

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

$$A = 3i + 4j - 6k$$

$$B = 5i - 11j + 2k$$

$$C = 7i - 7j + k$$

$$A \cdot C = (3 \cdot 7) + (4 \cdot -7) + (-6 \cdot 1) = 21 + (-28) + (-6) = -13$$

$$B \cdot C = (5 \cdot 7) + (-11 \cdot -7) + (2 \cdot 1) = 35 + 77 + 2 = 114$$

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

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

$$= A \cdot C - B \cdot C$$

$$= \therefore -13 - 114 = -127$$

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

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

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

$$= 3i - (-9)j + (-112)k = 3i + 9j - 112k$$

$$A \cdot (B \times C) = (3 \cdot 3) + (9 \cdot 9) + (-6 \cdot -112) = 9 + 81 + 672 = 762$$