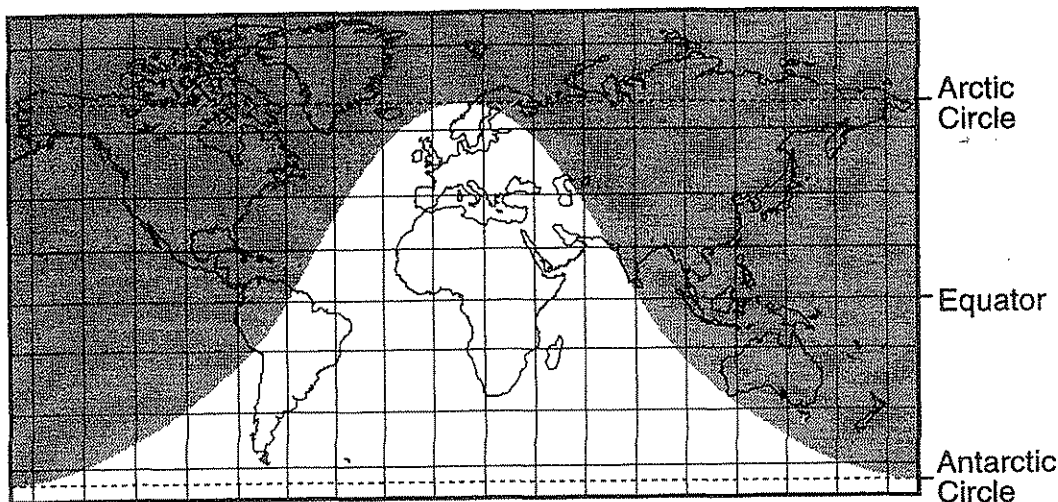


Name \_\_\_\_\_

# Sun's Path Practice

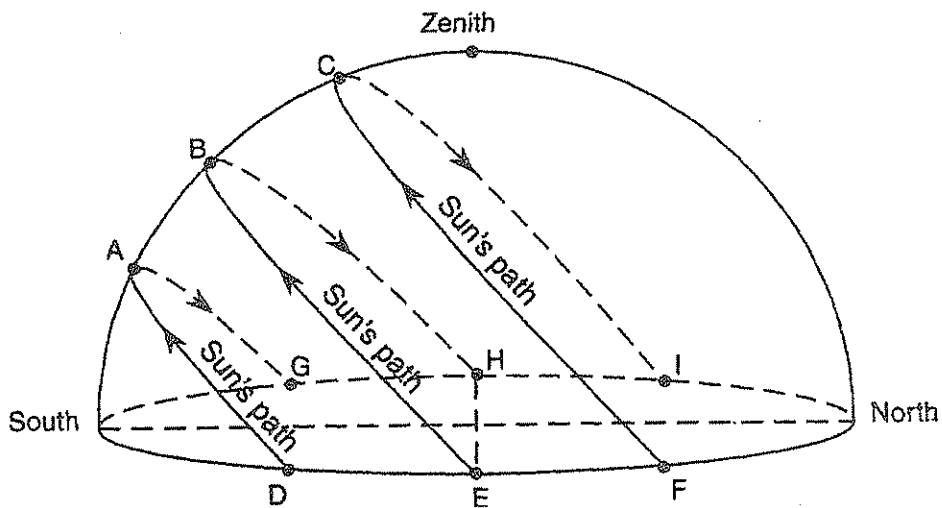
1. The shaded portion of the map below indicates areas of night and the unshaded portion indicates areas of daylight.



What day of the year is best represented by the map?

- (1) March 21                      (2) June 21                      (3) September 21                      (4) December 21

2. The diagram below represents a plastic hemisphere upon which lines have been drawn to show the apparent paths of the Sun at a location in New York State on the first day of each season. Letters *A* through *I* represent points on the paths.

