Set #1 - for Wd Sept. 29

**Read HR&K**  Chapter 1 - particularly Section 1.7
Chapter 2 - Sections 2.1 through 2.3
Appendix H: Vectors (2D and 3D)

**Read K&K**  Chapter 1 - Sections 1.1 through 1.4

**From Resnick, Halliday & Krane, Vol. 1 (5th Edition):**

**Ch. 1** Exercises 32, 33.

**Ch. 2** Exercise 10,  Problems 1, 2, 3.

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 \( a^2 + b^2 = c^2 \)

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?

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:
   \[
   \cos 0 + \cos \frac{2\pi}{N} + \cos \frac{4\pi}{N} + \ldots + \cos(N-1)\frac{2\pi}{N} = 0
   \]
   that is, \[
   \sum_{n=0}^{N-1} \cos \frac{2\pi n}{N} = 0
   \]
   Also show: \[
   \sum_{n=0}^{N-1} \sin \frac{2\pi n}{N} = 0
   \]

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.