

Name: _____

Key

ID # _____

- 1) In the figure, vector \vec{A} has a magnitude of 10 m, and vector \vec{B} has a magnitude of 6 m. What is $\vec{A} - \vec{B}$ (in unit vector notation)?

$$A_x = 10 \cos 45 = 7.07$$

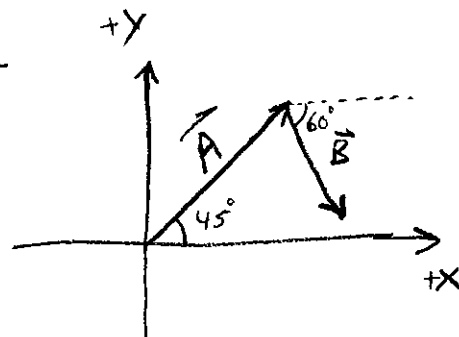
$$A_y = 10 \sin 45 = 7.07$$

$$\vec{A} = 7.07 \hat{i} + 7.07 \hat{j}$$

$$B_x = 6 \cos 300 = 3$$

$$B_y = 6 \sin 300 = -5.2$$

$$\vec{B} = 3 \hat{i} - 5.2 \hat{j}$$



$$\vec{A} - \vec{B} = 4.07 \hat{i} + 12.27 \hat{j}$$

- 2) You are given two vectors \vec{A} and \vec{B} . if $\vec{A} \cdot \vec{B} = 4$ and $|\vec{A} \times \vec{B}| = 3$, what is the angle between \vec{A} and \vec{B} ?

$$\vec{A} \cdot \vec{B} = AB \cos \phi = 4 \quad (1)$$

$$|\vec{A} \times \vec{B}| = AB \sin \phi = 3 \quad (2)$$

Divide $\frac{(2)}{(1)} \Rightarrow \frac{AB \sin \phi}{AB \cos \phi} = \frac{3}{4}$

$$\tan \phi = \frac{3}{4}$$

$$\phi = \tan^{-1} \left(\frac{3}{4} \right) = 36.9^\circ$$