Assignment 3

Instead of typing directly into UNM Learn, upload a word document with your answers. Remember to number your answers 1a. 1b., etc. so I know which questions you're answering. Be sure to show your work and reasoning for full credit.

1. *(30 points) It's March 18th and you're stranded on a raft in the water, with no idea how you got here. Not feeling great, you decide you need to figure out where you are so you can use your paper map of the Earth. You check your phone, it says the local time is 9:00 pm, a reasonable hour. You give Maziar, who has retired to Greenwich, a call to see if he can help you identify your position based on the stars. He picks up, you explain your situation and start naming constellations you see. As you explain that you observe Polaris at 49 degrees from the horizon, he replies, "Are you crazy? It's 4 in the morning! I told you this information would come in handy and you didn't listen! Besides, just use your GPS!" You realize he's right, you could have just pulled up Google maps, and hang up on him as he rants on about how easy the class would have been if you'd just ask questions. You pull up Google maps and your phone shuts off, out of battery.*

   (a) *What is your latitude?*

   (b) *Timezones are generally divided into one-hour increments—how many timezones are there, and how many degrees do they span on average?*

   (c) *How many degrees away from 0 are you longitudinally?*

   (d) *Identify your timezone and check that your answer is reasonable.*

   (e) *Is your longitude in the East or West hemisphere? Support your answer with the direction of the rotation of the Earth.*

   (f) *You are thirsty. Should you drink the water?*

2. *(15 points) Where are you on Earth in each of the following?*

   (a) *The stars rise and set perpendicular to the horizon.*

   (b) *The stars circle the sky parallel to the horizon.*

   (c) *The celestial equator passes through the zenith.*

   (d) *In the course of a year, all stars are visible.*

   (e) *The Sun rises on March 21 and doesn't set until September 21 (ideally).*

3. *(9 points) What is the phase of the Moon if it*

   (a) *rises at 3:00 pm?*

   (b) *is highest in the sky at sunrise?*

   (c) *sets at 10:00 am?*

4. *(15 points) What type of electromagnetic radiation would you observe from*

   (a) *a star with temperature 5800 K?*

   (b) *a gas heated to one million K?*

   (c) *A person on a dark night?*