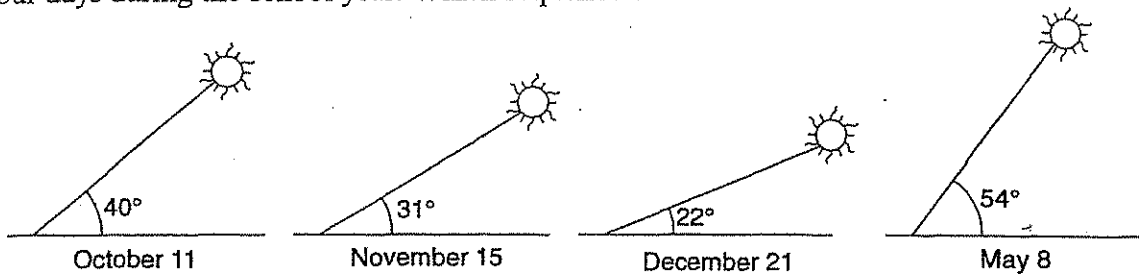


Which point represents the sunrise location on the first day of winter?

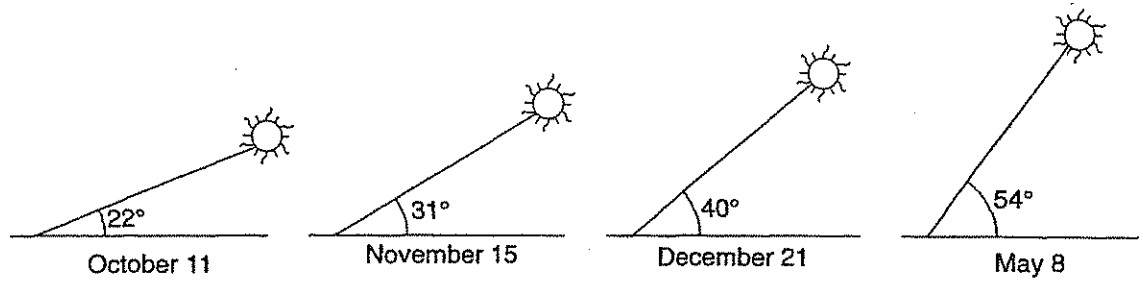
- (1) *G*                      (2) *F*                      (3) *E*                      (4) *D*

3. A student accurately measured the altitude of the noontime Sun from the same New York State location on four days during the school year. Which sequence best shows these measurements?

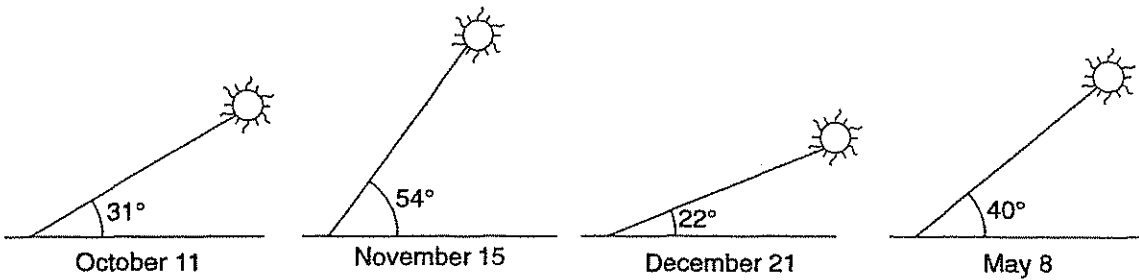
(1)



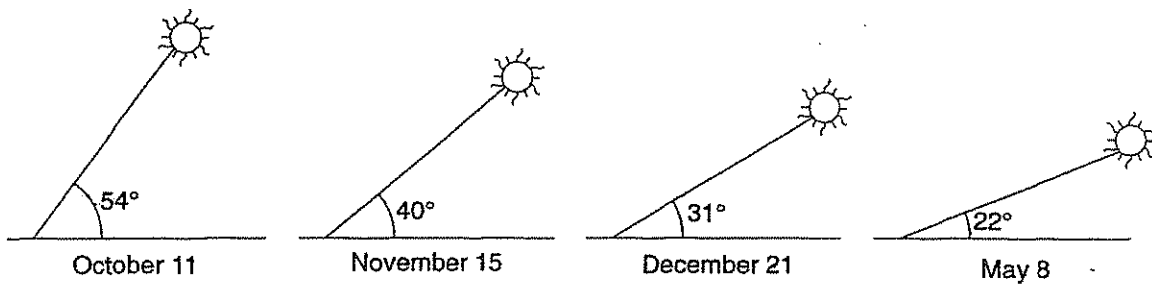
(2)



