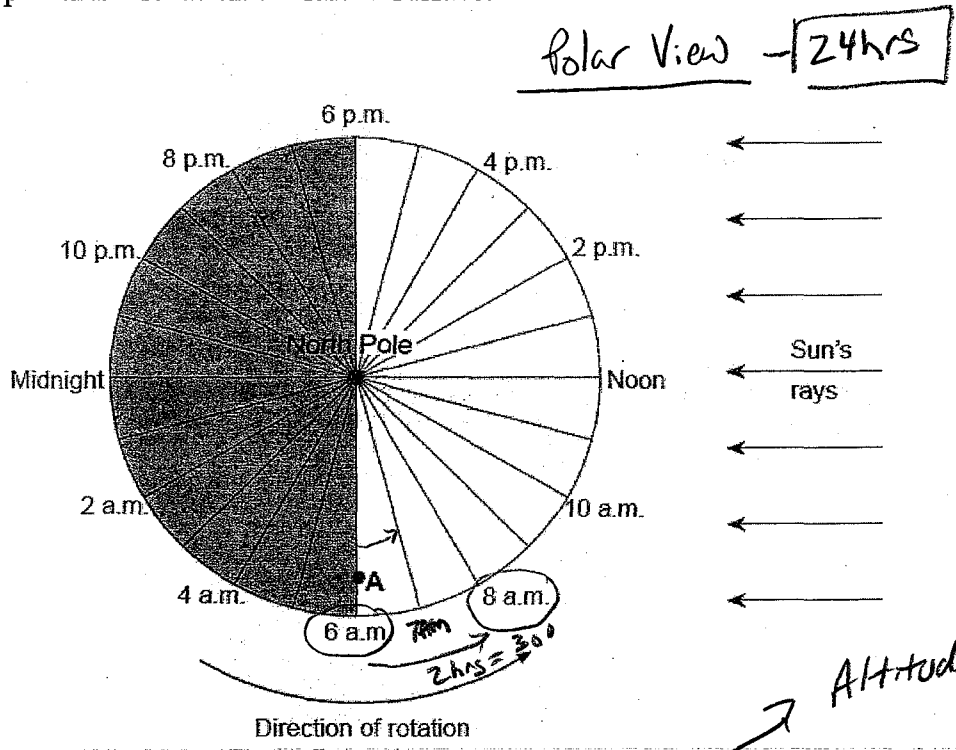


Name KEY

Due Tuesday 1/16/18

Base your answers to questions 1 through 3 on the diagram below, which represents a north polar view of Earth on a specific day of the year. Solar times at selected longitude lines are shown. Letter A represents a location on Earth's surface.

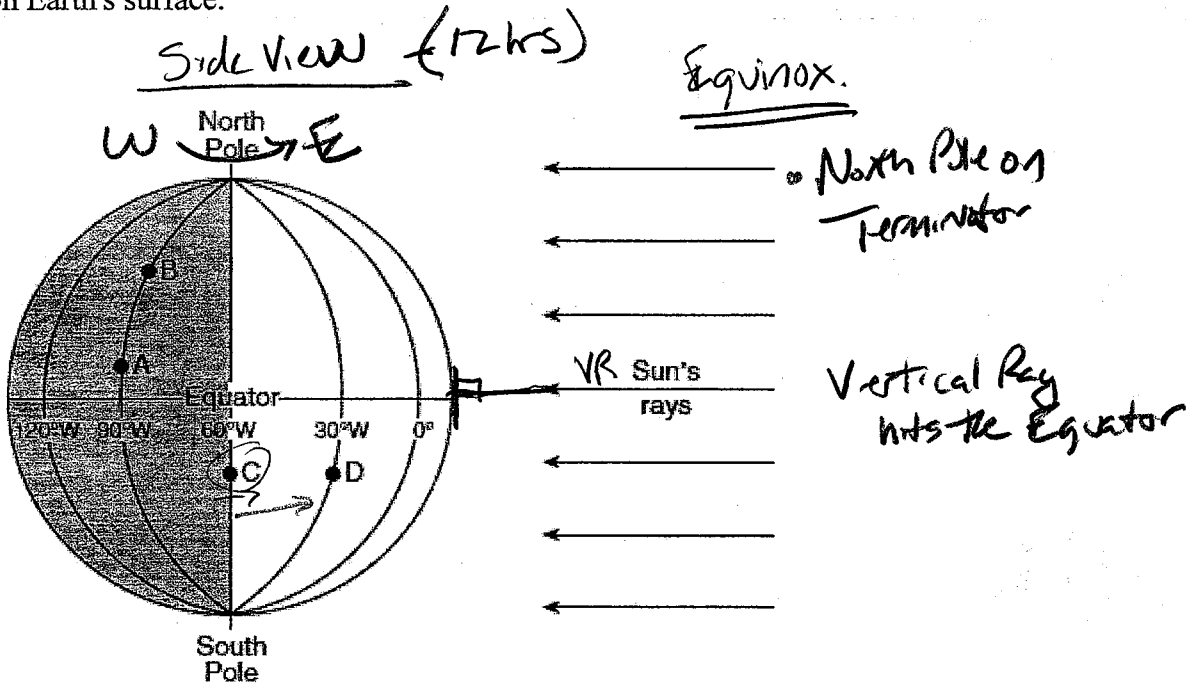


Altitude of Polaris = Observer's Latitude.

1. State the altitude of *Polaris* as seen by an observer at the North Pole. 90°
2. How many degrees apart are the longitude lines shown in the diagram? 15°
3. How many hours of daylight would an observer at location A experience on this day? 12 hours

Equinox

Base your answers to questions 4 through 6 on the diagram below and on your knowledge of Earth Science. The diagram represents Earth on the first day of a season. The equator, several lines of longitude, and the North and South Poles have been labeled. Letters A through D represent locations on Earth's surface.



