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19/ENG06/033

Mechanical ENGINEERING

MAT 102

Serial no: 157

1. i) $A \cdot B = 3u(6u^2 + 8) + (4u - 10)(2u - 5) + 8u^3 + (5)$

$$18u^2 + 24u + 8u^2 - 20u - 20u + 50 + 40u^3$$

$$58u^3 + 8u^2 - 16u + 50$$

$$\frac{d(A \cdot B)}{du} = \underline{174u^2 + 16u - 10}$$

$$\frac{dA}{du} = (\cancel{12u})i + \cancel{4}j + (\cancel{24u^2})k$$

ii) $\frac{dA}{du} = (12u)i + 4j + (24u^2)k$

$$\frac{dy}{dx} = \frac{4x^3}{3(1)y^2 - 5y}$$

when $x=1$

$$\begin{aligned} \frac{dy}{dx} &= \frac{4(1) - y^3}{3(1)y - 5y} \\ &= \frac{-4 - y^3}{3y^2 - 5y} \end{aligned}$$

when $y=2$

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