

JL ODIBE ANTHONY UDEENNA

COMPUTER ENGINEERING

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MAT 102

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

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

2 $(A - B) \cdot C$

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

Sol

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

$$(3i + 4j - 6k) \cdot (7i - 7j + k) + (5i - 11j + 2k) \cdot (7i - 7j + k)$$

$$= (21 - 28 - 6) + (35 + 77 + 2)$$

$$= -13 + 114$$

$$= \underline{101}$$

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

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

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

$$= 3i - 5i + 4j + 11j - 6k - 2k$$

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

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

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

$$= 14 - 105 - 8$$

$$= \underline{-127}$$

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

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

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

$$= i(-11+14) - j(-9) + k(-35+77)$$

$$= i(3) - j(-9) + k(42)$$

$$= 3i + 9j + 42k$$

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

$$= 9 + 36 - 252$$

$$= \underline{\underline{-207}}$$