- State whether the relative altitude of *Polaris* at location A is lower or higher than at location B. Explain why this difference is observed.
- State the solar time at location D if the solar time at location C is 6:00 a.m. Indicate a.m. or p.m. in your answer.
- Identify one possible date that is represented by the position of Earth in this diagram

4. Altitude of Polaris is lower at A because A has a lower latitude. (Altitude of Polaris = latitude of observer)

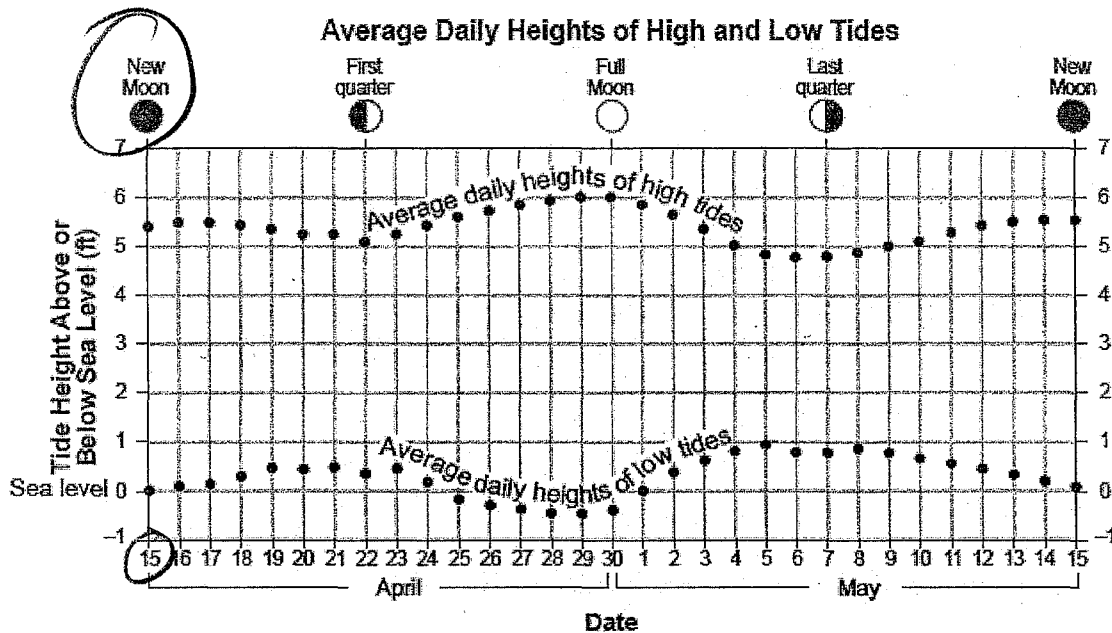
5. 8 AM (30° = 2 hrs East → later)

6. 3/21 or 9/23 (Equinox)  
 (+/-) (+/-)  
 (March 19<sup>th</sup> - March 22) (Sept 21 - Sept 24)  
 Spring/Vernal Equinox Autumnal/Fall Equinox.

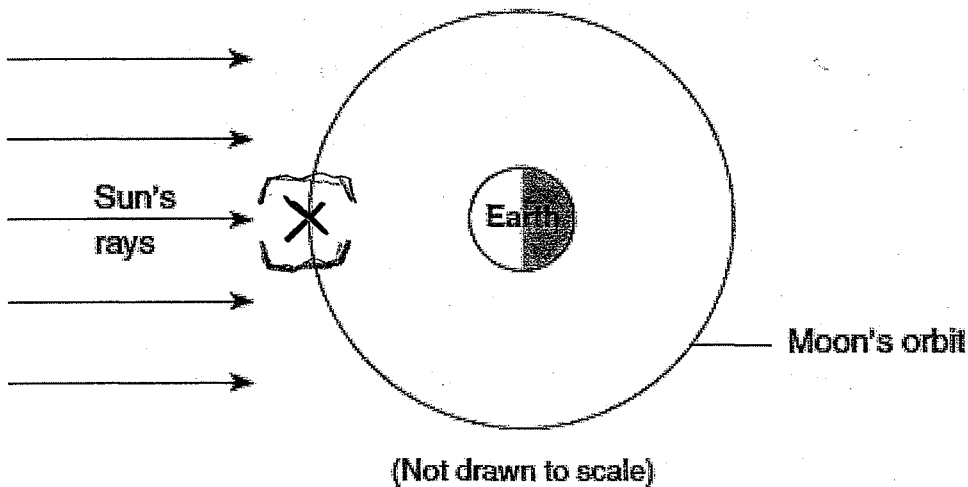
Key

# Midterm Review #4 -FR - 2018

Base your answers to questions 7 and 8 on the graph below and on your knowledge of Earth science. The graph shows the average daily heights above or below sea level of high and low tides from April 15 to May 15, for a New York State location. Five Moon phases are indicated at the dates on which they occurred.



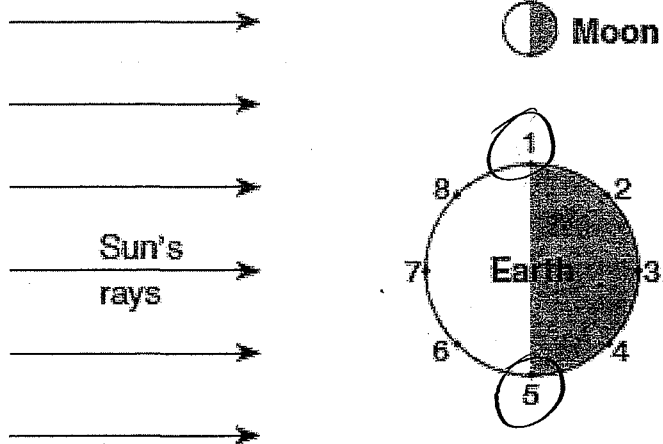
7. On the diagram below, place an X on the Moon's orbit to indicate the Moon's position on April 15. (New Moon)



Key

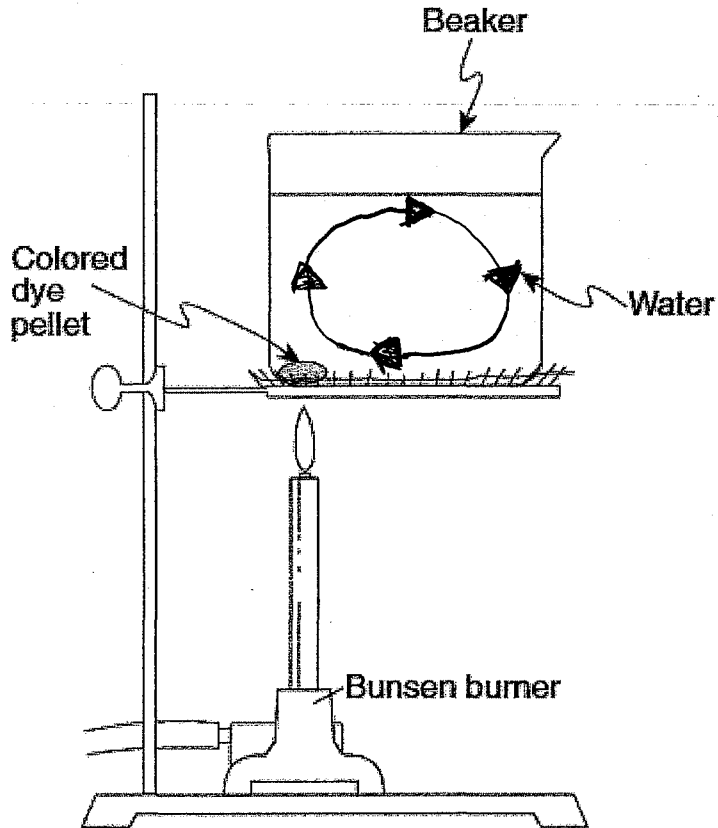
Midterm Review #4 -FR - 2018

8. On the diagram, circle the *two* numbers on Earth's surface that best represent the locations of high tide when the Moon is in the position shown on the diagram.

