Unit Conversions Problem Set

Introduction – HW#1

Name: _____

Date: _____ Period: _____

LENGTH

1. Horses are to race over a certain English meadow for a distance of 4.0 furlongs. What is the race distance in (a) rods and (b) chains? (1 furlong = 201.168 m, 1 rod = 5.0292 m and 1 chain = 20.117 m.)

2. The micrometer (1 μm) is often called the *micron*. (a) How many microns make up 1.0 km? (b) What fraction of a centimeter equal 1.0 μm? (c) How many microns are in 1.0 yd?

3. Antarctica is roughly semicircular, with a radius of 2000 km. The average thickness of its ice cover is 3000 m. How much cubic centimeters of ice does Antarctica contain? (Ignore the curvature of Earth.)

TIME

4. A lecture period (50 min) is close to 1 microcentury. (a) How long is a microcentury in minutes? (b) Find the percentage difference from the approximation.

5. A fortnight is a charming English measure of time equal to 2.0 weeks (the word is contraction of "fourteen nights"). That is a nice amount of time in pleasant company but perhaps a painful string of microseconds in unpleasant company. How many microseconds are in a fortnight?

6. The fastest growing plant on record is a *Hesperoyucca whipplei* that grew in 3.7 m in 14 days. What was its growth rate in micrometers per second?

MASS

7. Earth has a mass of 5.98×10^{24} kg. The average mass of the atoms that make up Earth is 40 u. How many atoms are there in Earth?

8. One cubic centimeter of a typical cumulus cloud contains 50 to 500 water drops, which have a typical radius of 10 µm. For that range, give the lower value and the higher value, respectively, for the following. (a) How many cubic meters of water are in a cylindrical cumulus cloud of height 3.0 km and radius 1.0 km? (b) How many 1-liter pop bottles would that water fill? (c) Water has a density of 1,000 kg/m^3. How much mass does the water in the cloud have?

Answers: 1) 160 rods, 40 chains; 2) 1.0×10^9 µm, 1.0×10^{-4} cm, 9.1×10^5 µm; 3) 1.9×10^{22} cm^3; 4) 52.56 min, 4.9%; 5) 1.21×10^{12} µs; 6) 3.1 µm/s; 7) 9.0×10^{49} atoms; 8) too long to put here!