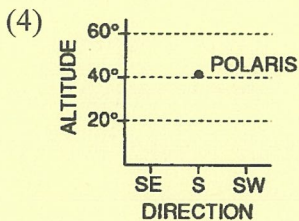
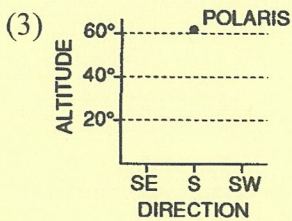
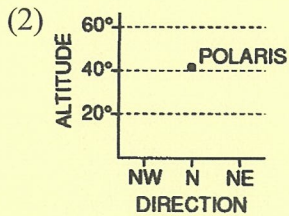
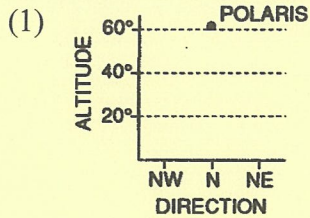
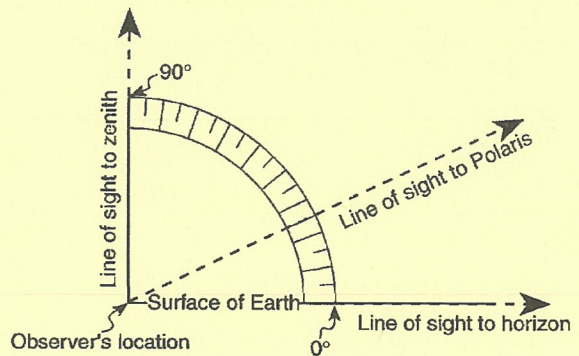


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1. Which diagram best shows the altitude and direction of Polaris for an observer in New York City? [Refer to the *Earth Science Reference Tables*.]



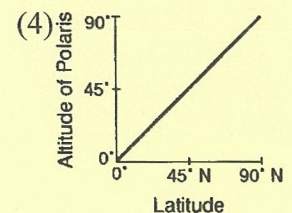
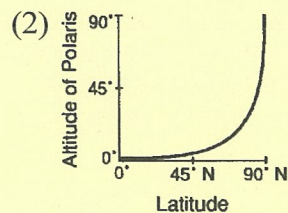
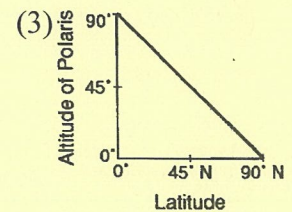
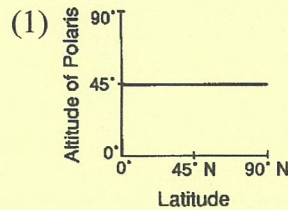
2. The diagram below shows the angular altitude of Polaris above the horizon at a certain location.



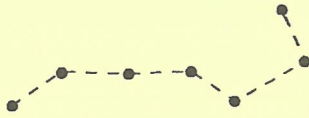
What is the latitude of the observer?

- (1) 15° N (3) 30° N
 (2) 25° N (4) 65° N

3. Which graph best represents the relationship between the latitude of an observer and the observed altitude of Polaris above the northern horizon?



4.



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.

5. Which latitude and longitude coordinates represent a location on the continent of Australia?

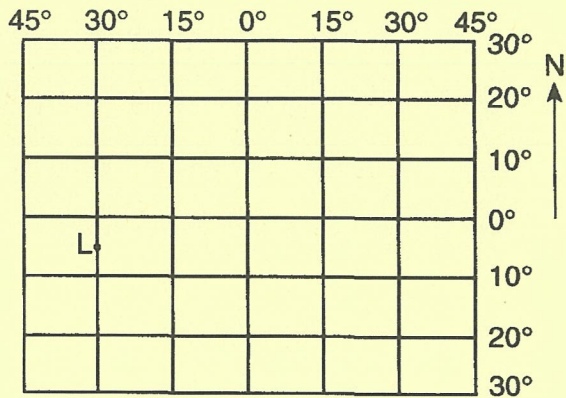
- (1) 20° N, 135° E (3) 20°S, 135° E
- (2) 20° N, 135° W (4) 20° S, 135° W

6. Base your answer to the following question on the *Earth Science Reference Tables*.

What is the location of Binghamton, New York?