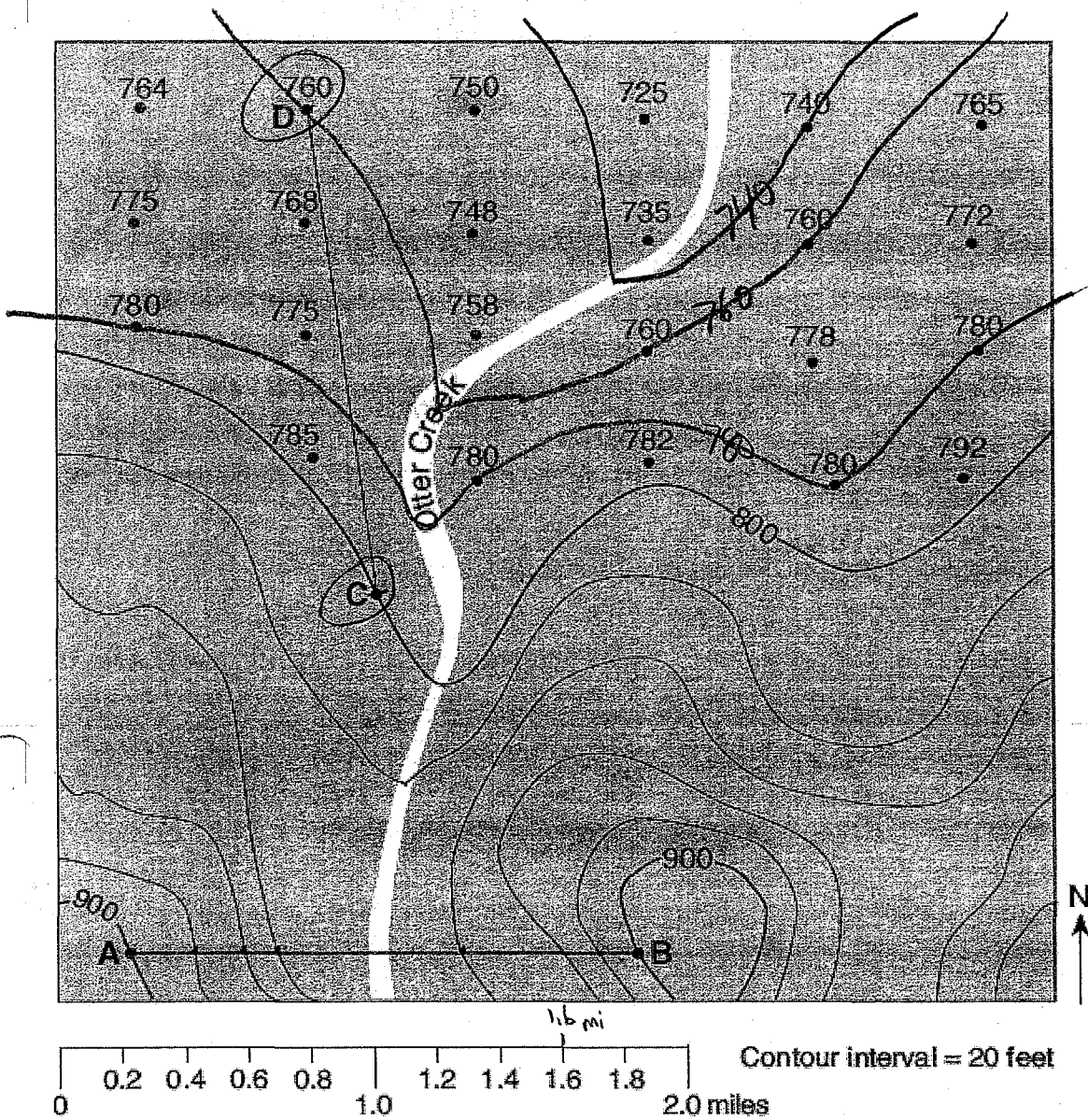


(Not drawn to scale)

9. The diagram below represents a beaker of water that is being heated. As the colored dye pellet dissolves, the dye will show the movement of water in the beaker. On the diagram, draw arrows in the water to show the direction the colored dye will move when the water is heated as shown.



Base your answers to questions 10 through 13 on the map below, which shows elevations in feet at various points. The southern part of the map has contour lines representing elevations at 20-foot intervals. Lines *AB* and *CD* are reference lines on the map.



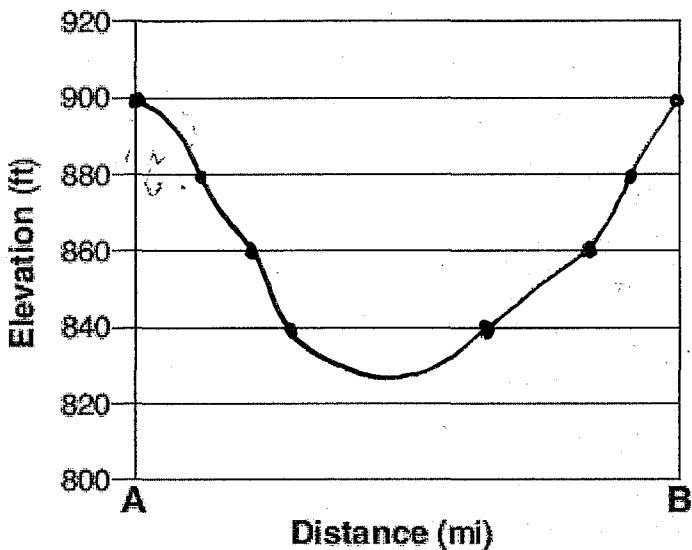
10. Explain how the contour lines indicate the direction of flow of Otter Creek.