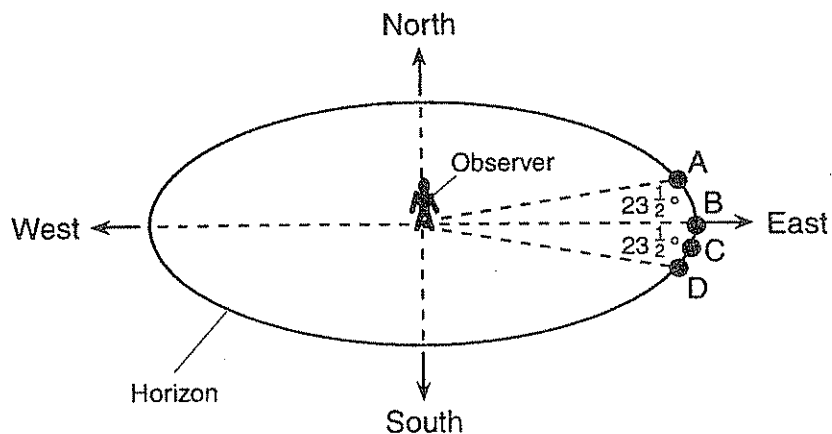
(3)



(4)



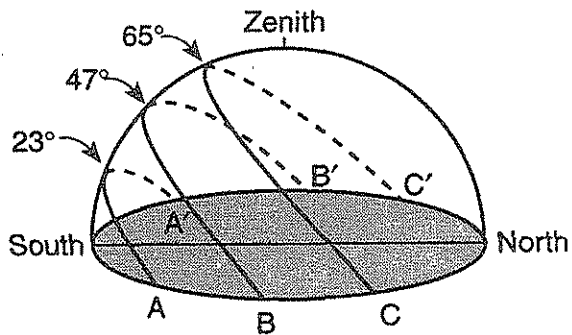
4. The diagram below, which represents a horizon in New York State, shows four positions of sunrise, *A*, *B*, *C*, and *D*, on different days of the year.



At which position would sunrise occur on June 21?

- (1) *A*                      (2) *B*                      (3) *C*                      (4) *D*

5. The model below shows the apparent path of the Sun on 3 days at a certain location in New York State.

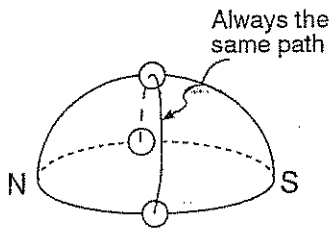


What could be the Sun's apparent path at this location on March 21?

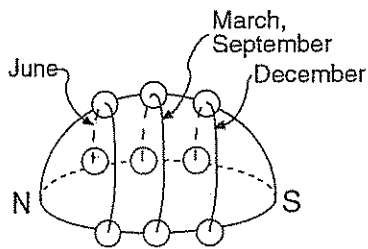
- (1) along path *A-A'*              (3) along path *B-B'*  
 (2) south of path *A-A'*            (4) north of path *C-C'*

6. Which model best represents the apparent path of the Sun observed at various times during the year at the Equator?

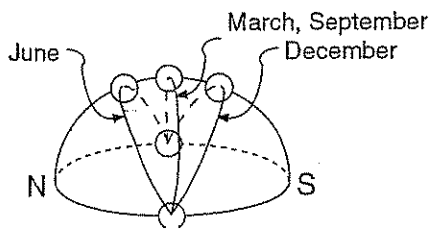
(1).



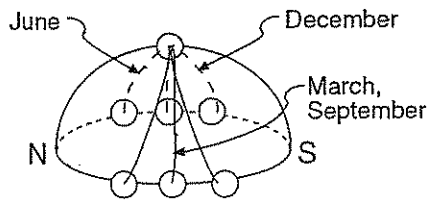
(2).