- (1) 42° 06' N. lat., 75° 55' W. long.
- (2) 42° 06' N. lat., 76° 05' W. long.
- (3) 42° 54' N. lat., 76° 05' W. long.
- (4) 42° 54' N. lat., 75° 55' W. long.

7. The diagram below represents part of Earth's latitude-longitude system.

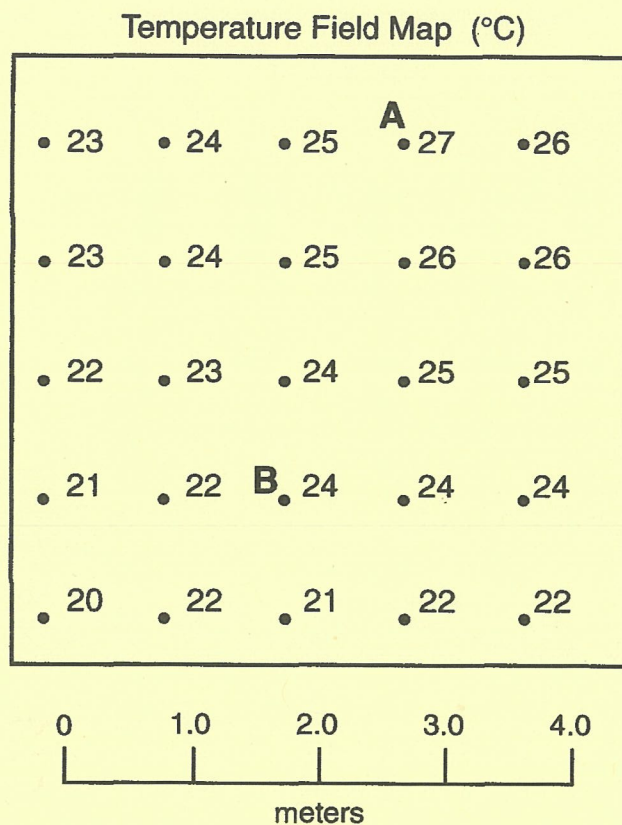


What is the latitude and longitude of point L?

