This assignment is in five short parts: syllabus, e-mail, writing, exercises, problems.

A. Due at 11:59 PM on Day 1: Read the syllabus (the course web page).

B. Due at 11:59 PM on Day 1: E-mail me your answers to these questions.

1. What would you like to be called in class? (My answer would be "Josh".)
2. Home town/state/country:
3. Expected graduation year:
4. Expected major(s):
5. Why do you want to take this course?
6. According to the syllabus, what special task are you required to perform during the first two weeks of the course?
7. I'm trying to set office hours that are useful to my students. Are you available during the following times?
   - 3A?
   - 6A?
   - TueThu 11:00-12:00?
   - TueThu 1:00-2:00?
8. Is there anything else you want to tell me right now?

C. Due at the start of class on Day 2: Complete Writing Assignment 1 (*An equation is a statement*) from the course web site.

D. Due at the start of class on Day 2 (but not collected): Complete the following textbook exercises on vectors. If you feel that you need more practice, then do more problems from the book.

Section 12.1 #5, 11-14, 19-21, 38-41, 45, 55-56.

E. Due at the start of class on Day 3: Submit polished solutions to the following three problems, in the order assigned. Include all necessary work and no unnecessary work. Don't forget to write in complete sentences with punctuation.

1. Section 12.1 #59

2. In this problem, all vectors are in the plane, and their directions are measured counterclockwise from the positive x-axis. The vector $\vec{v}$ has length 2 and direction 320°. The vector $\vec{w}$ has length 3 and direction 350°. Compute exactly the length and direction of $\vec{v} + \vec{w}$. Do not use Cartesian coordinates (components). Instead use the law of sines and the law of cosines, which are in the front of your textbook.

3. Planets, moons, comets, etc. tend to move in elliptical orbits. However, in this problem we are dealing with such a small segment of orbit, that we can reasonably approximate it as a straight line. Also, let's assume that our universe is two-dimensional (although the problem is not really any harder in three dimensions).

An astronomer working late at night notices a previously unknown asteroid on her computer. The asteroid is at position $\vec{p}$ and moving with velocity $\vec{v}$. (The unit of distance is 10^6 m, measured relative to the Sun, and the unit of time is the hour. Time $t = 0$ is when the astronomer discovers the asteroid.) At that moment, Earth is at position $\vec{q}$ and moving with velocity $\vec{w}$.

3A. Write expressions, in terms of $\vec{p}$, $\vec{v}$, $\vec{q}$, $\vec{w}$, and t, for these three quantities: the position of the asteroid at time t, the position of the Earth at time t, and the distance between the two bodies at time t (regarding them as point particles, although they're really spherical).

3B. Still working in terms of $\vec{p}$, $\vec{v}$, $\vec{q}$, $\vec{w}$, and t, find the time t at which the two bodies are closest, and how close they are at that time. (Hint: Don't minimize the distance. Rather, minimize the square of the distance. Also, you don't actually need any calculus.)

3C. Suppose that $\vec{p} = (213268.00, 208956.00)$, $\vec{v} = \langle 56.66, 113.32 \rangle$, $\vec{q} = (212132.00, 212132.00)$, and $\vec{w} = \langle 75.66, -75.66 \rangle$. Earth's radius is 6.38 and the asteroid's radius is 0.1. Will the asteroid hit Earth?

3D. Using the same values for $\vec{p}$, $\vec{v}$, $\vec{q}$, $\vec{w}$ as in the previous part, where will the asteroid be, 12 hours after its discovery by the astronomer? Where will Earth be, 24 hours after the discovery?