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 19 / Engos / 008

2d)  $A = 4i + 7j + 2k, B = 3i$

a)  $(A - 2B) \times C$

b)  $2C \times 3B$

Soln

$$A = 4i + 7j + 2k$$

$$2B = 6i - 4j + 2k$$

$$A - 2B = -2i + 11j - 4k$$

$$C = i + 0j - 2k$$

$$(A - 2B) \times C = \begin{vmatrix} i & j & k \\ -2 & 11 & -4 \\ 1 & 0 & -2 \end{vmatrix}$$

$$= i \begin{vmatrix} 11 & -4 \\ 0 & -2 \end{vmatrix} - j \begin{vmatrix} -2 & -4 \\ 1 & -2 \end{vmatrix} + k \begin{vmatrix} -2 & 11 \\ 1 & 0 \end{vmatrix}$$

$$= i(22 - 0) - j(4 - (-4)) + k(0 - 11)$$

$$= 22i - 8j - 11k$$

$$= -10i + 8j - 5k$$

b)  $2C = 2i + 0j - 4k$

$$3B = 9i - 6j + 3k$$

$$2C \times 3B = \begin{vmatrix} i & j & k \\ 2 & 0 & -4 \\ 9 & -6 & 3 \end{vmatrix}$$

$$= \begin{vmatrix} 2 & 0 & -4 \\ 9 & -6 & 3 \end{vmatrix}$$

$$= i \begin{vmatrix} 6 & -4 \\ -6 & 3 \end{vmatrix} - j \begin{vmatrix} 2 & -4 \\ 9 & 3 \end{vmatrix} + k \begin{vmatrix} 2 & 0 \\ 9 & -6 \end{vmatrix}$$

$$= i(0-24) - j(6-(36)) + k(-12-0)$$

$$= -24i - 42j - 12k$$

$$2 \times (2 \times 3) = \begin{vmatrix} 1 & -7 & 2 \\ 4 & 1 & -2 \\ -4 & -12 & -12 \end{vmatrix}$$

$$= 1 \begin{vmatrix} 1 & -2 \\ -4 & -12 \end{vmatrix} - 7 \begin{vmatrix} 4 & -2 \\ -4 & -12 \end{vmatrix} + 2 \begin{vmatrix} 4 & 1 \\ -4 & -12 \end{vmatrix}$$

$$= i(-12-84) - 7(-48-48) + 2(-16-24)$$

$$= 96i + 567j - 192k$$

$$A = 9i - 6j - 3k$$

$$B = 4i + 3j - k$$

$$C = i - 3j + 2k$$

$$\begin{vmatrix} 9 & -6 & -3 \\ 4 & 3 & -1 \\ 1 & -3 & 2 \end{vmatrix}$$

$$0 = 9 \begin{vmatrix} 3 & -1 \\ -3 & 2 \end{vmatrix} - (-6) \begin{vmatrix} 4 & -1 \\ 1 & 2 \end{vmatrix} - 3 \begin{vmatrix} 4 & 1 \\ 1 & -3 \end{vmatrix}$$

$$0 = p(6-3) + 6(8 - (-1)) - 2(8 - (-1))$$

$$0 = 3p + 3 + 27$$

$$0 = 3p + 5 + 27 \quad 0 = 3p + 27$$

$$\frac{3p = -27}{3} = \frac{-27}{3}$$

$$p = -9$$