Physics 160 Written Homework - Chapter 1.

1 Vector Components

Given the vector $\vec{A}$ at an angle $\pi/6$ radians and $\vec{B}$ at an angle $-\pi/6$ radians (measured counter-clockwise from the positive x axis), each with the same unknown magnitude:

a. Express the direction of $\vec{A}-\vec{B}$ as an angle in radians measured counter-clockwise from the positive x axis.

b. Express the direction of $\vec{A}+\vec{B}$ in the same manner.

c. If $|\vec{A}-\vec{B}| = 10m$, what is $|\vec{A}|$ and $|\vec{B}|$?

d. If $|\vec{A}+\vec{B}| = 10m$, what is $|\vec{A}|$ and $|\vec{B}|$?

2 Scalar and Vector Products

Given the vectors $\vec{A} = 4\hat{i} + 3\hat{j} - \hat{k}$ and $\vec{B} = -2\hat{i} + 5\hat{j} + 7\hat{k}$

a. Compute the scalar product $\vec{A} \cdot \vec{B}$.

b. From your answer to part a, what the angle θ between $\vec{A}$ and $\vec{B}$?

c. Compute the vector product $\vec{A} \times \vec{B}$.

d. Compute the vector product $\vec{B} \times \vec{A}$.

e. From the right hand rule, explain the relationship between $\vec{A} \times \vec{B}$ and $\vec{B} \times \vec{A}$.