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19/ENG06/041

Mechanical Engineering

MAT 102

$$i) \underline{A} = (6u^2 + 8)\mathbf{i} + (4u - 10)\mathbf{j} + 8u^3\mathbf{k}$$

$$\underline{B} = 3u\mathbf{i} + (2u - 5)\mathbf{j} + 5\mathbf{k}$$

$$ii) \underline{A} \cdot \underline{B} = ((6u^2 + 8)\mathbf{i} + (4u - 10)\mathbf{j} + 8u^3\mathbf{k}) \cdot (3u\mathbf{i} + (2u - 5)\mathbf{j} + 5\mathbf{k})$$
$$= (18u^3 + 24u) + (8u^2 - 40u + 50) + 40u^3$$
$$= 18u^3 + 40u^3 + 8u^2 + 24u - 40u + 50$$

$$A \cdot B = 58u^3 + 8u^2 - 16u + 50$$

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

$$ii) \frac{d\underline{A}}{du} = 12u\mathbf{i} + 4\mathbf{j} + 24u^2\mathbf{k}$$