

**Astronomy 100****Homework #1 Solutions****Due Tuesday September 15<sup>th</sup> 2009**

Chapter 1 #25, 46

Chapter 2 #23, 29, 33

Extra Credit

Chapter 2 #46

**Chapter 1 #25**

"Cosmic Address"

**Earth, Solar System, Milky Way Galaxy, Local Group, Local Supercluster, Universe****Chapter 1 #46**

"Driving Trips"

Speed  $v = 100 \text{ km/hr}$ 

Time = Distance / Velocity

a) Distance = Earth's Equator = 40,000 km

$$\text{Time} = (40,000 \text{ km}) / (100 \text{ km/hr}) = \mathbf{400 \text{ hrs}}$$

b) Distance = Sun to Earth =  $1.49 \times 10^8 \text{ km}$ 

(Astronomical Unit)

$$\text{Time} = (1.49 \times 10^8 \text{ km}) / (100 \text{ km/hr}) = \mathbf{1.49 \times 10^6 \text{ hrs}}$$

c) Distance = Sun to Pluto =  $5.9 \times 10^9 \text{ km}$ 

$$\text{Time} = (5.9 \times 10^9 \text{ km}) / (100 \text{ km/hr}) = \mathbf{5.9 \times 10^7 \text{ hrs}}$$

d) Distance = to Alpha Centauri = 4.4 light-years

$$= (4.4 \text{ yr}) \times (9.46 \times 10^{12} \text{ km/yr}) = 4.16 \times 10^{13} \text{ km}$$

$$\text{Time} = (4.16 \times 10^{13} \text{ km}) / (100 \text{ km/hr}) = \mathbf{4.16 \times 10^{11} \text{ hrs}}$$

**Chapter 2 #23**

True / False and Explain

"Although all the known stars appear to rise in the east and set in the west, we might someday discover a star that will appear to rise in the west and set in the east"

**False** - The Earth rotates from West to East, and it is the celestial sphere that is constant. Unless the Earth was to change its rotation, or if its orbit around the sun carried it past a slower planet, we would not see a "star" rise in the west and set in the east.

**Chapter 2 #29**

"Beijing and Philadelphia have about the same latitude but very different longitudes. Therefore, tonight's sky in these two places:"

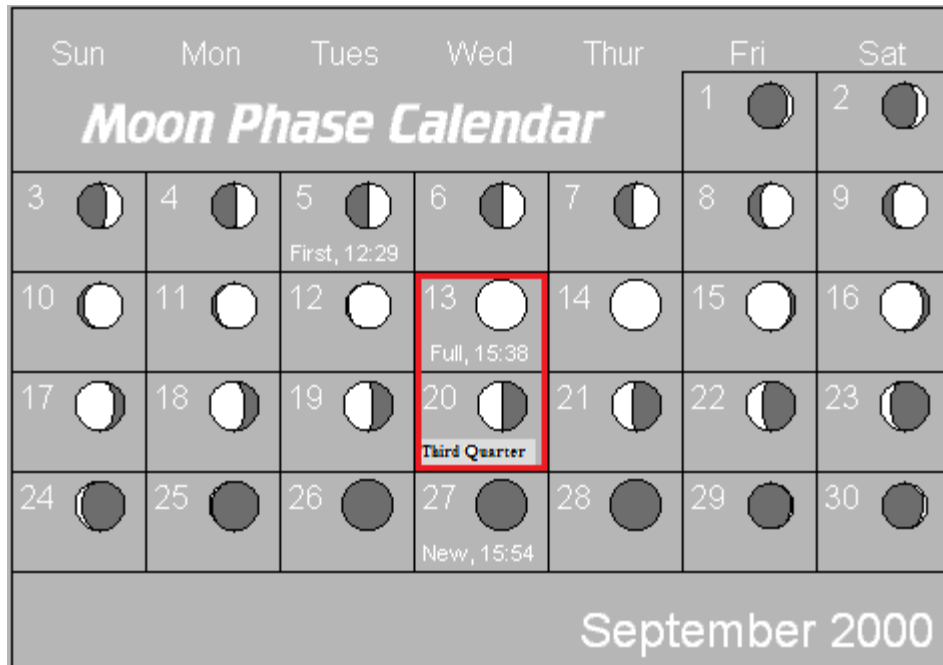
**(a) will look about the same.**

Since the Earth's rotation is from West to East, everyone along similar latitudes will observe a similar night sky. All the stars projected along the celestial sphere will remain constant. The moon will slightly change its position, (not phase), but the effect is not noticeable.

