PHYS 171: Planetary & Stellar Astronomy
Due: Friday, January 31, 2025

Problem Set #1

1. Cosmic Address: You write your home address in the order of street, town, state, and country. Write your cosmic address in a similar manner. Which of the following is the correct order?

- Earth, Milky Way, Solar System, Local Group
- Solar System, Local Group, Milky Way, Earth
- Earth, Solar System, Milky Way, Local Group
- Earth, Solar System, Local Group, Milky Way
- Solar System, Earth, Local Group, Milky Way

2. Unit conversion: Which of the following is ***not*** equivalent to 77 km (kilometers)?

- 7.7×10^{7} mm (millimeters)
- 7.7×10^{4} m (meters)
- 7.7×10^{10} μm (micrometers)
- 7.7×10^{-2} Mm (megameters)
- All are equivalent

3. Exponents: Using scientific notation, evaluate $(3 \times 10^{9})^{2} / (6 \times 10^{-7})^{3}$.

4. Unit conversion: The Alpha Centauri star system consists of three co-orbiting stars and is located about 4.3 ly (light years) from our Solar System. Convert this distance from light years to astronomical units (AU).

5. Old school physics: Suppose Eratosthenes had found that, in Alexandria, at noon on the first day of summer, the line to the Sun makes an angle of 20 degrees to the vertical. What then would he have found for the Earth's circumference?

6. Jupiter: Careful optical telescope measurements show that the largest angle that Jupiter subtends is 0.013 degrees as seen from Earth. Suppose that on the same day as this measurement, the total time to send a signal and then receive a return signal from the Juno space probe orbiting Jupiter is 1 hour and 10 minutes.
From this information determine the following:

a) How far away is Jupiter from Earth on this day?
b) What is the diameter of Jupiter?