

# Introduction to Astronomy [普通天文學]

## HW061016

due in one week

1. A comet moves in a highly elongated orbit about the Sun within a period of 1000 years. What is the length of the semimajor axis of the comet's orbit? What is the farthest the comet can get (aphelion distance) from the Sun?
2. If the Earth were 10 AU from the Sun, what would the length of the year be? How much stronger or weaker would the Sun's gravitational pull be on Earth?
3. The orbit of a spacecraft about the Sun has a perihelion distance of 0.5 AU, and an aphelion distance of 3.5 AU. What is the spacecraft's orbital period?
4. Compare the light-gathering power of the Lulin 1 m telescope to that of a fully dark-adapted human eye, which has a pupil diameter of about 5 mm.
5. If you were in charge of selecting a site for a new observatory, what factors would you consider? Give your reasoning.
6. The bright star Regulus in the constellation Leo (the Lion) has a surface temperature of 12,200 K. Approximately what is the dominant wavelength ( $\lambda_{\text{max}}$ ) of the light it emits?
7. The H  $\gamma$  line in the spectrum of the star Megrez in the Big Dipper is 486.112 nm. Laboratory measurements demonstrate that the normal wavelength of this line is 486.133 nm. Is Megrez coming toward us or moving away from us? At what speed? Download a star map and mark which star Megrez is. Label every star of the Big Dipper its name in Chinese.