- (1) 5° E 30° N (3) 5° N 30° E
- (2) 5° W 30° S (4) 5° S 30° W

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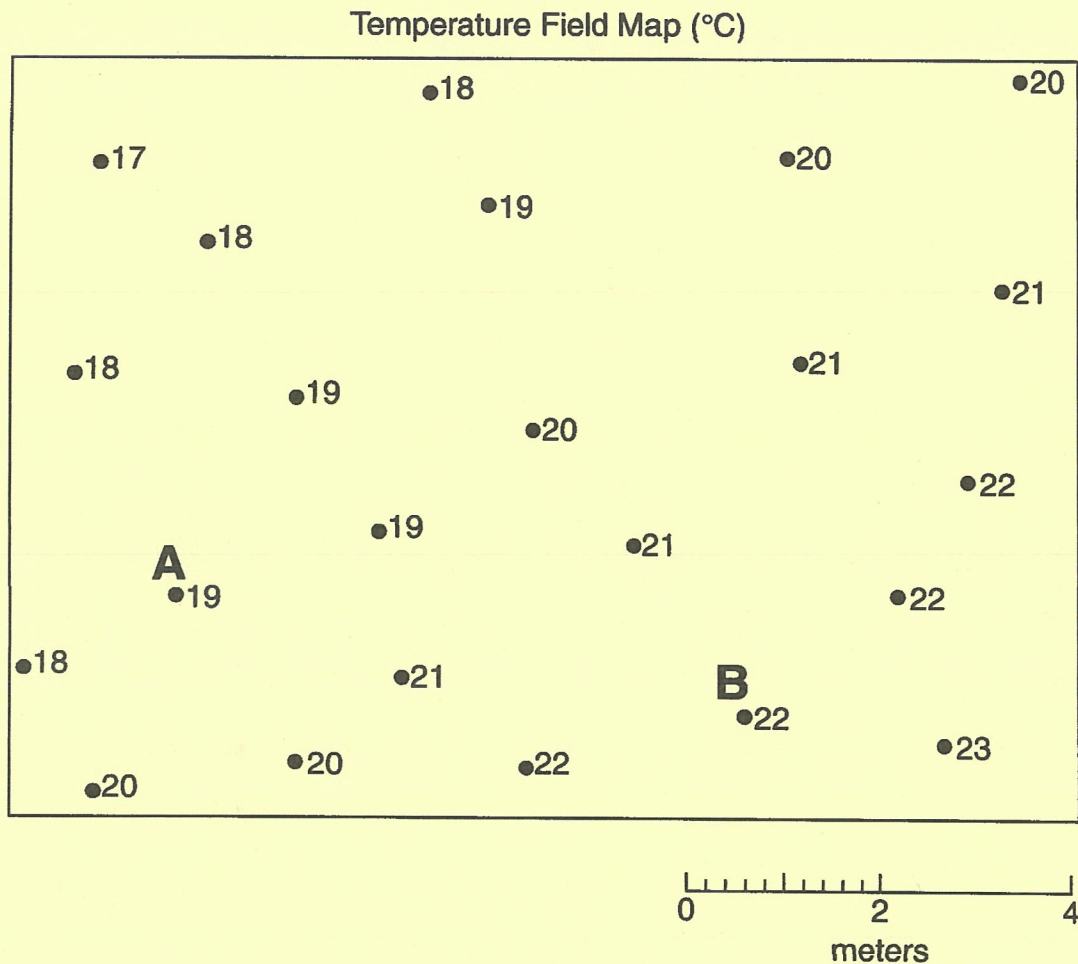
8. Base your answer on the temperature field map below. The map shows 25 measurements (in °C) that were made in a temperature field and recorded as shown. The dots represent the exact location of the measurements. *A* and *B* are locations within the field.



On the temperature field map above, draw three isotherms: the 23 °C isotherm, the 24 °C isotherm, and the 25 °C isotherm.

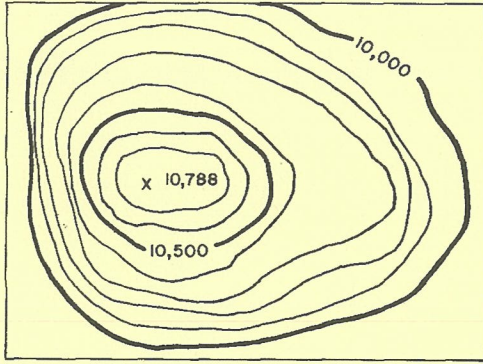
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Base your answers to questions 9 and 10 on the temperature field map below. The map shows temperature readings ($^{\circ}\text{C}$) recorded by students in a science classroom. The readings were taken at the same time at floor level. Temperature readings for points *A* and *B* are labeled on the map.



