

Answer on Question #78049 – Math – Calculus

Question

Show that $V \cdot (V \times F) = 0$ for a vector field F .

Solution

Here, we deal with a scalar triple product or mixed product. One of the properties of such product is an invariance under a circular shift:

$$a \cdot (b \times c) = c \cdot (a \times b).$$

We also know that $a \times a = 0$. Using these properties for the problem we have:

$$V \cdot (V \times F) = F \cdot (V \times V) = F \cdot 0 = 0.$$

Answer: $V \cdot (V \times F) = 0$.