PHYS 211 Homework Assignment
Chapter 2

Problem 1 A four-wheeler travels 21 km to the northeast, then 15 km to the east and finally 28 km to the north.

(a) What is the position vector of the four-wheeler at each turn?

(b) What is the total displacement?

Be sure to draw a coordinate system and label your axes. Use x and y instead of the cardinal directions.

Problem 2 A ship sets out to sail to a point 100 km due north. However, it is blown 30 km due east of its starting point before it even begins. How far and in what direction must the ship sail to reach its final destination?

Problem 3 Using the two vectors $\vec{a}$ and $\vec{b}$ below, find the following combinations:

$$\begin{aligned} \vec{a} &= 2.0\hat{i} - 3.0\hat{j} + 1.0\hat{k} \\ \vec{b} &= -2.0\hat{i} + 2.0\hat{j} - 1.0\hat{k} \end{aligned}$$

(a) $\vec{a} + \vec{b}$,

(b) $\vec{a} - 3\vec{b}$,

(c) $2\vec{a} - \vec{b}$,

(d) $\vec{a} \cdot \vec{b}$,

(e) $\vec{a} \times \vec{b}$.

Problem 4 Two vectors lie in the xy-plane and have components $a_x = 1.7, a_y = 2.3, b_x = 7.0, b_y = -2.2$. Find

(a) $\vec{a} \cdot \vec{b}$,

(b) ab,

(c) the angle between vectors $\vec{a}$ and $\vec{b}$.