

Astr 2100 Descriptive Astronomy
Fall 2017 – Assignment 3
Due Monday September 11th 2017

Introduction

When dealing with astronomical distances it is imperative to be able to convert between the different units

- Miles
- Meters (or kilometers)
- Astronomical units
- Light years
- Parsecs

Converting is straightforward if you approach it rationally. The general formula is

$$\text{distance in unit 1} = \text{distance in unit 2} \left(\frac{\text{number of unit 1}}{\text{unit 2}} \right)$$

So for example, given that 1 AU is the same as 93,000,000 miles, how far in AU is 1,200,000,000 miles. Change unit 1 to AU and unit 2 to miles

$$\text{distance in AU} = \text{distance in miles} \left(\frac{\text{number of AU}}{\text{mile}} \right)$$

$$\text{distance in AU} = 1.2 \times 10^9 \left(\frac{1 \text{ AU}}{93,000,000 \text{ mile}} \right) = 12.9 \text{ AU}$$

Assignment

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 = 1.5×10^{11} m)
2. 240 light years to miles (1 yr = 5.88×10^{12} miles)
3. 456 light years to parsecs (1 pc = 3.26 yr)
4. 6.4×10^{19} meters to light years (1 yr = 9.46×10^{15} m)
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 yr = 9.46×10^{15} m)
6. 40 AU to parsecs. (You will need to convert twice to answer this question.)
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?