

Name  $\Rightarrow$  Oyeyemi John Olabamiji  
Department  $\Rightarrow$  Computer Engineering  
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If  $A = (6u^2 + 8)i + (4u - 10)j + 8u^3k$  &  $B = 3ui + (2u - 5)j + 5k$

Find: (i)  $\frac{d}{du}(A \cdot B)$  (ii)  $\frac{dA}{du}$

Solution

$$(i) (A \cdot B) = ((6u^2 + 8)i + (4u - 10)j + 8u^3k) \cdot (3ui + (2u - 5)j + 5k)$$
$$= ((18u^3 + 8)i + (8u^2 + 50)j + (8u^3 + 5)k)$$

$$\frac{d}{du}(A \cdot B) = i \frac{d}{du}(18u^3 + 8) + j \frac{d}{du}(8u^2 + 50) + k \frac{d}{du}(8u^3 + 5)$$

$$\frac{d}{du}(A \cdot B) = 54u^2i + 16uj + \underline{\underline{24u^2k}}$$

$$(ii) \frac{dA}{du} = (6u^2 + 8)i + (4u - 10)j + 8u^3k$$

$$= 12ui + 4j + \underline{\underline{24u^2k}}$$