Homework 8

Please complete the following problems legibly on a separate sheet of paper. You should show all the steps you took and justify your answers. This assignment is due **Friday, June 7th.**

Bookwork

§4.2 Homework A, 4.2.1A, 4.2.4A, 4.2.6A, 4.2.10A (you do not need to leave in exact form)

(Additional Problem)

Let $\vec{w}$ be a vector, and let $\vec{w} = w_1\vec{i} + w_2\vec{j}$ be its unit decomposition. Note the following:

1. If $w_1 > 0$ and $w_2 > 0$, then $\vec{w}$ points in quadrant I.

2. If $w_1 < 0$ and $w_2 > 0$, then $\vec{w}$ points in quadrant II.

3. If $w_1 < 0$ and $w_2 < 0$, then $\vec{w}$ points in quadrant III.

4. if $w_1 > 0$ and $w_2 < 0$, then $\vec{w}$ points in quadrant IV.

Given the unit decomposition of a vector, we can recover the magnitude and angle with the horizontal as follows:

$$\|\vec{w}\| = \sqrt{w_1^2 + w_2^2} \tag{1}$$
$$\theta = \arctan\frac{w_2}{w_1} \text{ if } w_1 > 0 \tag{2}$$
$$\theta = \pi + \arctan\frac{w_2}{w_1} \text{ if } w_1 < 0 \tag{3}$$
$$\theta = \pi/2 \text{ if } w_1 = 0 \text{ and } w_2 > 0 \tag{4}$$
$$\theta = -\pi/2 \text{ if } w_1 = 0 \text{ and } w_2 < 0 \tag{5}$$

For the following vectors, find the magnitude and the angle made with the horizontal axis.

1. $\vec{w} = -12\vec{i}$

2. $\vec{w} = 2\vec{i} + 3\vec{j}$

3. $\vec{w} = -2\vec{i} - 3\vec{j}$

4. $\vec{w} = -5\vec{j}$