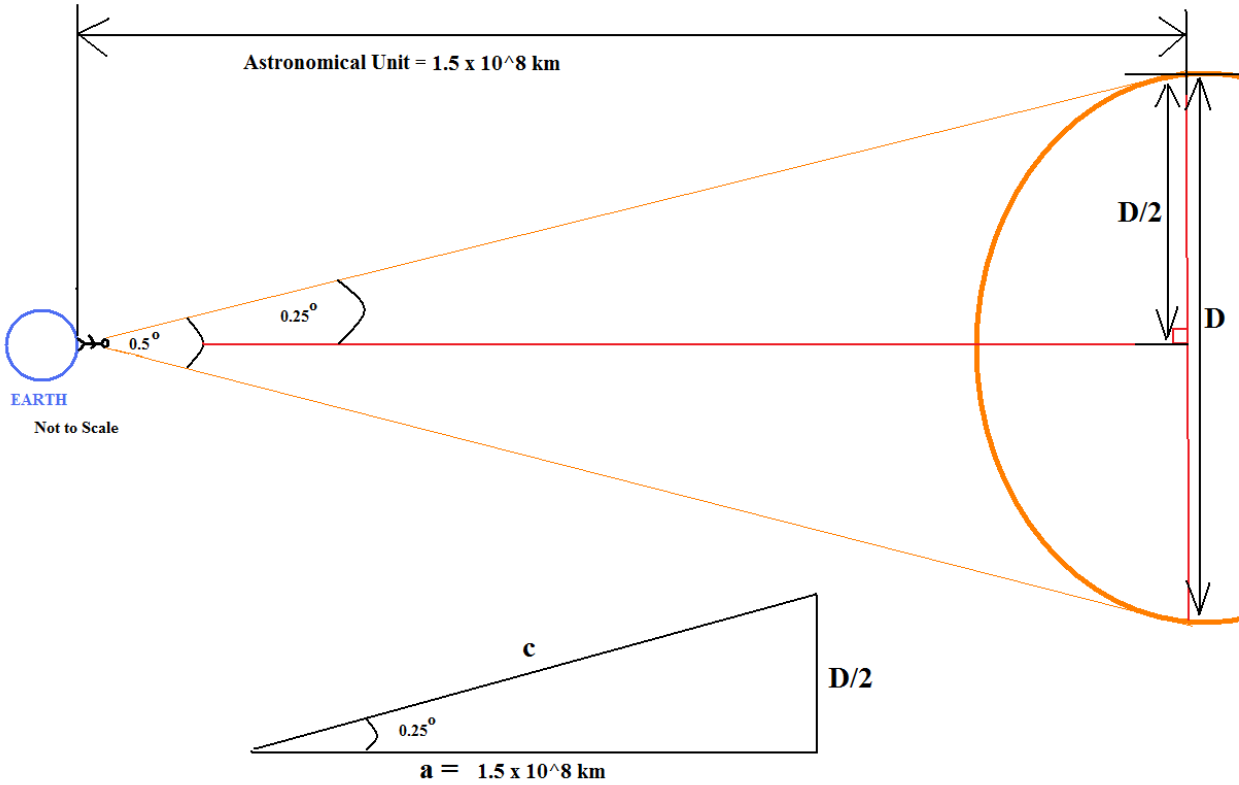
**Chapter 2 #33**

"A week after full moon, the Moon's phase is:"

**(b) Third Quarter**



Extra Credit  
Chapter 2 #46



$$(a)^2 + \left(\frac{D}{2}\right)^2 = (c)^2$$

$$\tan(0.25) = \frac{(D/2)}{a}$$

$$a * \tan(0.25) = \frac{D}{2}$$

$$2 * (1.5 * 10^8) * \tan(0.25) = D$$

$$D = 1,309,005.2 \text{ km}$$

$$= 1.3 \times 10^6 \text{ km}$$