S IV 97

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Maths 102 Mechanical Engineering.

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

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

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

$= 21 + (-28) + (-6)$

$= -13$

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

$= 35 + 77 + 2$

$= 114$

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

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

$A - B = 3i + 4j - 6k$
$\quad -5i - 11j + 2k$
$\quad -2i + 15j - 8k$

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

$= -14 + (-105) + (-8)$

$= -127$

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

$$= \begin{vmatrix} i & j & k \\ 3 & 4 & -6 \\ 5 & -11 & 2 \\ 7 & -7 & 1 \end{vmatrix}$$

$$= 3\begin{vmatrix} -11 & 2 \\ -7 & 1 \end{vmatrix} + 4\begin{vmatrix} 5 & 2 \\ 7 & 1 \end{vmatrix} - 6\begin{vmatrix} 5 & -11 \\ 7 & -7 \end{vmatrix}$$

$3[(-11 \times 1) - (-7 \times 2)] + 4[(5 \times 1) - (7 \times 2)] - 6[(-7 \times 5) - (1 \times 7)]$

$= 3[3] + 4[-9] - 6[42]$

$= 9 + 36 - 252$

$= -207$