Week 1 Problems

Due: Tuesday, September 8 by 5pm to Dickinson 104

Unless otherwise indicated, all problems come from "Essentials of College Physics"
Make sure to clearly state all assumptions you make and to show your work.

Note: On this problem set (and future problem sets), I will use the following notation:
[Chapter].[Problem #]
So, the book problem assigned this week is Problem #41 in Chapter 1.

1. You are outside Dickinson trying to get on top of the building (from the outside). Ladders tend to slip when they are too close to horizontal. Say that the minimum safe angle for a ladder is 35 degrees. What is the longest ladder that will work to get up onto the Dickinson roof?

2. How many meters in a furlong? How many square meters in a square furlong? (*Hint: Answers are not the same*).
   (Possibly) Helpful Information: 1 furlong = 220 yards, 1 yard = 3 feet,
   1 foot = 0.305 meters

3. Below are two versions of a famous saying:

   a. "There are more stars in **the universe** than there are grains of sand on all the beaches of Earth."

   b. "There are more stars in **the Galaxy** then there are grains of sand on all the beaches of Earth."

   The number of stars in our Galaxy is about 300 billion (3×10^{11}), whereas the number of stars in the observable Universe is closer to 10^{21}. Using an order-of- magnitude calculation, determine whether the number of grains of sand on all the beaches of Earth is closer to the number of stars in our galaxy or the number of stars in the observable Universe.

4. Problem 1.41