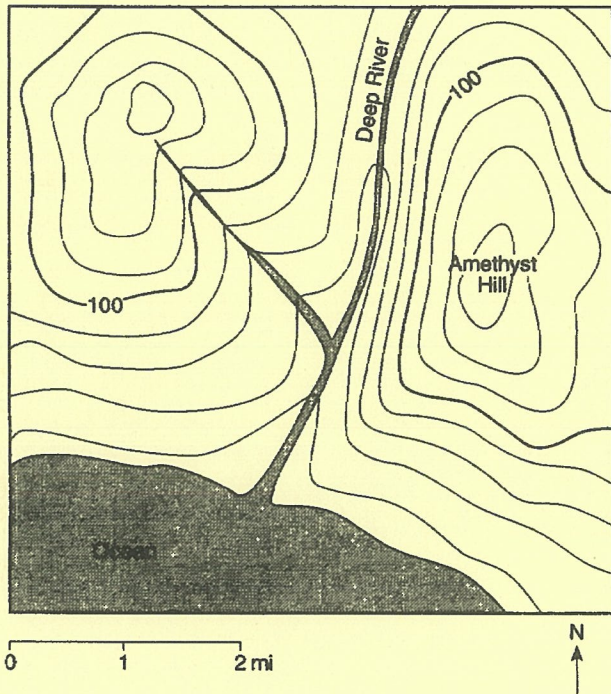
9. On the temperature field map, use solid lines to draw the 18°C , 20°C , and 22°C isotherms. Isotherms must extend to the boundary of the map. Label each isotherm to indicate its temperature.
10. Determine the temperature gradient from point *A* to point *B* by following the directions below.
- Write the equation used to determine the gradient.
 - Substitute values from the field map into the equation.
 - Solve the equation and label the answer with the proper units.

11. What is the elevation of the highest contour line shown on the map below?



- (1) 10,000 feet
- (2) 10,688 feet
- (3) 10,700 feet
- (4) 10,788 feet

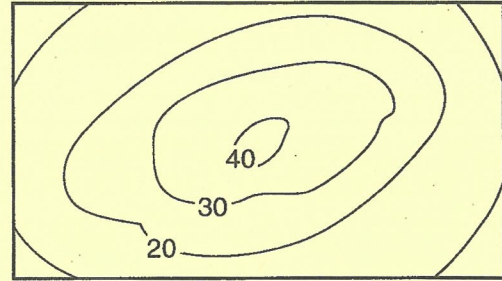
12. A contour map is shown below. Elevations are shown in feet.



What is the contour interval of this map?

- (1) 10 ft
- (2) 15 ft
- (3) 20 ft
- (4) 25 ft

13. Isolines on the map below show elevations above sea level, measured in meters.

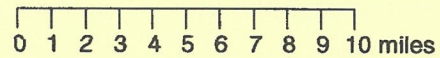
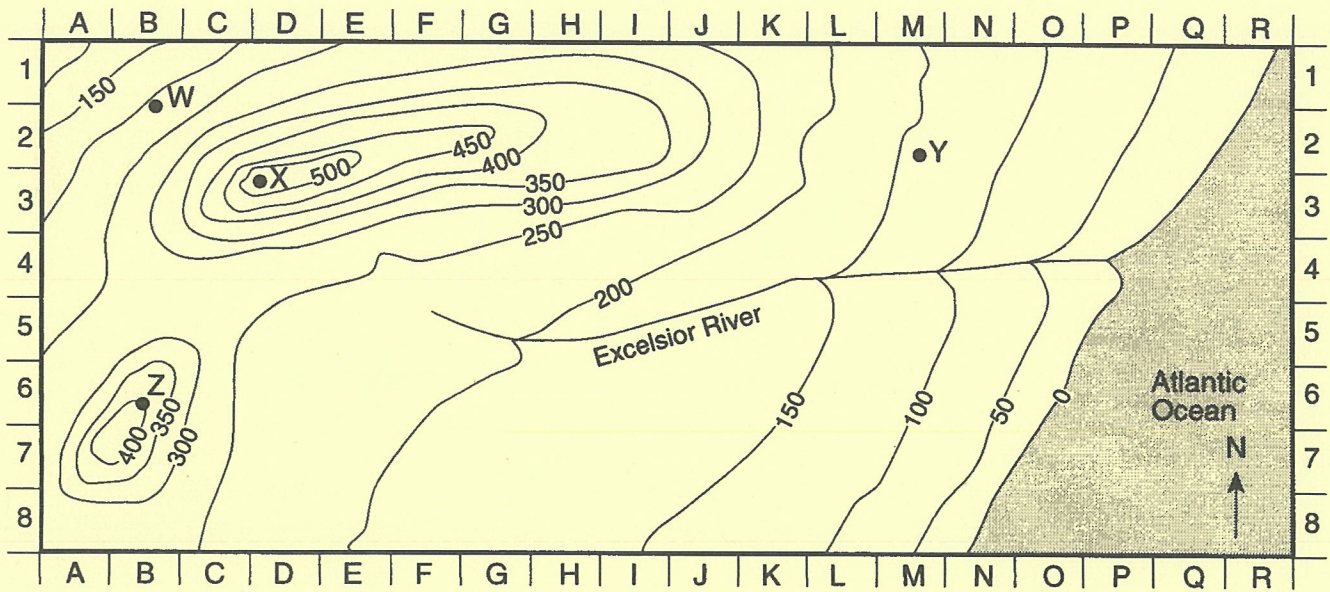


