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Electrical/Electronics

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MAT 102

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

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

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

$$= 21 - 28 - 6$$

$$A \cdot C = -13$$

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

$$= 35 + 77 + 2$$

$$B \cdot C = 114$$

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

$$A \cdot C + B \cdot C = 101$$

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

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

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

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

$$= -14 - 105 - 8$$

$$= -14 - 113$$

$$(A-B) \cdot C = -127$$

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

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

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

$$= i(-11 - (-14)) - j(5 - 14) + k(-25 - (-77))$$

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

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

$$= 9 + 36 - 252$$

$$A \cdot (B \times C) = \underline{\underline{-207}}$$