Answer on Question #56040 –Math –Vector Calculus

One of the following laws for dot and cross multiplication of three vectors A , B and C is invalid:

(A.B)C=A(B.C)

A×(B×C)=(A.C)B−(A.B)C

(A×B)×C=(A.C)B−(B.C)A

A×(B×C)≠(A×B)×C

Solution

(A.B)C=A(B.C)

$$(\bar{A} \cdot \bar{B})\bar{C} = \bar{A}(\bar{B} \cdot \bar{C}),$$

The dot products are scalars, so it means

$$\bar{C} = k\bar{A}, where\ k = \frac{(\bar{B} \cdot \bar{C})}{(\bar{A} \cdot \bar{B})}.$$

So $\bar{C}$ is some scalar multiple of $\bar{A}$. Thus, this rule is not true for any three vectors **A** , **B** and **C.**