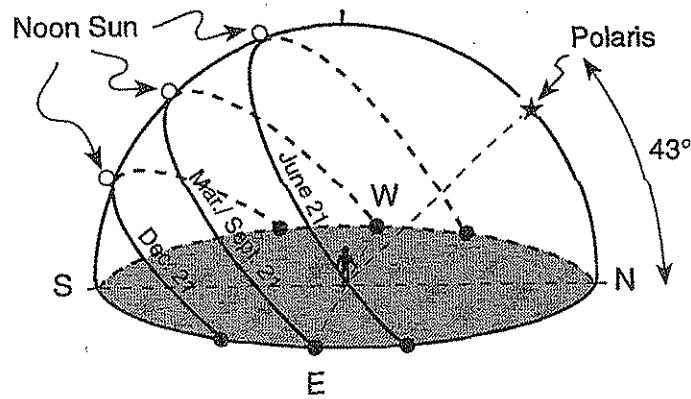
(3).



(4).

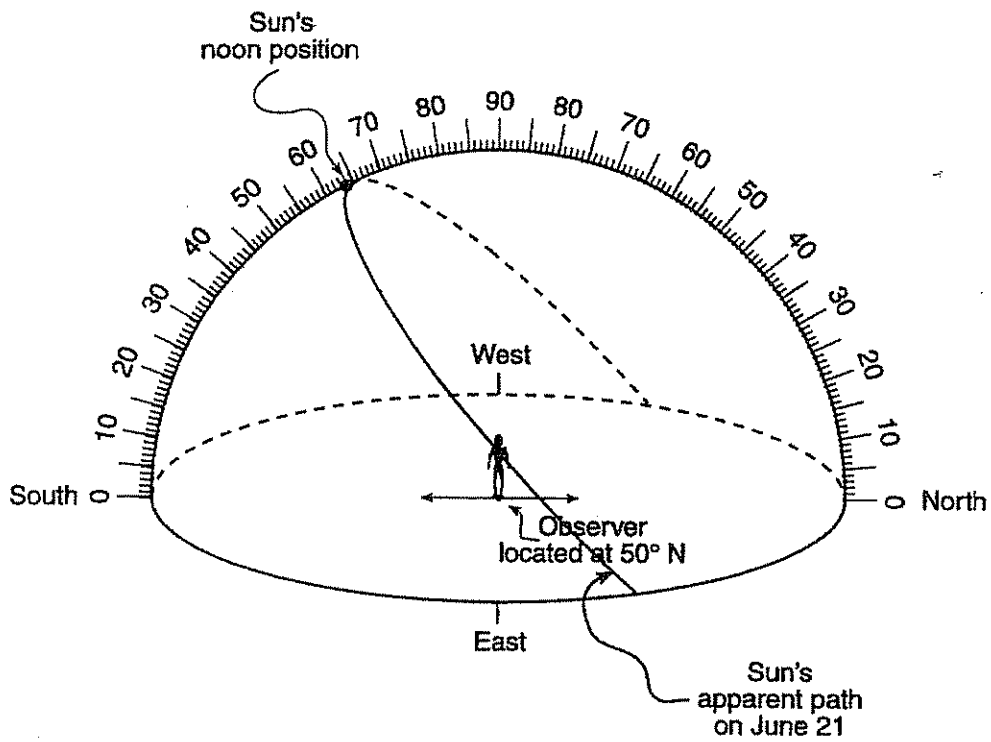


7. Base your answers on the diagram below and on your knowledge of Earth science. The diagram represents the apparent path of the Sun on the dates indicated for an observer in New York State. The diagram also shows the angle of Polaris above the horizon.



