Answer on Question #56113 – Math – Vector Calculus

If A=i−2j−3k, B=2i+3j+k and C=i+3j−2k, compute |(A×B)×C|

2(√2)

5(√26)

3(√21)

4(√11)

Solution

$$\mathrm{A}\times\mathrm{B}=\begin{bmatrix} i & j & k \\ 1 & -2 & -3 \\ 2 & 3 & 1 \end{bmatrix}=i(-2*1-(-3)*3)-j(1*1-(-3)*2)+k(1*3-(-2)*2)=$$

$$=i(-2+9)-j(1+6)+k(3+4)=7i-7j+7k.$$

$$(\mathrm{A}\times\mathrm{B})\times\mathrm{C}=\begin{bmatrix} i & j & k \\ 7 & -7 & 7 \\ 1 & 3 & -2 \end{bmatrix}=i(-7*(-2)-7*3)-j(7*(-2)-7*1)+k(7*3-(-7)1)$$

$$=$$

$$=i(14-21)-j(-14-7)+k(21+7)=-7i+21j+28k.$$

$$|(\mathrm{A}\times\mathrm{B})\times\mathrm{C}|=\sqrt{(-7)^2+21^2+28^2}=\sqrt{49+441+784}=\sqrt{1274}=\sqrt{7*7*26}=7\sqrt{26}.$$

Answer: $7\sqrt{26}$.