**Answer on Question #44079 – Math - Vector Calculus**

Let a $^{\rightarrow}$ = (3, -1, 0) and b $^{\rightarrow}$=(1/2,3/2,1). Find the vector c $^{\rightarrow}$satisfying a $^{\rightarrow}$×c $^{\rightarrow}$=4b $^{\rightarrow}$ and a $^{\rightarrow}$ .( c) $^{\rightarrow}$=1.

**Solution**

$$(\vec{a} \times \vec{c}) = 4\vec{b}$$

$$\vec{a} \times (\vec{a} \times \vec{c}) = 4\vec{a} \times \vec{b}.$$

Thus

$$\vec{a} \times (\vec{a} \times \vec{c}) = \vec{a}(\vec{a} \cdot \vec{c}) - \vec{c}(\vec{a} \cdot \vec{a}) = 4\vec{a} \times \vec{b}.$$

But $(\vec{a} \cdot \vec{c}) = 1$. So

$$\vec{c} = \frac{\vec{a} - 4\vec{a} \times \vec{b}}{(\vec{a} \cdot \vec{a})}.$$

$$(\vec{a} \cdot \vec{a}) = 3^2 + (-1)^2 + 0^2 = 10.$$

$$\vec{a} \times \vec{b} = \left((-1) \cdot 1 - 0 \cdot \frac{3}{2};\ 0 \cdot \frac{1}{2} - 3 \cdot 1; 3 \cdot \frac{3}{2} - (-1) \cdot \frac{1}{2}\right) = (-1, -3{,}5).$$

$$\vec{c} = \frac{(3, -1, 0) - 4(-1, -3{,}5)}{10} = \left(\frac{7}{10}, \frac{11}{10}, -2\right).$$

**Answer:** $\left(\frac{7}{10}, \frac{11}{10}, -2\right)$.