



## WEEK-IN-REVIEW 1 (VECTORS PART 1)

**Problem 1.** A vector starts at the initial point  $A(-1, 2)$  and ends at  $B(-3, 5)$ .

- (1) Draw the vector. Then sketch the position vector.
- (2) Find the vector  $\vec{AB}$ .
- (3) Find the magnitude of  $\vec{AB}$  and the unit vector of  $\vec{AB}$ .
- (4) What is vector  $\vec{BA}$ ?

**Problem 2.** Given two vectors  $\vec{a} = 2\vec{i} + 3\vec{j}$  and  $\vec{b} = 3\vec{i} - 2\vec{j}$ , find the following

- (1)  $|\vec{a} - \vec{b}|$
- (2)  $3\vec{a} + 4\vec{b} - \vec{i}$
- (3) A unit vector of length 5 in the direction of  $\vec{a}$ .
- (4) A unit vector in the direction opposite to  $\vec{b}$ .

**Problem 3. .**

- (1) Find the direction that the vector  $\vec{a} = \langle 1, \sqrt{3} \rangle$  makes with the positive  $x$ -axis.
- (2) Find the direction that the vector  $\vec{b} = \langle -1, \sqrt{3} \rangle$  makes with the positive  $x$ -axis.
- (3) Find the direction that the vector  $\vec{c} = \langle -1, -\sqrt{3} \rangle$  makes with the positive  $x$ -axis.
- (4) Find the direction that the vector  $\vec{d} = \langle 1, -\sqrt{3} \rangle$  makes with the positive  $x$ -axis.

**Problem 4.** Two forces,  $\mathbf{F}_1$  and  $\mathbf{F}_2$ , are acting on an object P.  $\mathbf{F}_1$  has a magnitude of 2 lbs and acts along the positive  $x$ -axis while  $\mathbf{F}_2$  has a magnitude of 4 lbs and acts at an angle of  $60^\circ$  with respect to the positive  $x$ -axis. Find the magnitude and direction of the resultant force acting on P.

**Problem 5.** A pilot steers his plane in the direction **N60E** at a speed of 250 kilometers per hour while the wind is blowing in the direction **N45W** at a speed of 50 kilometers per hour. Find the true course (in bearings) and the ground speed of the plane.