10. • Contour lines bend upstream where they cross a river.  
 • Streams flow from higher elevation to lower elevation contour lines.  
 • Contour lines bend uphill where they cross a river forming a V that points towards higher elevation.

Key

Midterm Review #4 -FR - 2018

11. On the grid below, construct a topographic profile along line AB by plotting the elevation of each contour line that crosses line AB. Connect the plots with a line to complete the profile.



13. C-D

$$g = \frac{40 \text{ ft}}{1.6 \text{ mi}}$$

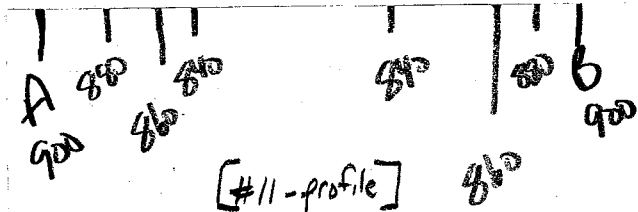
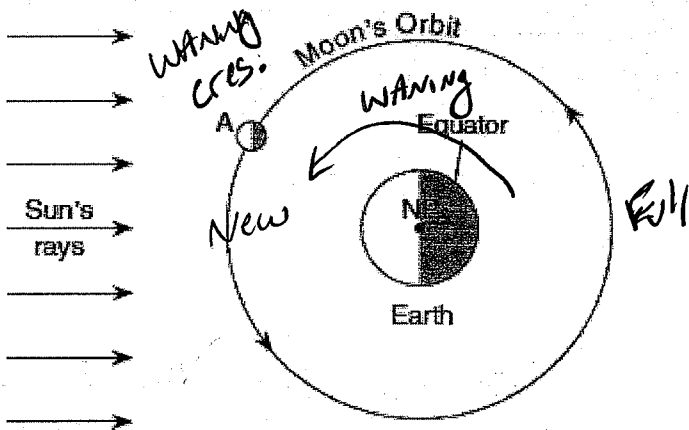
acceptable range	Answer must include UNIT
23-27 feet/mile	

gradient = 25 ft/mi (+/-)

12. On the map, draw contour lines for the 780-ft, 760-ft, and 740-ft elevations. Extend your contour lines to the edges of the map.

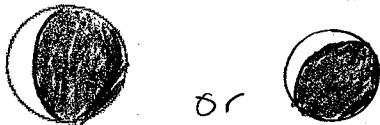
13. Calculate the gradient along line CD and label your answer with the correct units. (Use box above)

14. Base your answer to the following question on the diagram below and on your knowledge of Earth science. The diagram represents the Moon's orbit around Earth as viewed from space above Earth's North Pole (NP). Letter A represents one position of the Moon in its orbit.



(Not drawn to scale)

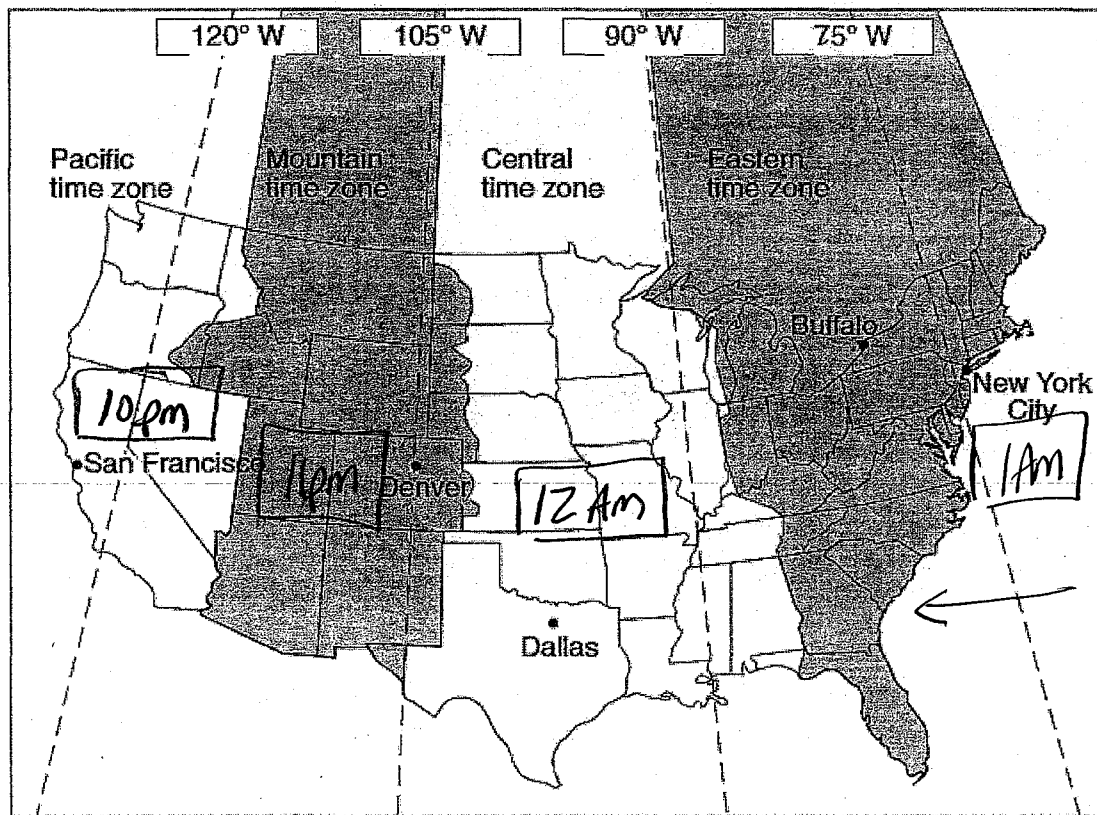
On the diagram below, shade the portion of the Moon that is in darkness as viewed from New York State when the Moon is at position A.



Base your answers to questions 15 and 16 on passage and time zones map shown below.