What is the highest possible elevation represented on this map?

- (1) 39 m
- (2) 41 m
- (3) 49 m
- (4) 51 m

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14. Base your answer on the *Earth Science Reference Tables* and the topographic map below that represents a location in North America. A grid system of letters and numbers along the edges of the map is provided to assist in finding locations. Elevations are expressed in feet.



What is a possible elevation at point X (grid location 3-D)?

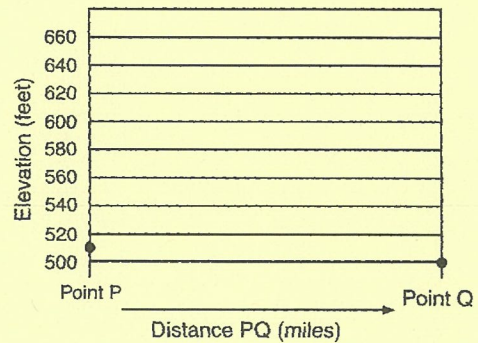
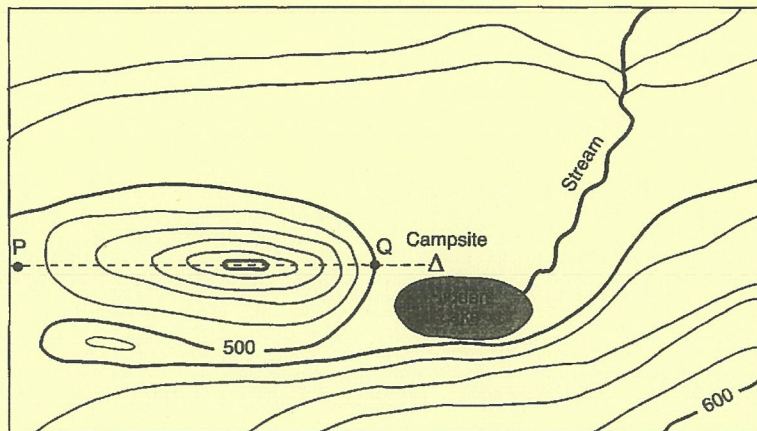
- (1) 488 ft (2) 548 ft (3) 558 ft (4) 598 ft

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Base your answers to questions 15 and 16 on the reading passage and topographic map below.

A group of Earth science students decided to take an adventurous camping trip, so they rode bicycles to a New York State park that was located in an isolated area. They traveled up a steep hill. When they reached the top, they looked at the landscape and noticed a lake at the bottom of the hill. They named it Hidden Lake. To the left of Hidden Lake was a large field with a small stream. They decided to set up their campsite in the field near Hidden Lake. To get to the field, they cycled down a very steep slope.

The map below shows the location of the bicycle trail and the students' campsite. Points *P* and *Q* are reference points on the map.



15. *a* State the general compass direction in which the stream is flowing.

