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Elect / Elect
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$\frac{dy}{dx}$

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

at stationary point, $\frac{dy}{dx} = 0$

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

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

$(3t^2 - 3t) \quad (+2t - 2)$

$3t(t-1) \quad 2(t-2)$

$(t-1) \quad (3t-2)$

$t = 1$ or $t = \frac{2}{3}$

ii Coordinate of stationary point

$t = 1$ or $\frac{2}{3}$

$t = 1$

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

$= 1 - \frac{1}{2} - 2 + 4$

$= 2.5$

$t = \frac{2}{3}$

$(\frac{2}{3})^3 - (\frac{2}{3})^2 \div 2 - \frac{4}{3} + 4$

$\frac{8}{27} - \frac{4}{9} - \frac{4}{3} + 4$

$= \frac{68}{27}$ 2.51

III Value of the stationary 2nd

$$\frac{d^2y}{dx^2} = 6x - 1$$

$dx = 1$ min

$$= 6(1) - 1$$

$$= 6 - 1$$

$$= 5$$

$dx = \frac{1}{3}$

$$= 6\cdot\left(\frac{1}{3}\right) - 1$$

$$= 4 - 1$$

$$= 3$$

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

$$\frac{d}{dx}(2y^2) + \frac{d}{dx}(5x^4) - \frac{d}{dx}(2) - \frac{d}{dx}7y^3$$

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

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

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

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

$\frac{d}{dx} 4x^2 + \frac{d}{dx} 2xy^3 - \frac{d}{dx} 5y^2 = 0$

$8x + 2x3y^2 \frac{dy}{dx} + 2y^3 - 10y\frac{dy}{dx}$

$2x3y\frac{dy}{dx} - 10y\frac{dy}{dx} + 8x + 2y^3$

$\frac{dy}{dx}(2x3y - 10y) + 8x + 2y^3 = 0$

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

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

$x = 1$
$y = 2 = \frac{-8(1) - 2(2)}{2(1)\times 3(2) - 10(2)}$

$= \frac{-8 - 4}{12 - 20}$

$\frac{+12}{+8} = 3/2$