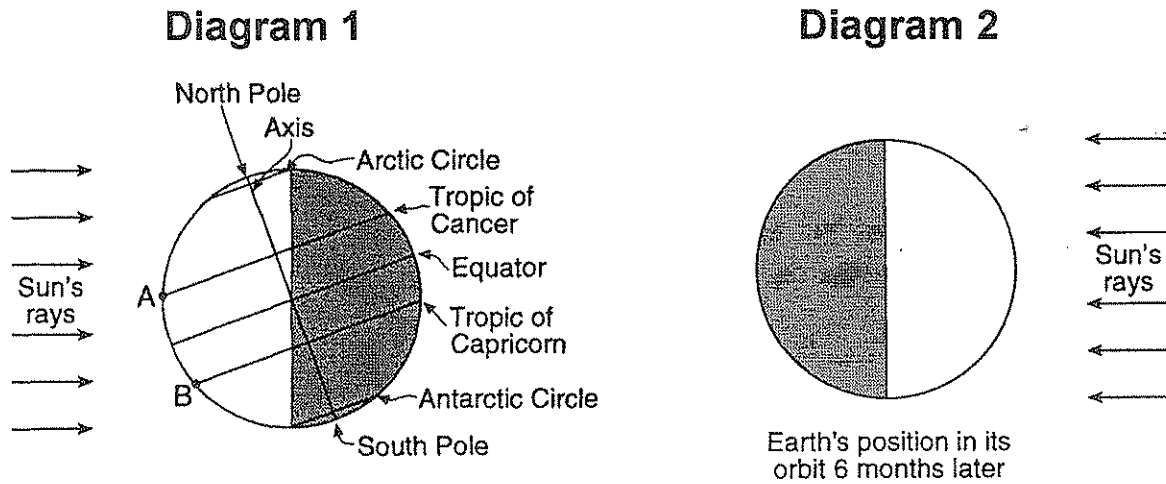
- a) State the latitude of the location represented by the diagram to the nearest degree. Include the latitude direction in your answer.
- b) On the diagram above, label the zenith.
- c) On the diagram above, draw the apparent path of the Sun on May 21. Mark the position of sunrise on May 21 and label it Sunrise.

Base your answers to questions 8 and 9 on the diagram below. The diagram is a model of the sky (celestial sphere) for an observer at 50° N latitude. The Sun's apparent path on June 21 is shown.



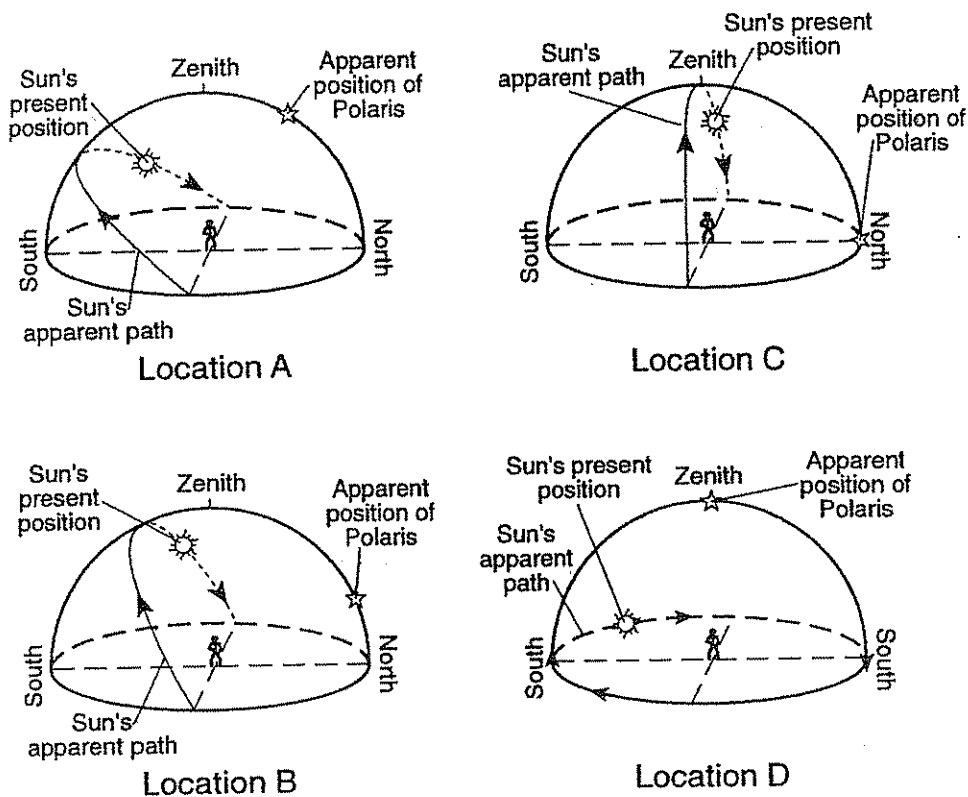
8. On the diagram mark with a dot the position of Polaris as viewed by the observer. Label this dot "Polaris."
9. On the diagram mark with a dot the position of the observer's zenith. Label this dot "Zenith."

