

Answer on Question #44313 – Math - Analytic Geometry

Find the angle between the given vectors to the nearest tenth of a degree.

$$u = \langle -5, -4 \rangle, v = \langle -4, -3 \rangle$$

Solution:

$$u = \langle -5, -4 \rangle$$

$$v = \langle -4, -3 \rangle$$

Magnitudes of the vectors:

$$|u| = \sqrt{(-5)^2 + (-4)^2} = \sqrt{41}$$

$$|v| = \sqrt{(-4)^2 + (-3)^2} = \sqrt{25} = 5$$

The scalar product of vectors (α – angle between vectors)

$$u \cdot v = |u| \cdot |v| \cdot \cos \alpha$$

$$\cos \alpha = \frac{u \cdot v}{|u| \cdot |v|}$$

$$\alpha = \arccos\left(\frac{u \cdot v}{|u| \cdot |v|}\right) = \arccos\left(\frac{u \cdot v}{|u| \cdot |v|}\right)$$

$$= \arccos\left(\frac{(-5) \cdot (-4) + (-4) \cdot (-3)}{\sqrt{41} \cdot 5}\right) = \arccos\left(\frac{32\sqrt{41}}{41 \cdot 5}\right) = 1.8^\circ$$

Answer: angle between the given vectors is 1.8° .