**Ast 110: Survey of Astronomy**  
Concept Test 1, Tuesday January 18\textsuperscript{th}

**Answers**

1. How long does it take light to reach us from  
   a) the Sun  
   b) α Centauri  
   c) the far side of the Milky Way  

   a) 8 minutes  
   b) 4 years  
   c) about 100,000 years (the Milky Way is about 100,000 light years across – see p12)

2. Order the following parts of your “cosmic address” from nearest to furthest:  
   *You, Earth, Milky Way Galaxy, universe, Supercluster, solar system*  

   You, Earth, solar system, Milky Way, Supercluster, universe  
   (see Figure 1.1)

3. Mad Professor X is a lively character on campus who I will refer to occasionally during the course. Recently, MPX hypothesized that the seasons on Earth are caused by the non-circularity of Earth’s orbit around the Sun. So summer is when the Earth is closest to the Sun and winter is when it is furthest away. Make a prediction from this hypothesis, compare with observed facts, and show that the Mad Professor is deluded.

   **Prediction:** northern and southern hemispheres are hot (i.e. have their summers) at the same time.  
   **Observation:** Nope, Australia’s summer is in December  
   **Conclusion:** Professor X is mad
4. I fly from Honolulu to the following places. In which one will I have the least jet lag? (Circle the appropriate answer.)
   c) Sydney, Australia: time changes with longitude, not latitude so the least jet lag occurs when going north-south

5. Which direction does the Sun rise?
   c) East: the Earth rotates such that everything rises in the East

6. Which direction does a quarter moon set?
   d) West: the Moon always sets in the West, no matter its phase

7. a) Can someone in Tahiti see Polaris, the North star?
   b) Can someone on the equator see Polaris? If so, where about it would be (e.g. overhead, on the eastern horizon, etc).
   a) No, Tahiti is in the southern hemisphere so the North star always lies below the local horizon (see Figure 2.8)
   b) Yes, just about – it would lie right on the (Northern!) horizon

8. For this question, you may find it helpful to refer to Figure 2.12:
   a) Can we see the constellation Sagittarius in winter?
   b) Can someone in Santiago, Chile see Sagittarius in (our) winter?
   In each case, briefly explain your answer.
   a) No, in December Sagittarius would be in the same line of sight as the Sun, so it would be up in the sky only in daytime when we can’t see the stars.
   b) No matter where on Earth you are, Sagittarius would still lie behind the Sun and therefore not up during nighttime.

9. What phase is the moon in during
   a) a solar eclipse
   b) a lunar eclipse
   a) New
   b) Full – see Figure 2.20

10. You’re stranded at sea away from any sort of communication: how can you figure out your latitude? What about your longitude?
Look at the elevation of the North star (how high it is above the horizon). The closer to the pole you are, the higher up it is. Longitude is tricky and requires knowledge of your local time – the history behind this is in the book *Longitude* by Dava Sobel.