**Time Zones**

In 1883, Earth was divided into 24 time zones. The United States (excluding Alaska and Hawaii) has four time zones, which are indicated by different shadings on the map. Each zone is roughly centered on lines of longitude that are 15° apart. These lines are shown as dashed lines on the map. Most locations within a time zone have the same time. This time is called standard time. As you move to the west, the time in each zone is one hour earlier than the previous time zone



15. Explain, in terms of Earth's rotation, why the time zones are 15° of longitude apart.

16. When it is 1 a.m. in New York City, what time is it in Denver?

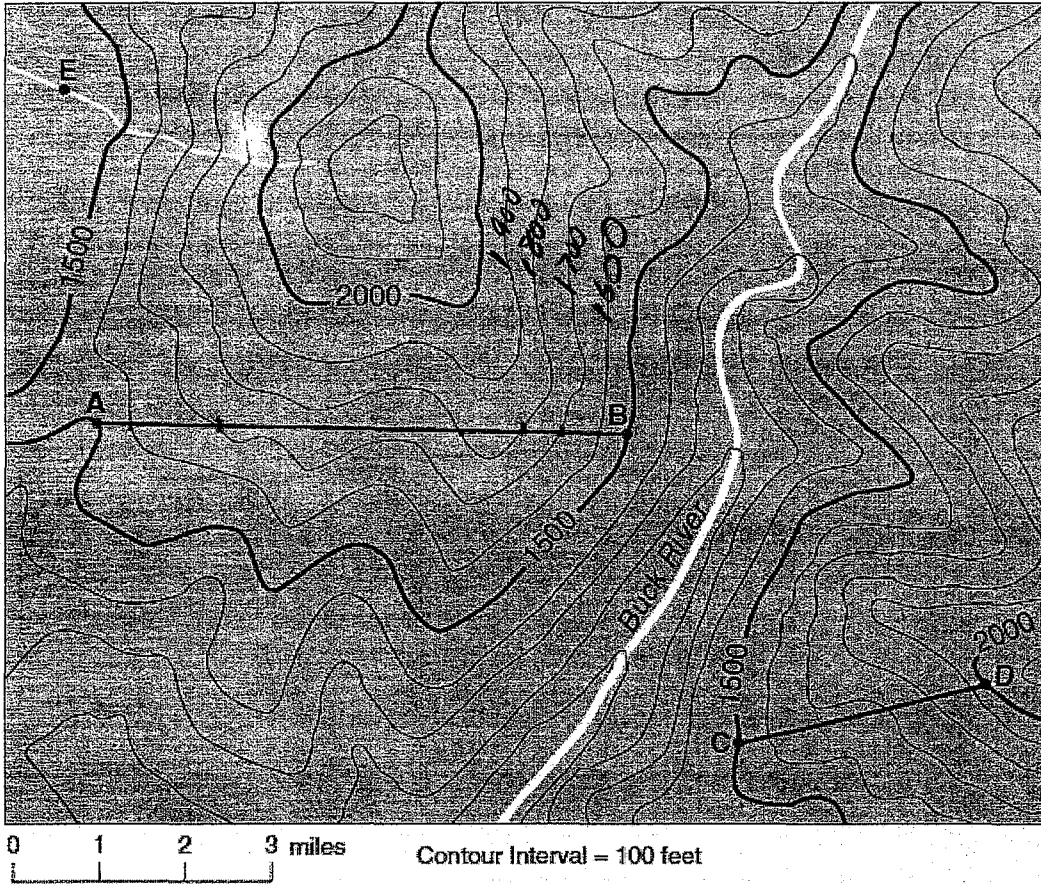
15. • Earth rotates at a rate of 15°/hr.  
 • Earth's period of rotation is 24 hours.  
 • Earth spins 360° in 24 hours.

16. 11 pm (must include pm)

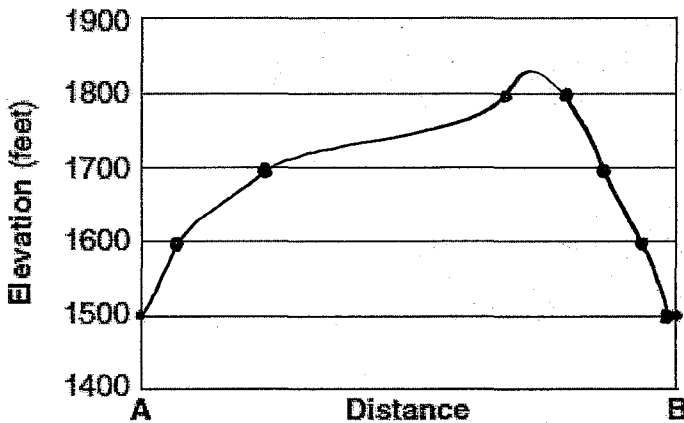
Key

Midterm Review #4 -FR - 2018

Base your answers to questions 17 through 19 on the topographic map below and on your knowledge of Earth science. Lines *AB* and *CD* are reference lines on the map. Letter *E* indicates a location in a stream.



17. Using the grid, construct a topographic profile along line *AB* by plotting the elevation of each contour line that crosses line *AB*. Point *A* and *B* have already been plotted on the grid. Connect all plots with a line from *A* to *B* to complete the profile.



18. • Contour lines bend upstream where they cross Buck River.

• Contour lines that cross a river form a "V" shape that points toward the source of the river.

• Contour lines bend in the opposite direction of stream flow where they cross the river.

