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Mechanical Engineering

$$= -3 \cdot 3 - 2$$

$$= -5 \cdot 3$$

\therefore At ~~(-0.55)~~ (-0.55, 4.78) we have a maximum point.

$$2) \quad 2y^2 - 5x^4 - 2 - 7y^3 = 0$$
$$4y \frac{dy}{dx} - 20x^3 - 21y^2 \frac{dy}{dx} = 0$$

iii) when $y=2$

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

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

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

At stationary point, $\frac{dy}{dt} = 0$

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

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

$$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$t = \frac{2 \pm \sqrt{4 + 24}}{6}$$

$$t = \frac{2 \pm \sqrt{28}}{6}$$

$$t = \frac{2 \pm 5.29}{6}$$

$$t = \frac{2 + 5.29}{6} \quad \text{or} \quad t = \frac{2 - 5.29}{6}$$

$$t = \frac{7.29}{6} \quad \text{or} \quad t = \frac{-3.29}{6}$$

$$t = 1.22 \quad t = -0.55$$

ii) when $t = 1.22$

$$y = (1.22)^3 - \frac{(1.22)^2}{2} - 2(1.22) + 4$$

$$y = 1.82 - 0.74 - 2.44 + 4$$

$$y = 2.64$$

when $t = -0.55$

$$y = (-0.55)^3 - \frac{(-0.55)^2}{2} - 2(-0.55) + 4$$