

$$1) \underline{A} = (6u^2 + 8)\mathbf{i} + (4u - 10)\mathbf{j} + 8u^2\mathbf{k}$$

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

$$\begin{aligned} \text{ii) } \underline{A} \cdot \underline{B} &= 3u(6u^2 + 8) + (4u - 10)(2u - 5) + 8u^2(5) \\ &= 18u^3 + 24u + 8u^2 - 20u - 20u + 50 + 40u^2 \\ &= 58u^3 + 8u^2 - 16u + 50 \end{aligned}$$

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

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