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

3) $4x^2 + 2xy^3 - 5y^2 = 0$ find dy/dx

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

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

$$dy/dx\,(6y^3x - 10y) = -8x - 2y^3$$

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

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

$$dy/dx = \frac{-8(1) - 2(2^3)}{6(2^2)(1) - 10(2)} = \frac{-8 - 16}{24 - 20}$$

$$= \frac{-24}{4}$$

$$= -6$$

The coordinate at $t = -2/3$:

$(-2/3, 130/27)$

∴ Coordinates are $(1, 5/2)$ and $(-2/3, \frac{130}{27})$

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

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

At $t = 1$; $6(1) - 1 = 5$

At $t = -2/3$; $6(-2/3) - 1 = -5$

∴ The stationary point at $t = 1$ is a minimum point and the stationary point at $t = -2/3$ is a maximum point.

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

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

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

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

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

At stationary point, $dy/dt = 0$

$dy/dt = 3t^2 - \frac{2t}{2} - 2 + 4$; $3t^2 - t - 2 = 0$

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

$\therefore t = 1$ and $-2/3$

$\therefore$ Stationary points are at $t = 1$ and $t = -2/3$

The coordinate at $t = 1$;

$(1^3) - \frac{(1^2)}{2} - 2(1) + 4 = \frac{5}{2}$

$\therefore$ Coordinate is $(1, 5/2)$

The coordinate at $t = -2/3$;

$[-2/3]^3 - \frac{(-2/3)^2}{2} - 2(-2/3) + 4$

$= \frac{130}{27}$