Answer on Question #56037 – Math – Analytic Geometry

Evaluate $(2\boldsymbol{i} - 4\boldsymbol{k}) \times (\boldsymbol{i} + 2\boldsymbol{j})$.

a) $8\boldsymbol{i} - 4\boldsymbol{j} + 4\boldsymbol{k}$
b) $2\boldsymbol{i} + 4\boldsymbol{j} + 3\boldsymbol{k}$
c) $3\boldsymbol{i} + 4\boldsymbol{j} + 2\boldsymbol{k}$
d) $5\boldsymbol{i} - 3\boldsymbol{j} - \boldsymbol{k}$

Solution

The cross (vector) product can be rewritten in the following form:

$$(2\boldsymbol{i} - 4\boldsymbol{k}) \times (\boldsymbol{i} + 2\boldsymbol{j}) = \begin{vmatrix} \boldsymbol{i} & \boldsymbol{j} & \boldsymbol{k} \\ 2 & 0 & -4 \\ 1 & 2 & 0 \end{vmatrix} = \boldsymbol{i} \begin{vmatrix} 0 & -4 \\ 2 & 0 \end{vmatrix} - \boldsymbol{j} \begin{vmatrix} 2 & -4 \\ 1 & 0 \end{vmatrix} + \boldsymbol{k} \begin{vmatrix} 2 & 0 \\ 1 & 2 \end{vmatrix} =$$

$$= 8\boldsymbol{i} - 4\boldsymbol{j} + 4\boldsymbol{k}.$$

Answer: $(2\boldsymbol{i} - 4\boldsymbol{k}) \times (\boldsymbol{i} + 2\boldsymbol{j}) = 8\boldsymbol{i} - 4\boldsymbol{j} + 4\boldsymbol{k}$**.**