Base your answers to questions 10 through 12 on the diagram below, which represents Earth at a specific position in its orbit as viewed from space. The shaded area represents nighttime. Points *A* and *B* are locations on Earth's surface.



10. *a* State the month in which Earth is at the position shown in the diagram.  
*b* State the latitude that receives the most intense radiation from the Sun when Earth is at this position in its orbit.
11. Describe the length of daylight at point *A* compared to the length of daylight at point *B* on the day represented by the diagram.
12. The model of Earth provided in **Diagram 2** represents Earth in its orbit *6 months later*. On the model shown
- draw the position of Earth's axis and label the axis
  - label the North Pole
  - draw the position of Earth's Equator and label the Equator

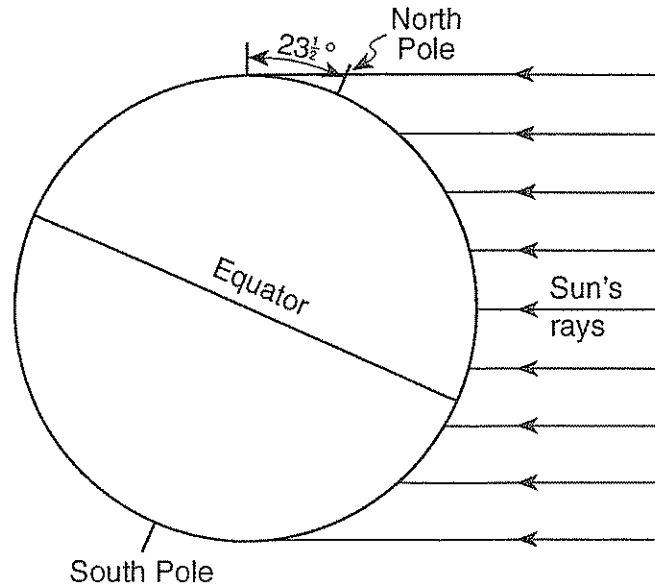
Base your answers to questions 13 through 15 on the diagram below. The diagram represents the apparent path of the Sun observed at four locations on Earth's surface on March 21. The present positions of the Sun, Polaris, and the zenith (position directly overhead) are shown for an observer at each location.



13. The observer at location *A* casts a shadow at the time represented in the diagram.
- State the compass direction in which the observer at location *A* must look to view her shadow.
  - Describe the change in the length of the shadow that will occur between the time shown and sunset.
14. The observer at location *D* is located at a higher latitude than the other three observers. State *one* way that this conclusion can be determined from the diagram.
15. State the other day of the year when the Sun's apparent path is exactly the same as that shown for these four locations on March 21.



Base your answers to questions 16 through 18 on the diagram provided below, which represents the Sun's rays striking Earth at a position in its orbit around the Sun.



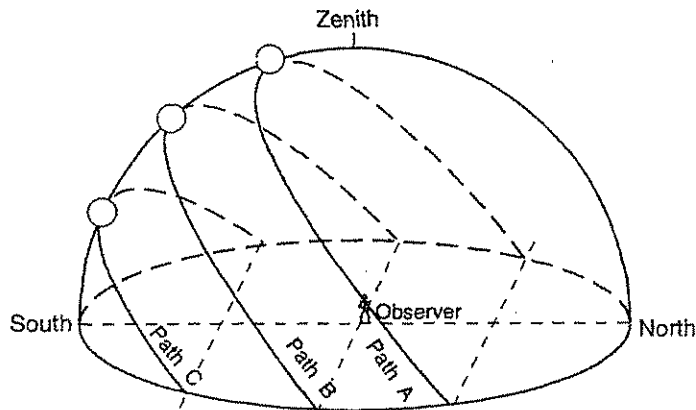
16. Neatly and accurately shade the area of Earth that is in darkness.

