The goal of these exercises is to help you become accustomed to the type of unit analysis and calculations we’ll be doing in the course. For your reference, a number of units and their conversions into other units are listed in Appendices 2 and 3 of the textbook. Also, several problems use the basic equation velocity × time = distance.

Show all of your work. No partial credit will be awarded if you do not show all the steps you took to get your answer. Also, remember to include units with all your numbers. A number without a unit measures nothing.

1. Kenetia needs to do some measuring, but she accidentally grabs a meter stick when she meant to grab a yard stick.

(a) How many centimeters are in one meter?

(b) How many inches are in one meter?

(c) How many feet are in one meter? Is a meter stick shorter or longer than a yard stick?

2. Over the course of the semester, each of your four courses assigns one chapter of reading per week, for a total of four chapters per week. If each chapter is twenty pages long and you had to read at this rate for the entire year (summers included), how many pages would you end up reading over the course of the entire calendar year?
3. Joe drives from Phoenix to Las Vegas in one night without stopping. The distance is 300 miles, and he drives an average (basically constant) speed of 60 miles per hour. How long does it take him to arrive in Las Vegas? Give your answer in hours.

4. In Las Vegas, Joe meets an alien who offers to give him a ride to Jupiter (stranger things have happened there…). The alien tells him it will take eight hours to get to Jupiter. You know that Jupiter is $6.3 \times 10^8$ km away from the Earth. Use this information to answer the following questions:

(a) How far away is Jupiter in miles?

(b) How fast must the spaceship be traveling to travel that distance in eight hours? Give you answer in miles per hour.

(c) Compare the speed you just calculated with the speed of light. The speed of light is roughly 186,000 miles per second. Change this speed to miles per hour before you compare. Does the alien’s spaceship travel above or below the speed of light?
(d) Since nothing can travel faster than the speed of light, should Joe trust the alien? Why or why not?

5. Tonya the racecar driver finds she has to drive on a completely circular racetrack. The radius of the racetrack is 1.5 miles. If it takes her five minutes to go completely around the track once, how fast is she going? Give your answer in miles per hour.