

## Answer on Question #59691 – Math – Analytic Geometry

### Question

1. Find the vector product  $\mathbf{a} \times \mathbf{b}$ , if  $\mathbf{a} = \mathbf{i} + 2\mathbf{j} - \mathbf{k}$  and  $\mathbf{b} = 2\mathbf{i} + 3\mathbf{j} + \mathbf{k}$ ?

a)  $5\mathbf{i} - 3\mathbf{j} - \mathbf{k}$

b)  $2\mathbf{i} - 4\mathbf{j} - \mathbf{k}$

c)  $3\mathbf{i} + \mathbf{j} - \mathbf{k}$

d)  $\mathbf{i} - \mathbf{j} + 3\mathbf{k}$

### Solution

$$\begin{aligned}\mathbf{a} \times \mathbf{b} &= \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ 1 & 2 & -1 \\ 2 & 3 & 1 \end{vmatrix} = (2 \cdot 1 - 3 \cdot (-1))\mathbf{i} - (1 \cdot 1 - 2 \cdot (-1))\mathbf{j} + \\ &+ (1 \cdot 3 - 2 \cdot 2)\mathbf{k} = (2 + 3)\mathbf{i} + (-2 - 1)\mathbf{j} + (3 - 4)\mathbf{k} = 5\mathbf{i} - 3\mathbf{j} - \mathbf{k}.\end{aligned}$$

Thus, a)  $5\mathbf{i} - 3\mathbf{j} - \mathbf{k}$  is a correct answer.

**Answer:** a)  $5\mathbf{i} - 3\mathbf{j} - \mathbf{k}$ .