Astr 2100 Descriptive Astronomy
Fall 2017 – Assignment 3 Answers

Convert the following (Don't forget to round your answers to 3 significant figures, and please answer on a separate sheet of paper.)

1. 12.5 AU to meters (1 AU = 1.5 x 10^{11} m)
    a. 12.5 AU = 12.5 * 1.5 x 10^{11} m = 1.88 x 10^{12} m
2. 240 light years to miles (1 lyr = 5.88 x 10^{12} miles)
    a. 240 light years = 240 * 5.88 x 10^{12} miles = 1.4 x 10^{15} miles
3. 456 light years to parsecs (1 pc = 3.26 lyr)
    a. 456 light years = 456 * (1/3.26) pc = 140 pc
4. 6.4 x 10^{19} meters to light years (1 lyr = 9.46 x 10^{15} m)
    a. 6.4 x 10^{19} meters = 6.4 x 10^{19} * (1/9.46 x 10^{15}) lyr = 6770 lyr
5. The nearest star to us (apart for our own Sun) is Proxima Centauri, about 4.2 light years away. How far is this in kilometers? (1 lyr = 9.46 x 10^{15} m)
    a. 4.2 lyr = 4.2 * 9.46 x 10^{15} m = 3.97 x 10^{16} m = 3.97 x 10^{13} km
6. 40 AU to parsecs. (You will need to convert ~~twice~~ three times to answer this question.)
    a. First convert to meters: 40 AU = 40 x 1.5 x 10^{11} m = 6 x 10^{12} m
    b. Then convert that answer to lyr: 6 x 10^{12} m = 6 x 10^{12} (1/9.46 x 10^{15}) lyr = 6.34 x 10^{-4} lyr
    c. Finally convert again to pc: 6.34 x 10^{-4} lyr = 6.34 x 10^{-4} * (1/3.26) pc = 1.95 x 10^{-4} pc
7. How many Astronomical Units are there in a light year? (You will need to convert twice to answer this question.) How many AU is Proxima Centauri from us?
    a. 1 lyr = 9.46 x 10^{15} m = 9.46 x 10^{15} * (1/1.5 x 10^{11}) AU = 63,100 AU
    b. 4.2 lyr = 4.2 * 63,100 AU = 265,000 AU