

Student

Physics 162

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### Problem set 7

- 1.) The way scientist know that a hypothesis in astronomy is a reasonable description of nature is to do experiments and observations about the predictions of the hypothesis.
- 2.) A light year is the distance light travels in one year.
- 3.) The star that provides energy for life on earth is the sun.
- 4.) The location of the earth in the milky way is a little less than 30,000 LY from the center.
- 5.) Adding a proton to the nucleus of an atom (or removing one), and an electron along with it, changes the atom into a new element.
- 6.) If you increase a value by an "order of magnitude", you have increased that value by a factor of 10.

7.) In the units used in the U.S., the speed of light is roughly 670 mph. Find approximately how many miles there are in a light year.

$$(670,000,000)(2.4 \times 10^4)(365.25)_{\text{hr}} = 5.87322 \times 10^{12} \text{ miles}$$

8.) The fastest human spaceship leaving the solar system is Voyager 1, which is traveling at 61,146 kph. Imagine it is traveling to a star system 7.1 light years away. Calculate, how long, in years, it will take Voyager 1 to arrive.

$$V = D/T$$

$$(365)(24)(61,146) = 535,638,960 \text{ km/year}$$

$$(6.7166 \times 10^{13} \text{ km})(7.1) = 6.7166 \times 10^{13} \text{ km in D}$$

$$\frac{6.7166 \times 10^{13}}{535,638,960} \rightarrow 1.253941648 \times 10^5$$

$$\rightarrow (1.2539 \times 10^5 \text{ years.})$$

9.) Put the moon, a galaxy, the sun, and Jupiter in order of size.



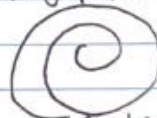
moon



Jupiter



sun



galaxy

10.) Scientific models are always an approximation of ~~time~~ nature: TRUE

11.) Scientific models and hypotheses can change as new experiments or observations are done, often with better equipment: TRUE

12.) The nearest star (other than the sun) is much less than a light-year away: false.