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Assignment

$$a) A = 4i + j - 2k$$

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

$$C = i - 2k$$

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

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

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

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

$$(A-2B) \times C = \begin{array}{c|c|c} + & - & + \\ i & j & k \\ \hline -2 & 5 & -4 \\ \hline 1 & -2 & 0 \end{array}$$

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

$$i [(5 \times 0) - (-4 \times -2)] - j [(-2 \times 0) - (-4 \times 1)] + k [(-2 \times -2) - (5 \times 1)]$$

$$i [0 - 8] - j [0 + 4] + k [4 - 5]$$

$$= -8i - 4j - k$$

$$(A-2B) \times C = -8i - 4j - k$$

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

$$(2C \times 3B) = 2(i - 2k) \times 3(3i - 2j + k)$$

$$= 2i - 4k \times 9i - 6j + 3k$$

$$(2C \times 3B) = \begin{array}{c|c|c} + & - & + \\ i & j & k \\ \hline 2 & -4 & 0 \\ \hline 9 & -6 & 3 \end{array}$$

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

19/ENR02/059

$$i[(-4 \times 3) - (0 \times -6)] - j[(2 \times 3) - (0 \times 9)] + k[(2 \times -6) - (-4 \times 9)]$$

$$i[-12 + 0] - j[6 - 0] + k[-12 + 36]$$

$$i[-12] - j[6] + k[24]$$

$$A \times (2C \times 9B) = \begin{vmatrix} + & - & + \\ i & j & k \\ 4 & 3 & -1 \\ -12 & -6 & 24 \end{vmatrix}$$

$$i \begin{vmatrix} 1 & -2 \\ -6 & 24 \end{vmatrix} - j \begin{vmatrix} 4 & -2 \\ 12 & 24 \end{vmatrix} + k \begin{vmatrix} 4 & 1 \\ -12 & -6 \end{vmatrix}$$

$$i[(1 \times 24) - (-2 \times -6)] - j[(4 \times 24) - (-2 \times 12)] + k[(4 \times -6) - (1 \times -12)]$$

$$i[24 - 12] - j[96 - 24] + k[-24 + 12]$$

$$12i - 72j - 12k$$

$$2) A = pi - 6j - 3k$$

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

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

$$A \cdot (B \times C) = \begin{vmatrix} + & - & + \\ p & -6 & -3 \\ 4 & 3 & -1 \\ 1 & -3 & 2 \end{vmatrix}$$

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

$$p[(3 \times 2) - (-1 \times -3)] + 6[(4 \times 2) - (-1 \times 1)] - 3[(4 \times -3) - (3 \times 1)] = 0$$

$$p[6 - 3] + 6[8 + 1] - 3[-12 - 3] = 0$$

$$p[3] + 6[9] - 3[-15] = 0$$

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

$$3p = 54 - 45$$

$$3p = 9 \quad \Rightarrow p = 3$$

$$p = 3$$