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MAT 104

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

$y = 3t^2 - 2t^{-1} - 2$

$= 3t^2 - t - 2$

$= 3t^2 + 3t - 1t + 1$

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

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

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

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

2.) $2y^2 - 5x^4 - 2 - 7y^3$

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

$= \frac{dx(0)}{x}$

i.e $4y\frac{dy}{dx} - 20x^3 - 0 - 21y^2\frac{dy}{dx} = 0$

rearranging gives

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

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

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

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

$8x + \frac{dy}{dx}(6xy^2 - \frac{dy}{dx}10y = 0$

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

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

$$\frac{8x}{6xy^2 - 10y} \qquad x = 1,\ y = 2$$

$$\frac{8}{6(4) - 20} = \frac{8}{24 - 20} = \frac{8}{4} = 2$$

$$14 - 04 \qquad -16 - 04$$