Answer on Question #42416 – Math – Analytic Geometry

Find a · b.
a = 10i + 9j, b = 4i + 3j
what do i have to do with the i.

Solution

$\vec{i}$ and $\vec{j}$ are the unit vectors of the *X* and *Y* axes. They are perpendicular. So,

$\vec{i}\cdot\vec{i}=1,\quad \vec{j}\cdot\vec{j}=1,\quad \vec{i}\cdot\vec{j}=\vec{j}\cdot\vec{i}=0.$

The scalar product of the vectors $\vec{a}$ and $\vec{b}$ is

$$\vec{a}\cdot\vec{b}=\left(10\vec{i}+9\vec{j}\right)\cdot\left(4\vec{i}+3\vec{j}\right)=10\cdot4\cdot\left(\vec{i}\cdot\vec{i}\right)+10\cdot3\cdot\left(\vec{i}\cdot\vec{j}\right)+9\cdot4\cdot\left(\vec{j}\cdot\vec{i}\right)+9\cdot3\cdot\left(\vec{j}\cdot\vec{j}\right)=$$

$$=40\cdot1+30\cdot0+36\cdot0+27\cdot1=67.$$

Answer: 67.