

# Starry Night Lab 1: The Night Sky 30 points

Due: \_\_\_\_\_

Name: \_\_\_\_\_

Starry Night version: \_\_\_\_\_

## Materials:

- pencil, eraser, and this lab
- computer with Starry Night Backyard and Adobe Acrobat PDF Reader

*N.B.* Problems 1 and 2 need to be done sequentially, without quitting out of your *Starry Night* program.

## Instructions:

### 0. Getting started:

- Install *Starry Night* on your computer.
- Review the Manual (file Manual.pdf) pages 7-54. Configure *Starry Night* for your home location. Practice using the controls as outlined in the manual.
- Read the Companion book (file Companion.pdf) pages 7-27.

### 1. (4 pts) Find

Do Exercise 1, Companion.pdf pages 27-28.

Using the techniques learned in the exercise, identify the home constellation for the following objects:

- Capella: \_\_\_\_\_
- M13: \_\_\_\_\_
- M74: \_\_\_\_\_
- Rigel \_\_\_\_\_

### 2. (4 pts) Information box

Do Exercise 2, Companion.pdf pages 28-29.

In step 5, find the Altitude and Azimuth for these objects:

- Polaris: \_\_\_\_\_
- Capella: \_\_\_\_\_
- Deneb: \_\_\_\_\_
- M57: \_\_\_\_\_

### 3. (7 pts) Star information and separations

Do Exercise 3 steps 1-3, Companion.pdf page 30, then do the following:

Neatly sketch the Big Dipper on a separate piece of paper.

Label the stars by name and apparent visual magnitude.

Neatly label the figure to show the distance (to the nearest degree) between the following stars:

- the pointer stars
- the 2 stars that form the top of the bowl
- Dubhe and Polaris
- Alkaid and Dubhe

### 4. (4 pts) Star information and separations

Do Exercise 3 steps 4-8, Companion.pdf page 30-31. Using the techniques learned so far, do the following:

Find the star Mizar. Overlay the 7x50 binoculars Field of View (FOV) and zoom in until the FOV touches the left and right sides of the screen.

Note the separation between Mizar and Alcor (don't forget units!):

- angular separation: \_\_\_\_\_
- spatial separation: \_\_\_\_\_

Are Mizar and Alcor an optical double star, or a binary star? Why do you think so? (Hint: Study the definitions in your text.)

### 5. (5 pts) Precession

Review Chapter 2 section 6 in your textbook. Then use *Starry Night* to measure the angular separation between Polaris and the North Celestial Pole (NCP) now, and at intervals of 1000 years in the past and in the future. Also note the name of the star closest to the NCP. Write results in the table below. For past times, use a few words to signify the historical context (eg, now-3000: Homer writes the *Illiad*)

- Set up

Use the Sky drop-down menu (or the keyboard shortcut) to turn off Daylight.

Use Find to center Polaris on your screen.

Use the Guides menu to turn on the Celestial Poles and the Celestial Grid.

Use the Constellations menu to display Rey's stick figures.

- Time control

Use the Red Square on the Time Control box on the top bar to STOP time updates.  
 Use the Time Step box on main bar to set the Time Step to 10 years.  
 Use the left-arrow button on the Time Control box to go back in time; stop as needed.  
 Use the NOW button on the main bar to return to NOW.  
 Use the right-arrow button on the Time Control box to go forward in time; stop as needed.

<b>Data: Precession and the Celestial Pole</b>				
time step	calendar year	separation Polaris to NCP	name of star closest to NCP	historical context or event
now+3000				–
now+2000				–
now+1000				–
now				
now-1000				
now-2000				
now-3000				

- What is the Celestial North Pole?
- Write a short description of the effect of precession illustrated in your data table.