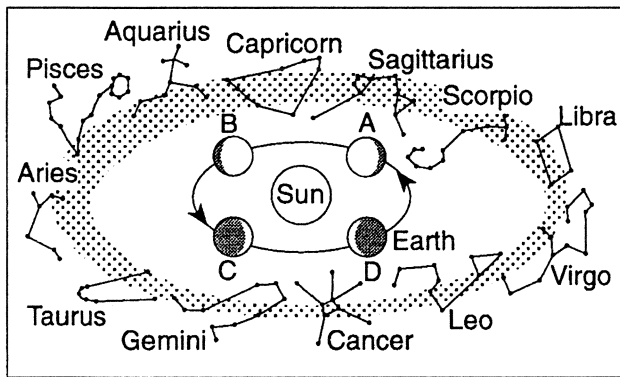


KEY

- The angle of the star *Polaris* above the northern horizon can be used to determine an observer's
 - latitude
 - longitude
 - solar time
 - local time
- Which statement provides the best evidence that Earth revolves around the Sun?
 - The Sun follows an apparent daily path, rising in the east and setting in the west.
 - A Foucault pendulum appears to shift its direction of swing in a predictable manner.
 - The stars appear to follow circular paths around the North Star (*Polaris*).
 - The seasons of spring, summer, fall, and winter repeat in a pattern.
- Base your answer to the following question on the diagram below which shows twelve constellations that are visible in the night sky to an observer in New York, over the course of a year. Different positions of Earth are represented by letters A through D. The arrows represent the direction of Earth's motion around the Sun.

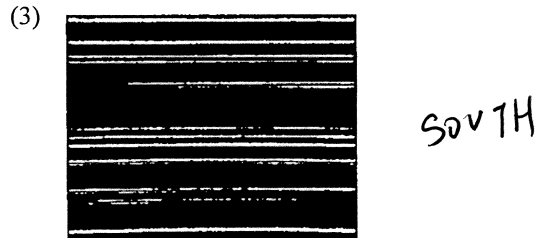
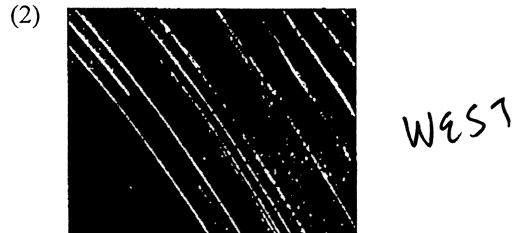
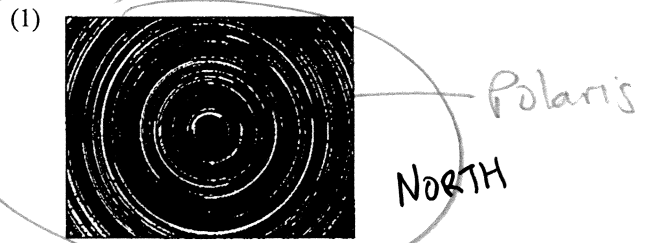


(Not drawn to scale)

The constellations observed from New York when Earth is at position A are different from the constellations observed when Earth is at position C because

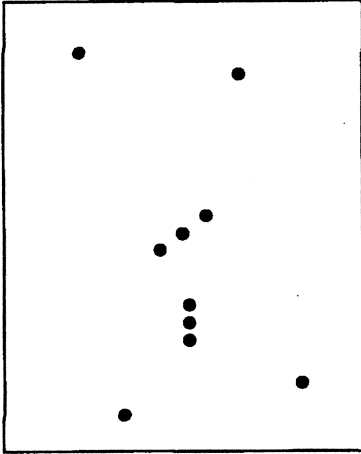
- Earth moves in its orbit *Revolution*
 - Earth is tilted on its axis
 - the lengths of day and night are different
 - the stars move around Earth as shown by star trails
4. When observed from a location in Maine for one night, the North Star (*Polaris*) appears to *STAY the same*
- rise in the east and set in the west
 - rise in the west and set in the east
 - move southward along an arc-shaped path
 - remain stationary in the sky
5. The North Star (*Polaris*) can be used for navigation in Earth's Northern Hemisphere because *latitude*
- Polaris* is located directly over the Tropic of Cancer
 - Polaris* is the brightest and most easily located star
 - the altitude of *Polaris* is equal to the observer's latitude
 - the position of *Polaris* changes with the seasons

6. Which photograph of star trails was taken by an observer facing directly north in New Jersey?



7. At which location will the highest altitude of the star *Polaris* be observed? *highest latitude*
- Equator
 - Tropic of Cancer
 - Arctic Circle
 - central New York State
8. The Earth's planetary winds are deflected as a result of the Earth's *curve* *coriolis effect*
- revolution around the Sun
 - seasonal changes
 - rotation on its axis
 - tilted axis
9. The length of an Earth year is based on Earth's
- rotation of 15°/hr
 - revolution of 15°/hr
 - rotation of approximately 1°/day
 - revolution of approximately 1°/day

10. The diagram below represents the major stars of the constellation Orion, as viewed by an observer in New Jersey.



constellations = revolution

Which statement best explains why Orion can be observed from New York State on December 21 but not on June 21?

