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Maths 102 assignment.

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

(1) $A \cdot C + B \cdot C$

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

$A \cdot C = 21i - 28j - 6k$

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

$B \cdot C = 35i + 77j + 2k$

$A \cdot C + B \cdot C = (21i - 28j - 6k) + (35i + 77j + 2k)$

$A \cdot C + B \cdot C = 56i + 49j - 4k$

(2) $(A - B) \cdot C$

$A - B = (3i + 4j - 6k) - (5i - 11j + 2k)$

$A - B = -2i + 15j - 8k$

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

$(A - B) \cdot C = -14i - 105i - 8k$

(3) $A \cdot (B \times C)$

$$B \times C = \begin{vmatrix} + & - & + \\ i & j & k \\ 5 & -11 & 2 \\ 7 & -7 & 1 \end{vmatrix}$$

$$B \times C = i\begin{vmatrix} -11 & 2 \\ -7 & 1 \end{vmatrix} - j\begin{vmatrix} 5 & 2 \\ 7 & 1 \end{vmatrix} + k\begin{vmatrix} 5 & -11 \\ 7 & -7 \end{vmatrix}$$

$B \times C = [-11+14]\hat{i} - \hat{j}[5-14] + \hat{k}[-35+77]$

$B \times C = 3\hat{i} + 9\hat{j} + 42\hat{k}$

$A \cdot (B \times C) = (3\hat{i} + 4\hat{j} - 6\hat{k}) \cdot (3\hat{i} + 9\hat{j} + 42\hat{k})$

$A \cdot (B \times C) = 9\hat{i} + 36\hat{j} - 252\hat{k}$