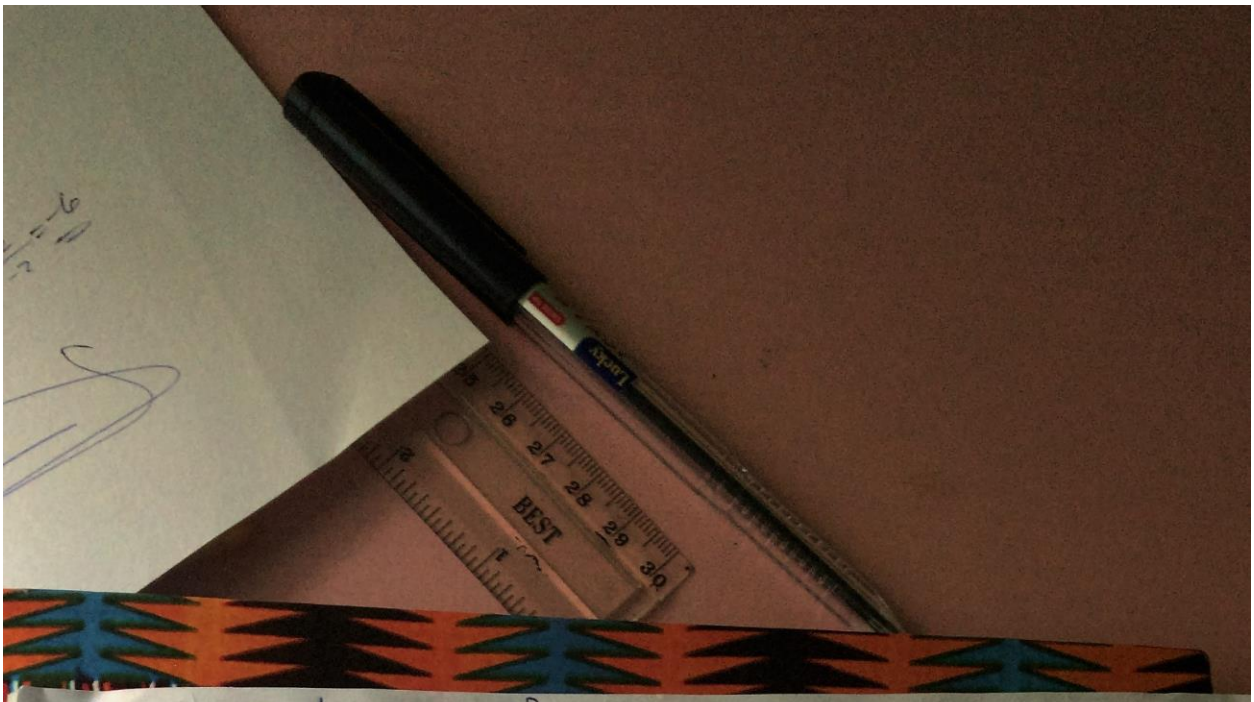
$\frac{dy}{dx} = \frac{20x^3}{4y - 21y^2}$

③ ~~$8x + 6xy^2\frac{dy}{dx}$~~ $\cdot 4x^2 + 2xy^3 - 5y^2 = 0$

$8x + 6xy^2\frac{dy}{dx} + 2y^3 - 10y\frac{dy}{dx} = 0$

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

~~$\frac{dy}{dx} = \frac{-8x - 2y^3}{6xy^2 - 10y} = \frac{-2(4x + y^3)}{-2(-3xy^2 + 5y)}$~~ $\frac{dy}{dx} = \frac{-2(4x + y^3)}{-2(-3xy^2 + 5y)} = \frac{4x + y^3}{-3xy^2 + 5y}$



at $x=1, y=2, \frac{dy}{dx} = \frac{4(1)+(2)^3}{-3(1)(2)^2+5(2)} = \frac{4+8}{-3(4)+10} = \frac{12}{-12+10} = \frac{12}{-2} = -6$