

### Answer on Question #42008 – Math – Trigonometry

A vector  $w$  of magnitude 50 points southeast. Resolve the vector into southerly and easterly components.

a) The southerly component has a magnitude of \_\_\_\_.

b) What is the length?

*Solution.*

Let input a Cartesian coordinate system with  $X$ -axis along the south and  $Y$ -axis along the east. The given vector will be with  $\vec{w}(w\cos\alpha; w\sin\alpha)$ , there  $w = 50$  is the magnitude of the vector and  $\alpha = 45^\circ$  is the angle between the vector and  $X$ -axis.

a) The southerly component has a magnitude of  $|w\cos\alpha| = |50 \cdot \cos 45^\circ| = 50 \cdot \frac{\sqrt{2}}{2} = 25\sqrt{2}$  points.

b) The projection of the southerly component is  $w\cos\alpha = 50 \cdot \cos 45^\circ = 25\sqrt{2}$ .

**Answer:** a)  $25\sqrt{2}$ ; b)  $25\sqrt{2}$ .