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

3.) $4x^2 + 2xy^3 - 5y^2 = 0$ at $x = 1$ $y = 2$

$$[d/dx]\,4x^2 + [d/dx]\,2xy^3 - [d/dx]\,5y^2 = 0$$

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

$$(6xy^2 - 10y)\, dy/dx = -8x$$

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

At $x = 1, y = 2$

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

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

$$dy/dx = \frac{-8}{4}$$

$$dy/dx = -2$$

point

②

x^3

i) $y = t^3 - t^2/2 - 2t - 4$

$dy/dt = 0$

$dy/dt = 3t^2 - t - 2$

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

$3t^2 - 3t + 2t - 2$

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

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

$3t+2=0$ or $t-1=0$

At Stationary point

$t = -2/3$ or $t = 1$

ii) For Coordinate of stationary point

At $t = -2/3$

$y = (-2/3)^3 - 1/2(-2/3)^2 - 2(-2/3) + 4$

$y = -0.2962 - 1.125 - (-1.33) + 4$

$y = 3.9088$

At $t = 1$

$y = (1)^3 - 1/2(1)^2 - 2(1) + 4$

$1 - 0.5 - 2 + 4$

$y = 2.5$

$(-0.67,\ 3.9088)$

$(1,\ 2.5)$

iii) Nature of the Stationary point:

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

At $t = -2/3$

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

$$= \underline{\underline{-5.02}}$$ At $t = -2/3$ we have maximum

At $t = 1$

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

$$= \underline{\underline{5}}$$ At $t = 1$ we have minimum

2.) $2y^2 - 5x^4 - 2 - 7y^3 = 0$ dy/dx

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

$$\left[\frac{d}{dx}\right] 2y^2 \left[\frac{d}{dx}\right] - 5x^4 \left[\frac{d}{dx}\right] - 7y^3 = \frac{d}{dx}(2)$$

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

$$(4y - 21y^2)\,dy/dx = 20x^3$$