1. The age of the universe is about 14 billion years. What is this age in seconds? Use powers-of-ten notation.

2. At what distance would a person have to hold a European 2-euro coin (which has a diameter of about 2.6 cm) in order for the coin to subtend an angle of (a) 1°? (b) 1 arcmin? (c) 1 arcsec? Give your answers in meters.

3. A cluster of stars has an angular size of 1.4°. What is the size of the cluster in minutes of arc and in seconds of arc?

4. On November 1 at 8:30 p.m. you look toward the eastern horizon and see the bright star Bellatrix rising. At approximately what time will Bellatrix rise one week later, on November 8?

5. Is there any place on Earth where all the visible stars are circumpolar? If so, where? Is there any place on Earth where none of the visible stars are circumpolar? If so, where? Explain your answers.

6. Suppose that you live at the latitude of 40° N. What is the elevation of the Sun above the southern horizon at noon at the time of the winter solstice? Explain your reasoning.

7. The city of Mumbai in India is 19° north of the equator. On how many days of the year, if any, is the Sun at the zenith at midday as seen from Mumbia? Explain your answer.