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## Exercise A5: The Celestial Sphere

Student name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Check the box with the correct answer.

**Question 1:** Which of the following constellations does the celestial equator not pass through?

*Hint:* Click anywhere in the Main Window and press "k" on your keyboard to toggle the constellations on and off.

- a. Cetus
- b. Orion
- c. Ursa Major
- d. Aquarius

**Question 2:** Where would the celestial equator appear to be located for an observer standing directly on one of the Earth's poles? *Hint:* Change your location on the Earth to the North Pole.

- a. It would pass directly overhead, from east to west.
- b. It would be parallel to and coincident with the horizon.
- c. It would run parallel to the horizon at an angle of 45 degrees above it.
- d. It would be below the horizon and therefore not be visible.

**Question 3:** The relatively bright star near the north celestial pole is:

- a. Kochab
- b. Capella
- c. Dubhe
- d. Polaris

**Question 4:** An observer in Earth's northern hemisphere is looking directly towards Polaris. In what direction is this observer facing?

- a. South
- b. North
- c. Northeast
- d. Northwest

**Question 5:** How does the altitude of the north celestial pole relate to the observer's geographic latitude on the surface of the Earth?

- a. The altitude of the NCP is equal to  $180^\circ$  minus the observer's geographic latitude.
- b. The altitude of the NCP is equal to  $90^\circ$  minus the observer's geographic latitude.
- c. The altitude of the NCP is equal to the observer's geographic latitude.
- d. There is no relationship between these two angles since the altitude of the NCP changes throughout the night.

**Question 6:** The ecliptic is inclined at 23.5 degrees to the celestial equator. This is the result of:

- a. the tilt of Earth's rotational axis with respect to the orbital plane of the Earth.
- b. the tilt of the Sun's spin axis.
- c. the fact that the Earth's orbit is elliptical.
- d. the tilt of the Earth's spin axis with respect to its equator.

**Question 7:** On what date of the year does the Vernal Equinox occur? On what date of the year does the Autumnal Equinox occur? [Hint: Run time forward to find the two dates when the Sun is on the celestial equator.]

- a. December 21, September 23
- b. December 21, June 21
- c. March 21, June 21
- d. March 20, September 22

**Question 8:** On what date does the Sun reach the most northerly point (the summer solstice) along the ecliptic? On what date does the Sun reach the most southerly point (the winter solstice) along the ecliptic?

- a. December 21, September 23
- b. June 21, December 21
- c. March 21, June 21
- d. March 21, September 21

**Question 9:** An observer notices that the Sun is directly overhead at midday during the Summer Solstice. What is this observer's latitude upon the Earth?

- a. 23.5 degrees North.
- b. 23.5 degrees South.
- c. 0 degrees, on the Equator.
- d. 66.5 degrees South.