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MAT 102

Answers

1) If $A = 3i + 4j - 6k$, $B = 5i + 11j + 2k$, $C = 7i + 7j + k$. Find

i) $A \cdot C + B \cdot C$

$$A \cdot C = (3i + 4j - 6k) \cdot (7i + 7j + k)$$

$$= 21 + 28 - 6 \quad 21 - 28 - 6$$

$$= 43 \quad = -13$$

$$B \cdot C = (5i + 11j + 2k) \cdot (7i + 7j + k)$$

$$= 35 + 77 + 2 \quad 35 - 77 + 2$$

$$= 114 - 40$$

$$A \cdot C + B \cdot C = 43 + 114 - 13 + (-40)$$

$$= 157 - 53$$

$$\begin{aligned} \text{ii) } (A - B) \cdot C &= (3i + 4j - 6k) - (5i + 11j + 2k) \cdot (7i + 7j + k) \\ &= (-2i + 15j - 8k) \cdot (7i + 7j + k) \end{aligned}$$

$$(A - B) \cdot C = (-2i + 15j - 8k) \cdot (7i + 7j + k)$$

$$= -14i - 14j - 49k - 8 \quad 14i + 10j - 14k - 8$$

$$= -77 - 127$$

$$\text{3) } A \cdot (B \times C) = B \times C \begin{array}{c|c|c} +i & +j & +k \\ \hline 1 & 1 & 1 \\ \hline 5 & 1 & 2 \\ \hline 7 & 7 & 1 \end{array}$$

$$\begin{array}{c|c|c} i & j & k \\ \hline 1 & 1 & 1 \\ \hline 5 & 1 & 2 \\ \hline 7 & 7 & 1 \end{array}$$

$$i(-11 - 14) - j(5 - 14) + k(-35 - 77)$$

$$= -25i + 9j + -25i + 9j - 112k$$

$$A \cdot (B \times C) = (3i + 4j - 6k) \cdot (-25i + 9j - 112k)$$

$$= -75 + 36 + 672$$

$$= 633$$