

### Answer on Question #52235 – Math – Vector Calculus

1. IF line(OA) =  $4i + 3j$ , line(OB) =  $6i - 2j$  and line(OC) =  $2i - j$ . Deduce the length of the triangle CA.

13--√

20--√

29--√

17--√

2 What quantity have both magnitude and direction ?

vector

scalar

mass

dot product

3 Find the vector product  $a \times b$ . If  $a = i + 2j - k$  and  $b = 2i + 3j + k$

$5i - 3j - k$

$2i - 4j - k$

$3i + j - k$

$i - j + 3k$

4 A ..... is the sum of two vectors.

resultant vector

free vector

null vector

position vector

5 A temperature of

1000

C is a ..... quantity.

force

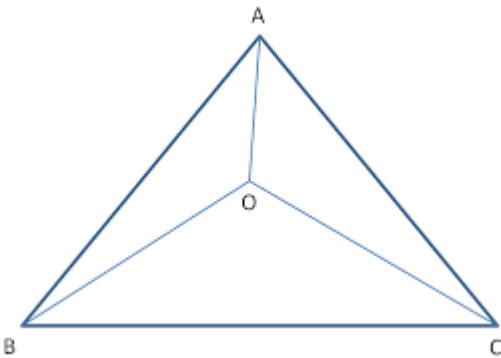
scalar

vector

magnitude

**Solution.**

**1.**



$$\vec{AC} = \vec{OC} - \vec{OA} = 2i - j - (4i + 3j) = -2i - 4j$$

$$|\vec{AC}| = \sqrt{(-2)^2 + (-4)^2} = \sqrt{20} = 2\sqrt{5} \approx 4.47$$

**2. vector**

**3. The vector product (or the cross product) is**

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

**4. resultant vector**

**5. scalar**