Answer on Question #81264 – Math – Linear Algebra

Question

Check whether the vector $(2\sqrt{3}, 2)$ is equally inclined to the vectors $(2, 2\sqrt{3})$ and $(4,0)$.

Solution

Let $\vec{a} = (2\sqrt{3}, 2), \vec{b} = (2, 2\sqrt{3})$ and $\vec{c} = (4, 0)$.

Find dot product

$$\vec{a} \cdot \vec{b} = 2\sqrt{3}(2) + 2(2\sqrt{3}) = 8\sqrt{3}$$
$$\vec{a} \cdot \vec{c} = 2\sqrt{3}(4) + 2(0) = 8\sqrt{3}$$

$$|\vec{a}| = \sqrt{\left(2\sqrt{3}\right)^2 + (2)^2} = 4$$

$$|\vec{b}| = \sqrt{(2)^2 + \left(2\sqrt{3}\right)^2} = 4$$

$$|\vec{c}| = \sqrt{(4)^2 + (0)^2} = 4$$

$$\cos\beta = \frac{\vec{a} \cdot \vec{b}}{|\vec{a}||\vec{b}|} = \frac{8\sqrt{3}}{4 \cdot 4} = \frac{\sqrt{3}}{2}$$

$$\cos\gamma = \frac{\vec{a} \cdot \vec{c}}{|\vec{a}||\vec{c}|} = \frac{8\sqrt{3}}{4 \cdot 4} = \frac{\sqrt{3}}{2}$$

Therefore, the vector $(2\sqrt{3}, 2)$ is equally inclined to the vectors $(2, 2\sqrt{3})$ and $(4,0)$.