Answer on Question #44747 – Math – Analytic Geometry

the angle between vector p and vector q is cos inverse (-3b/2a),if |p|=|vector a +2bvector|. find vector q . if|p|=|q|

Solution:

$\alpha = \arccos\left(-\frac{3b}{2a}\right) - \text{angle between two vectors;}$

$|\vec{p}| = |\vec{a} + 2\vec{b}| \qquad (1)$

$|\vec{p}| = |\vec{q}| \qquad (2)$

$$|\vec{p}|^2 = |\vec{a} + 2\vec{b}|^2$$

$$|\vec{p}|^2 = a^2 + 4\vec{a}\vec{b} + 4b^2$$

The scalar product of two vectors:

$$\vec{p} \cdot \vec{q} = |\vec{p}| \cdot |\vec{q}| \cdot \cos\alpha \qquad (3)$$

$$(1)\text{and}(2)\text{in}(3):$$

$$\vec{p} \cdot \vec{q} = |\vec{a} + 2\vec{b}| \cdot |\vec{a} + 2\vec{b}| \cdot \left(-\frac{3b}{2a}\right)$$

$$\vec{p} \cdot \vec{q} = (\vec{a} + 2\vec{b})^2 \cdot \left(-\frac{3b}{2a}\right)$$

$$\vec{p} \cdot \vec{q} = (a^2 + 4\vec{a}\vec{b} + 4b^2)\left(-\frac{3b}{2a}\right)$$

We can't find vector $\vec{q}$ using only vectors $\vec{a}$ and $\vec{b}$, we need more information about vector $\vec{p}$ to find vector $\vec{q}$.