17. Draw the line of latitude that is receiving the Sun's direct perpendicular rays on this date.

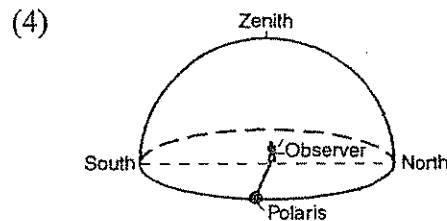
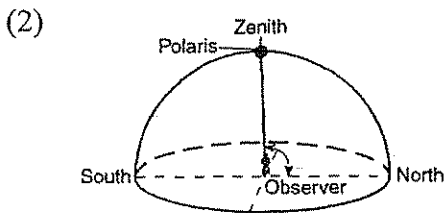
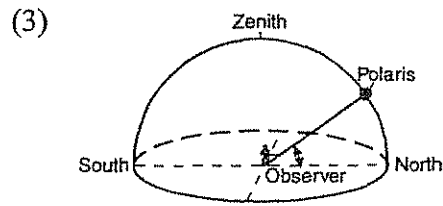
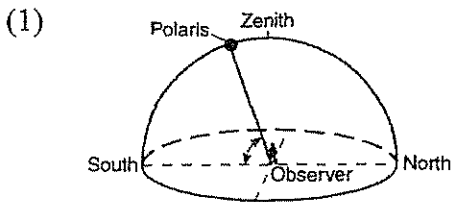
18. What month of the year is represented by the diagram?

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Base your answers to questions 19 through 23 on the diagram below. The diagram shows the apparent paths of the Sun at the beginning of each season for an observer at a location in New York State.



19. Which diagram best represents the altitude of Polaris for this observer?



20. The Sun's apparent daily movement across the sky is caused by

- (1) the Sun's revolution around the earth      (3) the Sun's rotation on its axis  
 (2) Earth's revolution around the sun      (4) Earth's rotation on its axis

21. Which day of the year is represented by path A?

- (1) June 21      (2) August 21      (3) September 23      (4) December 21

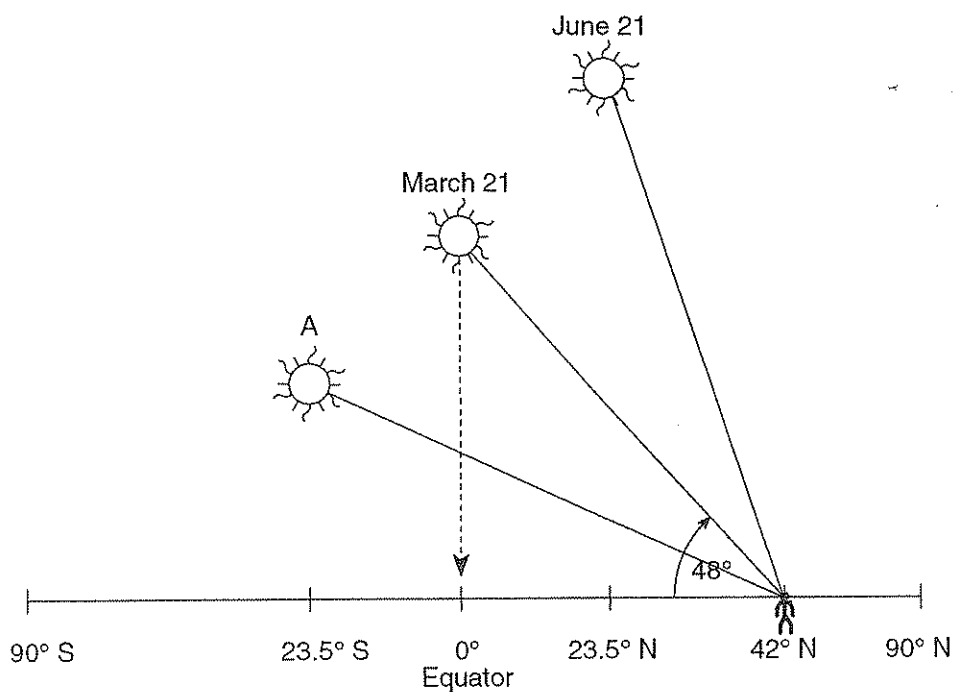
22. In which compass direction must the observer look to locate the noontime Sun?

- (1) north      (2) south      (3) northeast      (4) southwest

23. What is the time interval from the Sun's apparent path A to the Sun's apparent path C?

- (1) 1 day      (2) 1 month      (3) 6 months      (4) 12 months

Base your answers to questions 24 and 25 on the diagram below, which represents the position of the Sun with respect to Earth's surface at solar noon on certain dates. The latitudes of six locations on the same line of longitude are shown. The observer is located at  $42^{\circ}$  N in New York State. The date for the Sun at position *A* has been deliberately left blank.