18. Describe how the contour lines indicate the direction in which Buck River flows.

19. Calculate the gradient along line *CD*.

gradient =  $\frac{500\text{ft}}{3\text{ miles}}$

#17 A 1500 1700

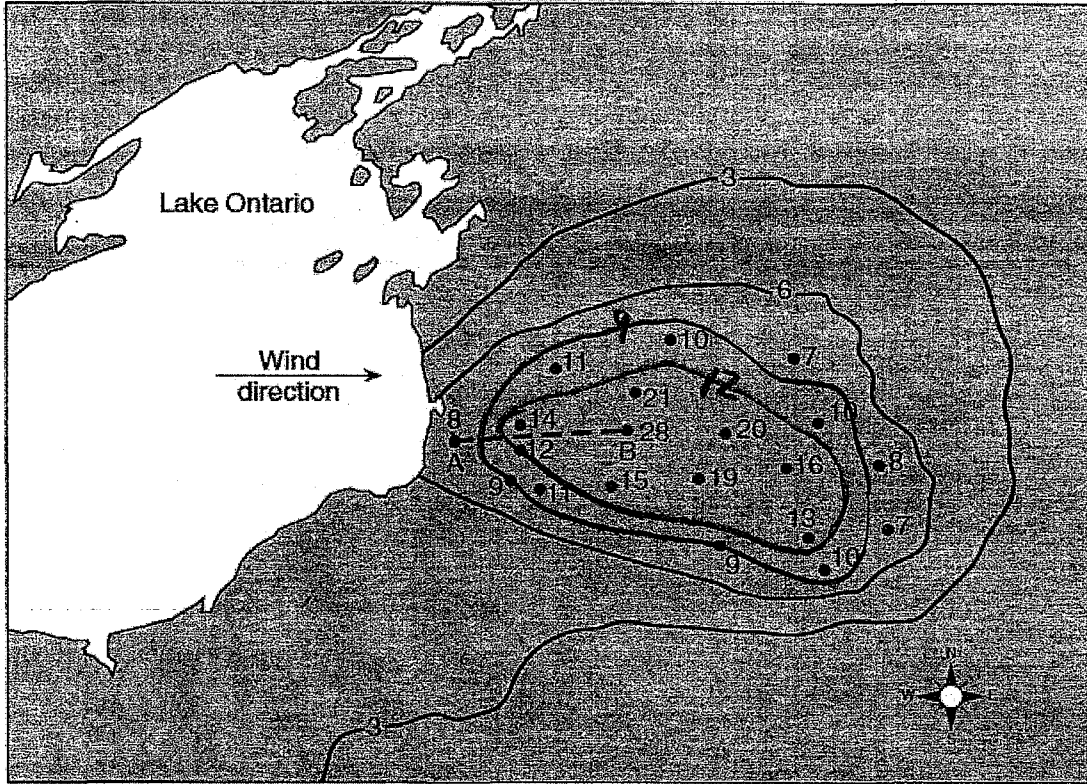
B 1800 1600 1700 1500



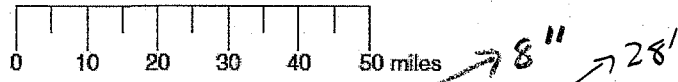
Key

Base your answers to questions 20 and 21 on the snowfall map of the Tug Hill Plateau region of New York State and your knowledge of Earth science. A lake-effect snowstorm occurred on November 16-19, 2008. Snow depths are indicated in inches at several points and by two labeled isoline. Dashed line AB is a reference line on the map between two recorded snow depths.

November 16-19, 2008, Storm Snow Depth (inches)



- Both lines form closed loops
- Lines can't touch another line
- Lines cannot hit a part for a different value.
- (9 line hits 2 points)
- 12 line hits 1 point,



20. Calculate the snow depth gradient between point A and point B, in inches per mile.

21. On the map, draw the 9-inch and 12-inch snow depth isolines.

20.

$$\text{gradient} = \frac{\text{Change in field Value}}{\text{distance}}$$

$$= \frac{28 \text{ inches} - 8 \text{ inches}}{25 \text{ miles}} = \frac{20}{25 \text{ miles}}$$

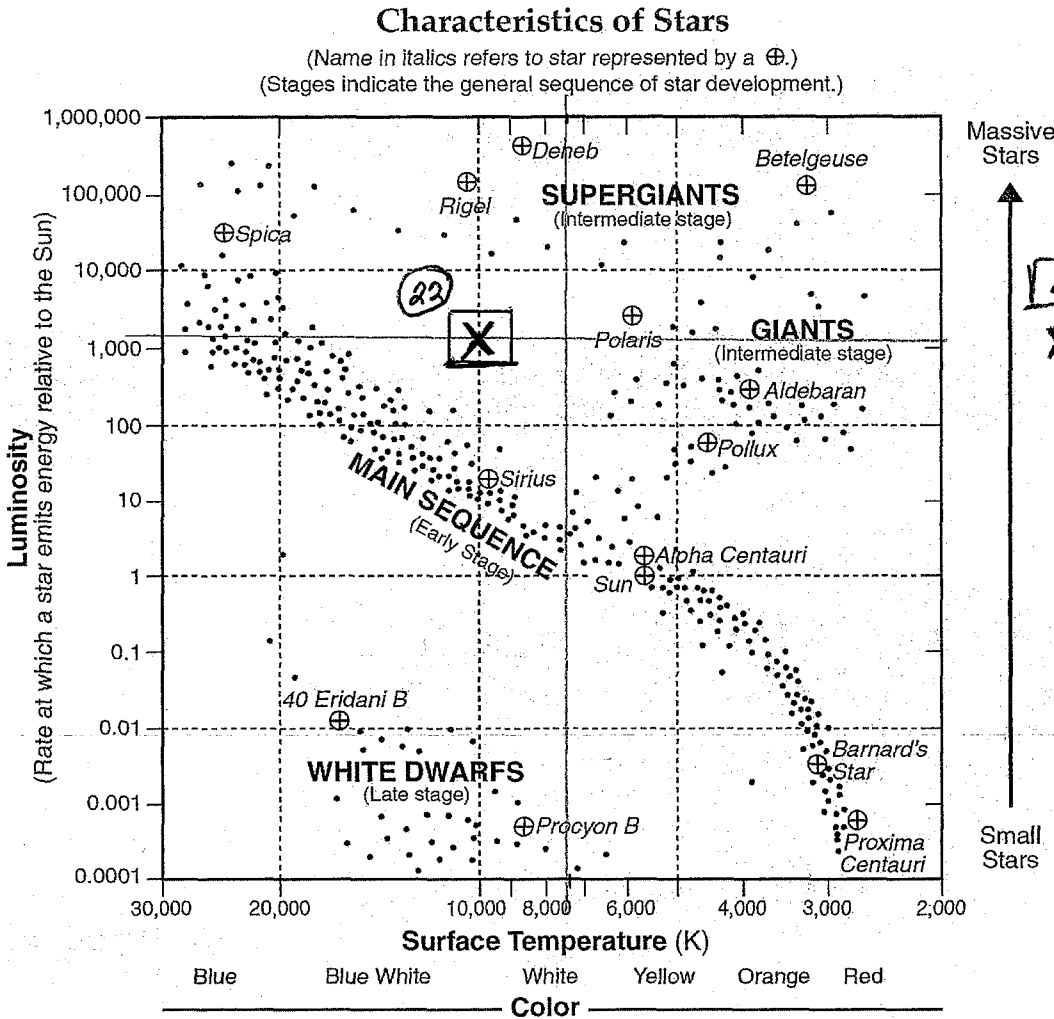
$$\text{gradient} = .8 \text{ inches/mile}$$

acceptable range

0.75 "/mi to 0.85 "/mi

Answer must include unit

Base your answers to questions 22 through 25 on the Characteristics of Stars graph below and on your knowledge of Earth science.



22 - Center of the X is inside the box.

22. The star *Canopus* has a surface temperature of 7400 K and a luminosity (relative to the Sun) of 1413. Use an X to plot the position of *Canopus* on the graph above, based on its surface temperature and luminosity.

23. Identify *two* stars from the Characteristics of Stars graph that are at the same life-cycle stage as the Sun. Spica, Sirius, Alpha Centauri and Barnard's Star, Proxima Centauri

24. Describe how the relative surface temperature and the relative luminosity of *Aldebaran* would change if it collapses and becomes a white dwarf like *Procyon B*.

