

NAME: _____

DATE: _____

Setting Circles Lab

Purpose: To be able to find unknown stars from their published positions.

Background: We will be using the equatorial coordinate system to determine the locations of stars. We have discussed the units of this system briefly. Right ascension runs along the celestial equator starting at 0 hr when the celestial equator and the ecliptic cross in spring (called: _____). Declination runs from the North Pole +90° to the South Pole -90° and 0° along the equator. We will be finding several stars using R.A. and Dec coordinates derived from the Norton’s Sky Atlas. We will also be discussing a stars apparent magnitude.

Procedure:

- 1) Using the Norton’s Star Atlas find the R.A., Dec, and Magnitude for the star list on page 3.
- 2) Find the R.A. and Dec of a bright star for R.A. and Dec telescope calibration.

| | Right Ascension | Declination | Apparent Magnitude |
|-----------------|-----------------|-------------|--------------------|
| α Boötis | | | |

You will use this star to adjust the R.A. and Dec of the telescope. We need to align with the star and “set the clock” of our telescope. Once the telescope is turned on and the R.A. is properly set, it will rotate the same angular speed as the planet.

- 3) On the roof. Set up the telescope including the alignment of the Telrad. Plug in the hand controller and turn the telescope on. Press **MODE** until the hand controller reads “Object”. The telescope is now running at 15°/hr (also called _____ time).
- 4) Align the telescope with α Boötis. Adjust the R.A. and Dec to match those coordinates you wrote down earlier. Now the telescope is aligned with sky.
- 5) Move the telescope manually or use the hand controller to move the telescope to the first star on your list. Write down some notes about the star. Note the stars color. This can be accomplished by adjust the telescope out of focus.
- 6) Use the table and the night sky to answer the questions. Include α Boötis while developing answers. Read all the questions and use your time effectively.

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Questions:

1) Which stars from your list are found in the northern sky (“above” the Celestial Equator)? Southern sky?

2) Which are the brightest stars? Which are the dimmest stars? What is the relationship between brightness/dimness and apparent magnitude? Where does the sun fall on this spectrum?

3) In which direction does Right Ascension increase? (East or West). Formulate an argument using the R.A. and Dec of the stars you have looked up.

4) Why aren't the zodiac constellations found on the celestial equator? Where are they found right now? Where will they be found in 6 months?

5) Using your new acquired understanding of the night sky and equatorial coordinates determine the R.A. and Dec for Procyon. It will be pointed out to you while on the roof. You might have to visualize the coordinate system in the sky to answer this question.

6) How many hours of Right Ascension can be seen at any one time? What about on a tall mountain top?

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| | Right Ascension | Declination | Apparent Magnitude | Drawing | Notes |
|------------------------------|-----------------|-------------|--------------------|---------|-------|
| α Alpha Ursae Minoris | | | | | |
| α Leonis | | | | | |
| ζ Ursae Majoris | | | | | |
| δ Boötis | | | | | |
| δ Corvi | | | | | |