Read

RHK Ch. 1, Special attention to 1.7
 Ch. 2, Sections 2.1-2.3
 Appendix H
KK Ch. 1, Sections 1.1-1.4

Solve

From RHK Ch. 1 Exercises 32, 33
 Ch.2 Exercise 10, Problems 1, 2, 3

Problem 1. Indicate the properties of two vectors $\vec{a}$ and $\vec{b}$ such that

a) $\vec{a} + \vec{b} = \vec{c}$ and $a+b=c$ (note: $|\vec{a}| = a$)

b) $\vec{a} + \vec{b} = \vec{a} - \vec{b}$

c) $\vec{a} + \vec{b} = \vec{c}$ and $a^2+b^2=c^2$

Problem 2. A tourist flies from Washington D.C. to Manila. The latitude and longitude of the two cities are 39°N, 77°W and 15°N, 121°E respectively. The radius of the earth is 6370 km.
a) Describe the displacement vector.
b) What is its magnitude?

Problem 3. Let N be an integer greater than 1. Consider the sum of N vectors of equal length, each vector making an angle of $2\pi/N$ with that preceding. Then show:

$$\cos 0 + \cos\frac{2\pi}{N} + \cos\frac{4\pi}{N} + ... + \cos\frac{2(N-1)\pi}{N} = 0$$

that is,

$$\sum_{n=0}^{N-1} \cos\frac{2\pi n}{N} = 0$$

Also show:

$$\sum_{n=0}^{N-1} \sin\frac{2\pi n}{N} = 0$$

Problem 4. You have 200 ft of steel sheet 0.020 in thick and you want to wrap it around a 6.00 in diameter tubing. How many turns of steel will you get? Neglect any air gap effects.

Good Luck, Dr. B