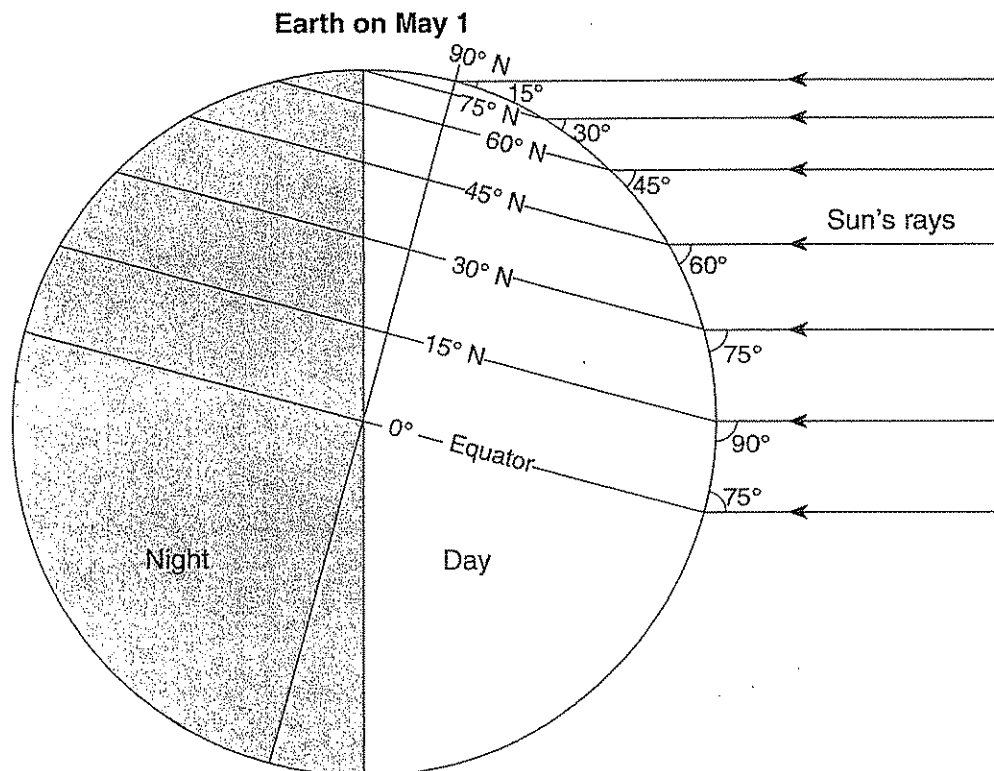
24. When the Sun is at position *A*, which latitude receives the most direct rays of the Sun?
- |   |  |
|---|--|
| (1) Tropic of Cancer ( $23.5^{\circ}$ N)    | (3) Equator ( $0^{\circ}$ )              |
| (2) Tropic of Capricorn ( $23.5^{\circ}$ S) | (4) Antarctic Circle ( $66.5^{\circ}$ S) |
25. When the Sun is at the March 21 position, New York State will usually have
- (1) longer days than nights
  - (2) 12 hours of daylight and 12 hours of darkness
  - (3) the lowest annual altitude of the Sun at solar noon
  - (4) the highest annual altitude of the Sun at solar noon

**Part B-1**

**Answer all questions in this part.**

*Directions (36–50): For each statement or question, write on your separate answer sheet the number of the word or expression that, of those given, best completes the statement or answers the question. Some questions may require the use of the Earth Science Reference Tables.*

Base your answers to questions 36 and 37 on the diagram below, which shows the angle of the Sun's noontime rays received at different Earth latitudes on May 1.



36 Which changes can be expected to occur at 45° N over the next 30 days?

- (1) The duration of insolation will decrease and the temperature will decrease.
- (2) The duration of insolation will decrease and the temperature will increase.
- (3) The duration of insolation will increase and the temperature will decrease.
- (4) The duration of insolation will increase and the temperature will increase.

37 At which latitude can the noontime Sun be observed in the northern part of the sky?

- |           |           |
|-----------|-----------|
| (1) 0°    | (3) 60° N |
| (2) 30° N | (4) 90° N |