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Matr. 102.

Solve

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

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

Solve

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

$$= 21i - 28j - 6k = (-13)$$

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

$$= 35 + 77 + 2 = 114$$

$$\therefore A \cdot C + B \cdot C = -13 + 114 = 101$$

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

$$A - B = [3i + 4j - 6k] - [5i - 11j + 2k]$$

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

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

$$= -14 - 105 - 8 = -127$$

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

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

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

$$i[3] - j[9] + k[42] = 3i - 9j + 42k$$

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

$$= 9 + 36 - 252 = -207$$