Use your star wheel to work out the following problems. If it's clear out, check your answers (when relevant) by looking up! IMPORTANT: Unless otherwise specified, please assume the following date and/or time throughout: Aug 25, 8 pm Pacific Daylight Time (PDT) = 7 pm Pacific Standard Time (PST). Remember: times on the Star Wheel are in PST. For problems involving time, take care to convert correctly between PDT and PST, i.e., PST = PDT – 1 hour (and thus PDT = PST + 1 hour).

1. **Look up every night this week to see if you can see any stars.** If you see any, look specifically for the stars of the summer triangle asterism. Which ones can you see? How do you know which is which? Be ready to discuss what you saw in class next week!

2. **What are the principal constellations that should be visible during tonight's lab?** Your list should include about a dozen or more constellations that contain reasonably bright stars visible from San Francisco.

3. **At about what time (PDT) will the following objects rise, and from what direction?**
   - the galaxy M31 in Andromeda:
   - the Pleiades star cluster in Taurus:
   - the brightest star in the constellation Aries:
   - the star Fomalhaut in Pisces Austrinus:

4. **At about what time (PDT) will the following objects set, and in what direction?**
   - the star Altair in Aquila:
   - the star Antares in Scorpius:
   - the star Dubhe in Ursa Major (star in the cup of the Big Dipper asterism that is closest to Polaris):
   - the globular cluster M13 in Hercules:

5. **At about what time (PDT) will the following be on the meridian?**
   - the star Vega in Lyra:
   - the star Deneb in Cygnus:
   - the tip of the spout of the “Teapot” asterism in Sagittarius:
   - the middle of the “Great Square of Pegasus” asterism:
6. **Describe in words, in detail, how a person can use the Big Dipper asterism to find Polaris (the “North Star”).** You may use a diagram, but the explanation should be complete without reference to it. Using your star wheel, verify that your method will work on any date and at any time of the night and include an explanation of this in your description of the method.

7. **Draw two pictures of the Celestial Sphere:** (i) from the vantage point of someone outside the sphere, but in the plane of the Earth’s equator (“edge-on view”), (ii) from the vantage point of someone outside the sphere, but about 20 degrees (very roughly) above the plane of the equator (“tipped view”). *Each drawing should be at least 7 cm in diameter and neatly drawn.* Use a drafting compass if you have one. *Label all the key features* on each drawing (NCP, SCP, and celestial equator), making sure that the NCP is at the top. This is for practice… we’ll use drawings like these a lot over the course of the semester ☺