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CIVIL ENGINEERING

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

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

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

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

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

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

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

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

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

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

when $x = 1$ & $y = 2$

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

$= -6$

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

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

at stationary point

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

$(3t^2 - 3t)(+2t - 2) = 0$

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

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

$t = 2/3$ and 1

Coordinates of stationary point

3(1) when $x = 1$

$3(1)^2 - 1 - 2 = 0$

at $x = 2/3$

$y = 3(2/3)^2 + 2/3 - 2 = 0$

stationary point co-ordinates $(1, 0)$ and $(-2/3, 0)$

nature of stationary point

$d^2y/dx^2 = 6t - 1$

at $x = 1$

$6(1) - 1$

$= 5$

at $x = -2/3$

$6(-2/3) - 1$

$= -5$

d^2y/dt^2 we have a maximum point

at t_1 d^2y/dt^2 we have minimum point.