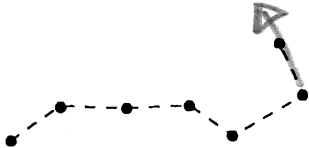
- (1) Orion has an eccentric orbit around Earth.
 - (2) Orion has an eccentric orbit around the Sun.
 - (3) Earth revolves around the Sun.
 - (4) Earth rotates on its axis.
11. The length of an Earth day is determined by the time required for approximately one
- (1) Earth rotation
 - (2) Earth revolution
 - (3) Sun rotation
 - (4) Sun revolution

Revolution

12. The spinning of Earth on its axis causes the apparent rising and setting of the
- (1) Sun, only
 - (2) Sun and the Moon, only
 - (3) Moon and some stars, only
 - (4) Sun, the Moon, and some stars

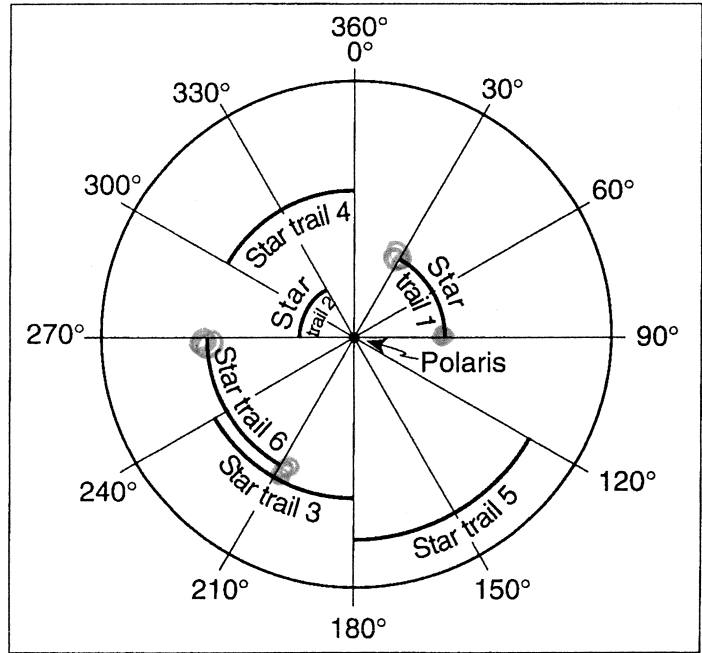
Rise / set

13.



The group of stars known as the Big Dipper can be used to locate the North Star (*Polaris*) in the night sky. On the diagram of the Big Dipper provided draw a straight arrow passing through *two* stars to indicate the direction to *Polaris*

14. A camera was placed outside at night and pointed directly at *Polaris* and several other stars. The lens was kept open and a time-exposure photograph was taken. The diagram below represents that photograph of *Polaris* and star trails, with an angular protractor to measure apparent motion.



$$\begin{array}{r} 270^\circ \\ - 210^\circ \\ \hline 60^\circ \end{array}$$

$$\frac{60}{15^\circ/\text{hr}} = 4 \text{ hrs}$$

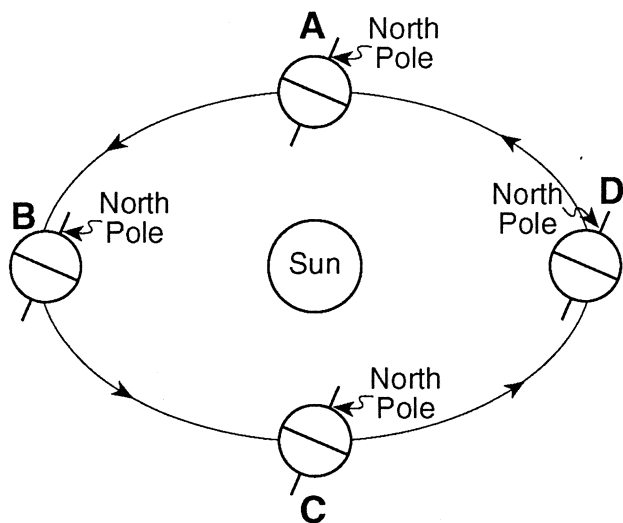
$$\begin{array}{r} 90^\circ \\ - 30^\circ \\ \hline 60^\circ \text{ path} \end{array}$$

$$\frac{60}{15^\circ/\text{hr}} = 4 \text{ hrs}$$

How many hours was the lens kept open to create the star trails in this photograph?

- (1) 1 hour
- (2) 6 hours
- (3) 3 hours
- (4) 4 hours

15. Base your answer to the following question on the diagram below, which represents an exaggerated view of Earth revolving around the Sun. Letters *A*, *B*, *C*, and *D* represent Earth's location in its orbit on the first day of each of the four seasons.



Which observation provides the best evidence that Earth revolves around the Sun?

- (1) Stars seen from Earth appear to circle *Polaris*.
- (2) Earth's planetary winds are deflected by the Coriolis effect.
- (3) The change from high ocean tide to low ocean tide is a repeating pattern.
- (4) Different star constellations are seen from Earth at different times of the year.