Physics 10293 Lab #4:
Learning Starry Night, Part 3

Introduction

In this lab, we will continue using Starry Night to explore some of the most important concepts we will cover in lecture.

Continue with Skyguide

Once you start the program, if the left sidebar is not already open to the SkyGuide, just type "Skyguide" into the search box in the upper right corner and follow the instructions. We will continue walking through the tutorial to learn more about the features of Starry Night and to learn more about naked eye astronomy that we are covering in lecture.

Proceed to the Student Exercises entitled "Unit A: Earth, Moon and Sun," which are buttons on the main sky guide pane. Answer the associated questions for these exercises on your worksheet for exercises B1-B4, C1-C3 and E1-E4.

Unit B: Solar System

In "B1 part 3: The Heliocentric Model"

Q1. Which of the given statements is NOT a feature of the Copernican heliocentric model?

_____

_____

In "B1 part 4: Heliocentric explanation for retrograde motion"

Q2. How does the heliocentric model explain retrograde motion?

_____

_____

_____

In "B2 part 1: The inferior planets"

Q3. The sidereal period of Mercury is _____ days.

In "B2 part 2: Conjunctions and elongations"
Q4. Examine the current date in the Main Window. When will the next superior conjunction of Venus occur?

_____

In "B2 part 3: Synodic period"

Q5. The synodic period of Mercury is _____ days.

In "B2 part 5: Sidereal and synodic period of Jupiter"

Q4. The length of Jupiter's sidereal period is _____ days.

Q5. The length of Jupiter's synodic period is _____ days.

In "B3 part 1: Kepler's first law"

Q6. The length of the major axis of Mars' orbit is _____ AU.

In "B3 part 3: Kepler's third law"

(you will need a calculator for these questions…)

Q7. The sidereal period of Mars is _____ years.

Q8. At what distance would a planet have to orbit the Sun on average in order to have a sidereal period of 10 years?

_____ AU

In "B4 part 1: The phases of Venus"

Q9. What is the phase of Venus in the simulation shown?

_____

In "B4 part 2: Apparent size of Venus"
Q10. What is the approximate angular diameter of Venus when it is a very slim crescent? _____

Q11. Which model is supported by your observations?

_____

In "B4 part 3: The moons of Jupiter"
Q12. Why did the observations described in the text persuade Galileo that the geocentric view of Ptolemy was wrong?

_____

_____

Unit C: The Planets
Note: Not all questions asked in Starry Night will appear here for this section.

In "C1 part 1: Orbits of the inner planets"
Q13. Which of the inner planets has the most eccentric orbit? _____

In "C1 part 2: Mercury"
Q14. What is the length of a Mercury solar day in Earth days? _____ days

There are no further questions from C1, although you are encouraged to read through the last few parts.

In "C2 part 1: Orbits of the outer planets"
Q15. The eccentricity of the outer planets' orbits is close to zero: True / False (circle one)

Now skip ahead to Unit E.

Unit E: Star Finding

In "E1 part 1: The Big Dipper"

Q16. What is the orientation of the Big Dipper asterism in winter?

_____

In "E1 part 2: Star Hopping"

Q17. Polaris is part of which constellation?

_____

In “E1 part 3: Polaris and Latitude”

Q18. What happens to the position of Polaris in your sky as time advances over a period of a year?

_____

_____

Q19. What is the relationship between the altitude of Polaris and the latitude of the observer?

_____

_____

In “E1 part 4: The south star?”

Q20. What is the nearest star to the south celestial pole, shown in the main window? _____

In “E2 part 1: Apparent magnitude”

Q21. A magnitude 2 star is _____ times brighter than a magnitude 4 star.

Q22. Which of the four named stars from the constellation Orion is the faintest? _____

In “E2 part 2: Magnitudes of solar system objects”

Q23. What is the apparent magnitude of the Sun? _____

Q24. What is the 2nd brightest object in our sky? _____

In “E2 part 3: Comparing brightness of objects”

Q25. How much brighter is the planet Venus than the planet Mars on January 24, 2015?

_____ times brighter

In “E2 part 4: Absolute magnitude”

Q26. What is the absolute magnitude of the star Deneb? _____

In “E3 part 1: The diurnal cycle of stars”

Q27. Virgo is considered to be a spring constellation in the northern hemisphere because…

_____

_____

In “E3 part 2: The zodiac”

Q28. Which of the listed constellations is not a part of the zodiac? _____

Q29. Which of the listed celestial objects is NOT always found near the zodiac? _____

In “E3 part 3: Circumpolar constellations”

Q30. Which of the given statements regarding celestial objects seen at the poles is false?

_____

_____

Q31. What is the maximum angular measure that a star at this latitude could possess in order to be considered a circumpolar star?

_____ degrees

In “E4 part 1: Sun signs”

Q32. Over what time period is the Sun actually in the constellation Sagittarius?

_____

Q33. How well do astrologer’s dates agree with Starry Night’s dates for the passage of the Sun through Sagittarius?

_____

_____

In "E4 part 2: Comparison over time"

Q34. How closely do the dates of the Sun's passage through Leo in the year 1 CE match the dates assigned by astrologers to the Leo horoscope sign?

_____

Q35. How closely do the dates of the Sun's actual passage through Capricorn in the year 2000 BCE match with astrologers' Sun sign dates?

_____

Q36. When was the last time that the Sun sign positions from astrology accurately reflects the true location of the Sun in the celestial sphere?

_____

In "E4 part 3: Precession of the equinoxes"

Q37. The vernal equinox is presently in the constellation Pisces. In what constellation was the vernal equinox located in the year 2500 BCE?

_____

In "E4 part 4: The 13th constellation"

Q38. What is the additional constellation through which the Sun now moves, aside from the 12 standard zodiacal constellations?

_____

Q39. Astrology has kept pace with our present knowledge of the changing sky: True / False

Unit F: The Stars

In "F2 part 1: Measuring stellar parallax"

Q40. What is the parallax of Alpha Centauri?

_____

Q41. What is Alpha Centauri's approximate distance from Earth?

_____

In "F2 part 2: Proper motion"

Q42. Which of the given stars has the greatest proper motion?

_____

In "F2 part 3: Barnard's Star"

Q43. What is the average annual proper motion of Barnard's Star?

_____ arc seconds

In "F2 part 4: Effects of proper motion — Gamma Caeli"

Q44. When will Gamma Caeli because a star located within the boundaries of the constellation Columba?

_____ CE

Finally, let us consider the zodiacal signs. If you read your horoscore in the newspaper, you may find the following "official" dates apply:

Aries (Mar 21 - Apr 19)	Libra (Sep 23 - Oct 22)
Taurus (Apr 20 - May 20)	Scorpio (Oct 23 - Nov 21)
Gemini (May 21 - Jun 20)	Sagittarius (Nov 22 - Dec 21)
Cancer (Jun 21 - Jul 22)	Capricorn (Dec 22 - Jan 19)
Leo (Jul 23 - Aug 22)	Aquarius (Jan 20 - Feb 18)
Virgo (Aug 23 - Sep 22)	Pisces (Feb 19 - Mar 20)

For your essay, address the following questions:

In the first paragraph, state your birth day and then use Starry Night to determine your "correct" astrological sign for the date of your birth. State whether this is different from the sign found using the common, mistaken dates above.

In the second paragraph, explain whether your opinion about the validity of horoscopes has changed. Assuming you have the opportunity in the future to check your horoscope, explain whether you will check your "correct" sign or your sign based on

the dates given above? Which would you give preference to and why? If you don't believe horoscopes are valid in the first place, explain why you think this. You may write your essay in the space below.