25. Describe *one* characteristic of the star *Spica* that causes it to have a greater luminosity than *Barnard's Star*.

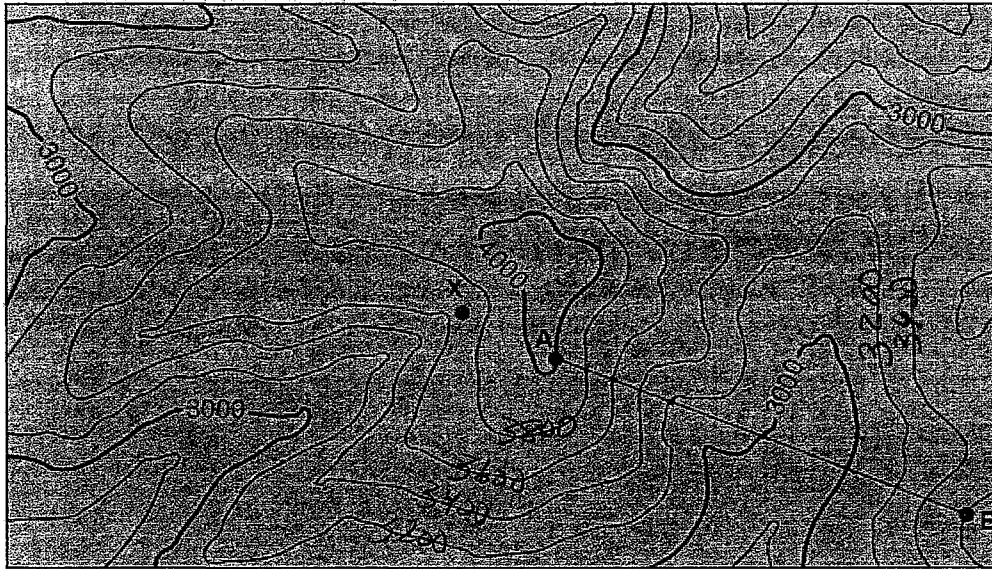
24. Aldebaran's surface temperature will increase (hotter or rise)  
Aldebaran's Luminosity will decrease. (reduced)

25. Spica is more massive. (Larger, Giant size, Supergiant). Hotter, Greater Temp. Spica is a blue star.

Key

Base your answers to questions 26 and 27 on the topographic map below and on your knowledge of Earth science. The map is centered on the peak of New York State's Slide Mountain at 42° North. Points A, B, and X represent locations on the map. Line AB is a reference line on the map. Elevations are shown in feet.

Slide Mountain

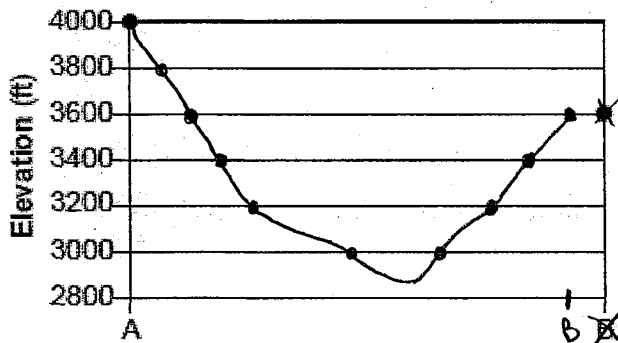


Contour interval = 200 feet

Any Value greater than 3,600 but less than 3,800 feet  $3600 < X < 3800$

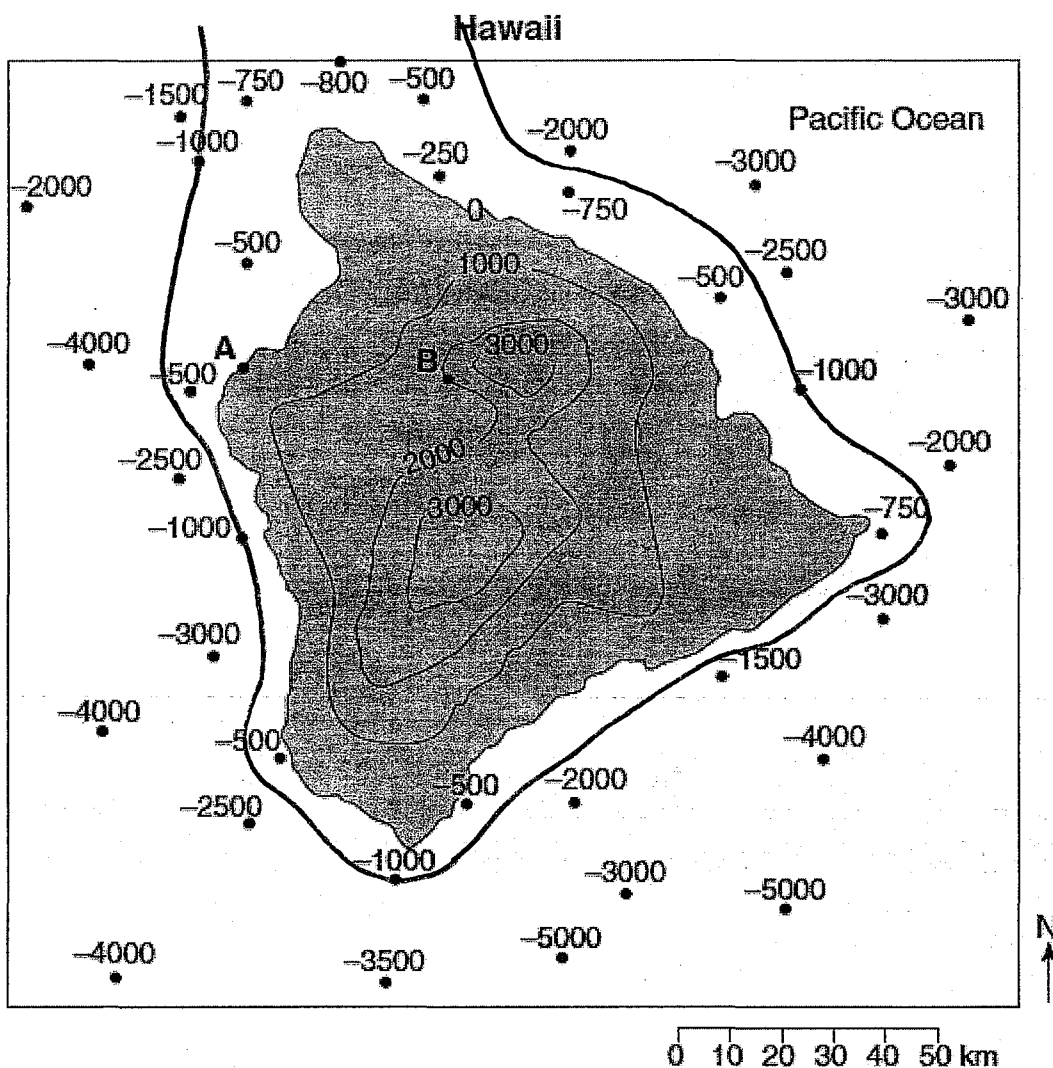
26. Determine one possible elevation of point X.

