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Computer Engineering 19/ENG02/051
MAT 102

1a) $(A-2B)\times C$

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

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

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

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

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

$i(-10) - j(4-(-4)) + k(-5)$

$-10i - 8j - 5k$

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

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

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

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

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

$i(-24) - j(42) + k(-12)$

$-24i - 42j - 12k$

$A \times (2C \times 3B) = \begin{vmatrix} i & j & k \\ 4 & 1 & -2 \\ -24 & -42 & -12 \end{vmatrix}$

$i\begin{vmatrix} 1 & -2 \\ -42 & -12 \end{vmatrix} - j\begin{vmatrix} 4 & -2 \\ -24 & -12 \end{vmatrix} + k\begin{vmatrix} 4 & 1 \\ -24 & -42 \end{vmatrix}$

$i(-96) - j(-96) + k(-144)$

$= -96i + 96j - 144k$

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

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

$p(3) + 6(9) - 3(-15) = 0$

~~$3p + 18 + 45 = 0$~~ $3p + 54 + 45 = 0$

~~$3p + 60 = 0$~~ $3p + 99 = 0$

~~$3p = -60$~~ $3p = -99$

~~$p = -60/3$~~ ~~$p = -20$~~ $p = -99/3$ $p = -33$