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COURSE MAT 102

1. $A = 4i + j - 2k$, $B = 3i - 2j + k$ & $C = i - 2k$

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

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

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

$= -2i + 5j - 4k$

$$(A-2B)\times C = \begin{vmatrix} i & j & k \\ -2 & 5 & -4 \\ 1 & 0 & -2 \end{vmatrix}$$

$$i\begin{vmatrix} 5 & -4 \\ 0 & -2 \end{vmatrix} - j\begin{vmatrix} -2 & -4 \\ 1 & -2 \end{vmatrix} + k\begin{vmatrix} -2 & 5 \\ 1 & 0 \end{vmatrix}$$

$= -6i - 8j - 5k$

b) $A \times (2C \times 3B)$

$2C = 2(i - 2k) = 2i - 4k$

$3B = 3(3i - 2j + k) = 9i - 6j + 3k$

$$2C \times 3B = \begin{vmatrix} i & j & k \\ 1 & 0 & -2 \\ 9 & -6 & 3 \end{vmatrix}$$

$$i\begin{bmatrix} 0 & -2 \\ -6 & 3 \end{bmatrix} - j\begin{bmatrix} 1 & -2 \\ 9 & 3 \end{bmatrix} + k\begin{bmatrix} 1 & 0 \\ 9 & -6 \end{bmatrix}$$

$i[0 + 18] - j[3 + 18] + k[-6 - 0]$

$18i - 21j - 6k$

$$A \times (2C \times 3B) \begin{vmatrix} i & j & k \\ 4 & 1 & -2 \\ 18 & -21 & -6 \end{vmatrix}$$

$$i\begin{bmatrix} 1 & -2 \\ -21 & -6 \end{bmatrix} - j\begin{bmatrix} 4 & -2 \\ 18 & -6 \end{bmatrix} + k\begin{bmatrix} 4 & 1 \\ 18 & -21 \end{bmatrix}$$

$$i[-6+36] - j[-24+36] + k[-84-18]$$

$$30i - 12j - 102k$$

2. $A = 8i - 6j - 3k$, $B = 4i + 3j - k$ & $C = 1 - 3j$

$$\begin{vmatrix} i & j & k \\ p & -6 & -3 \\ 4 & 3 & -1 \\ 1 & -3 & 2 \end{vmatrix}$$

$$+p\begin{vmatrix} 3 & -1 \\ -3 & 2 \end{vmatrix} + 6\begin{bmatrix} 4 & -1 \\ 1 & 2 \end{bmatrix} - 3\begin{vmatrix} 4 & 3 \\ 1 & -3 \end{vmatrix}$$

$$p(6-3) + 6(8+1) - 3[-12-3]$$

$$3p + 54 + 45 = 0$$

$$3p = -54 - 45$$

$$p = \frac{-99}{3}$$

$$p = -33 //$$