27. On the grid below, construct a topographic profile along line AB by plotting the elevation of each contour line that crosses line AB. Points A and B have already been plotted. Connect all ten plots with a line, starting at A and ending at B, to complete the profile.



#27  
 A 4000 3800 3600 3400 3200 3000 3000 3200 3400 3600  
 3600 3400 3200 3000 3100  
 B 3100

28. Base your answer to the following question on the topographic map of Hawaii below and on your knowledge of Earth Science. Points *A* and *B* represent surface locations on the island. Land elevations and Pacific Ocean depths are shown in meters.

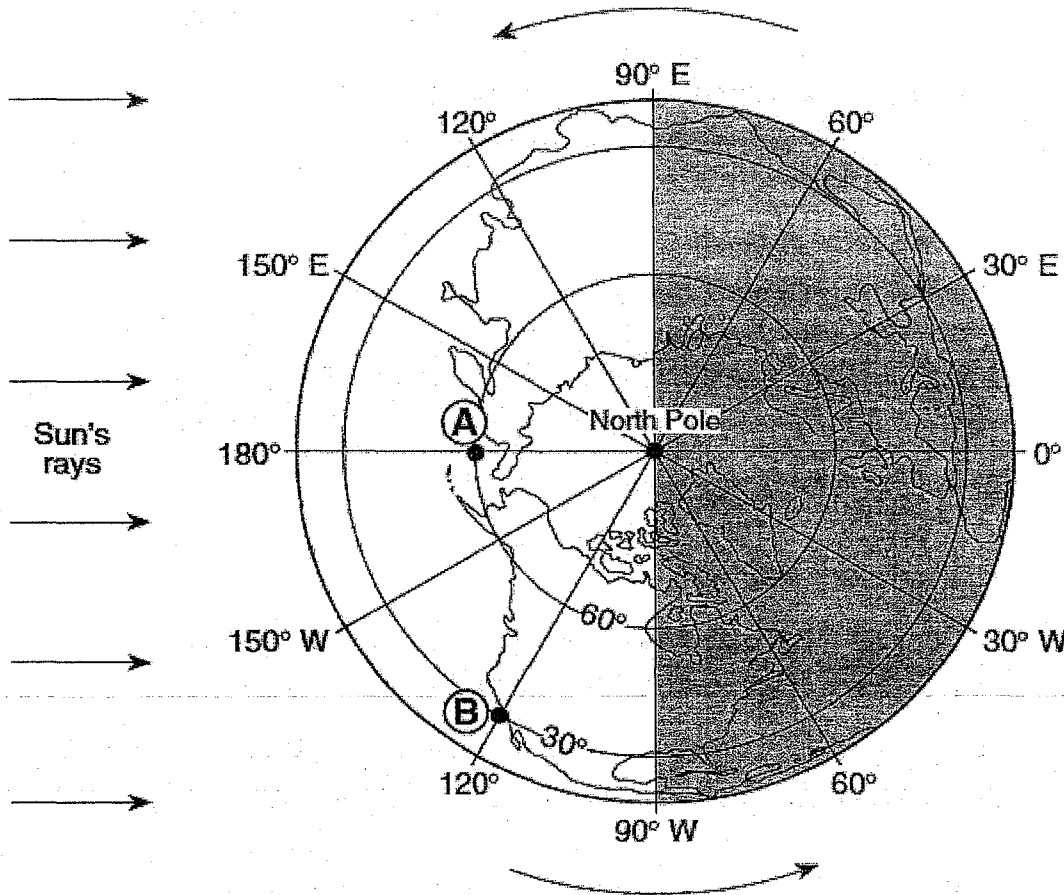


On the map, draw the -1000-meter ocean-depth isoline. Extend the isoline to the edge of the map.

- -1000 Line must hit all 4 points of -1000.
- Line cannot hit the Island.
- Line must extend to the edge of the Map. (run through)
- Line cannot hit any other points. (not -1,000)

Key

29. Base your answer to the following question on the diagram below, which shows Earth as seen from above the North Pole. The curved arrows show the direction of Earth's motion. The shaded portion represents the nighttime side of Earth. Some of the latitude and longitude lines have been labeled. Points A and B represent locations on Earth's surface.

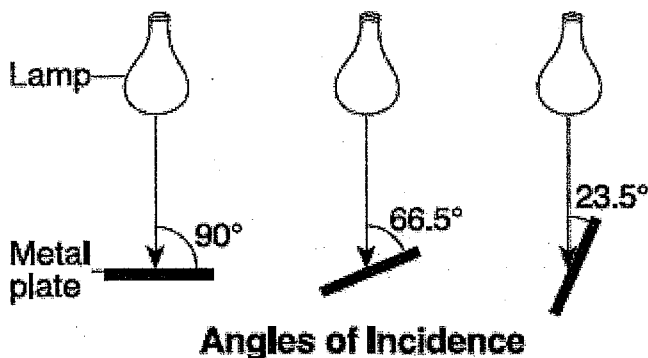


Identify *one* possible date that is represented by the diagram.

29. March 20 - 22  
September 21 - 24  
 Equinox

30. Base your answer to the following question on the experiment description and diagram below.

A student was interested in how the angle of insolation affects absorption of radiation. The student took three black metal plates, each containing a built-in thermometer, and placed them at the same distance from three identical lamps. The plates were tilted so that the light from the lamps created three different angles of incidence with the center of the plates, as shown in the diagram. The starting temperatures of the plates were recorded. The lamps were turned on for 10 minutes. Then the final temperatures were recorded.



Explain why the metal plate at a 90° angle of incidence had a final temperature higher than the other two plates.

30. • The 90° angle plate received more intense radiation.
- The 90° plate received more direct / concentrated rays.
- It (90° plate) absorbed the most light.
- It (90° plate) reflected the least light.