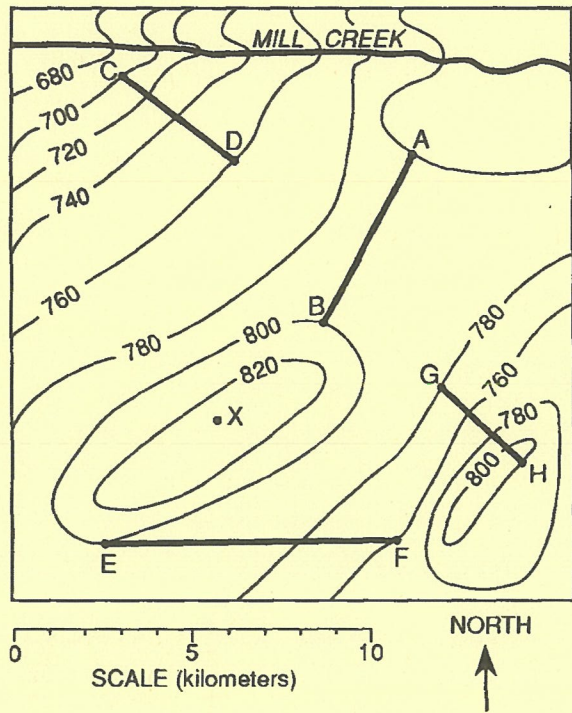
b State how contour lines provide the evidence for determining this direction.

16. On the grid provided above, draw a profile of the landscape along the bicycle trail from point *P* to point *Q* by following the directions below.

a Plot the elevation along line *PQ* by marking with a dot *each* point where a contour line is crossed by line *PQ*. Point *P* and point *Q* have been plotted for you.

b Connect the dots to complete the profile.

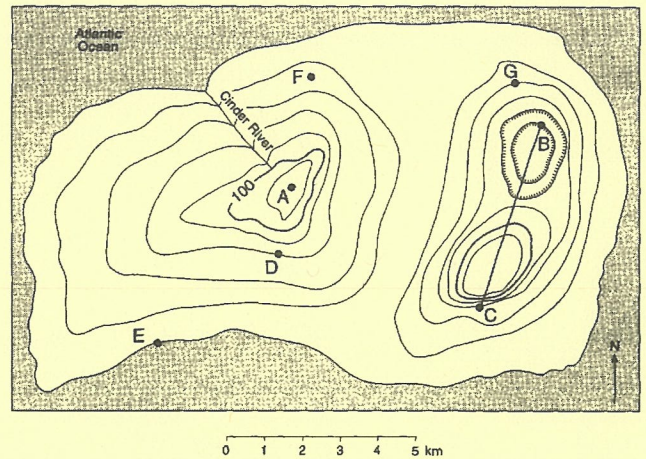
17. Base your answer on the *Earth Science Reference Tables* and the topographic map below. The topographic map represents elevation contours measured in meters. Four straight lines, *AB*, *CD*, *EF*, and *GH*, have been drawn for reference purposes.



What is the general direction of flow of Mill Creek?

- (1) east to west
- (2) west to east
- (3) north to south
- (4) south to north

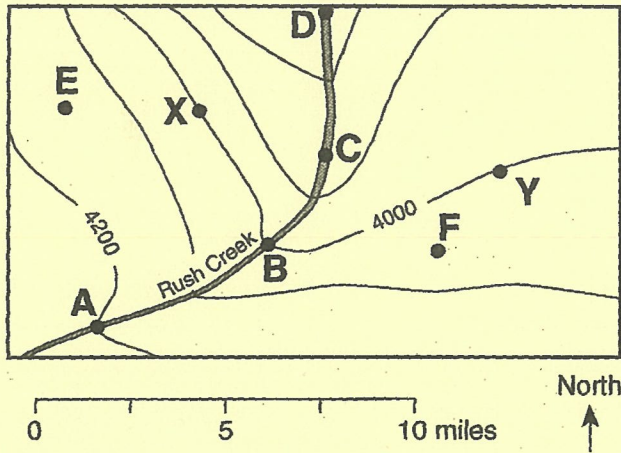
18. Base your answer on the contour map of an island below. Points *A* through *G* represent locations on the island. Elevations are in meters.



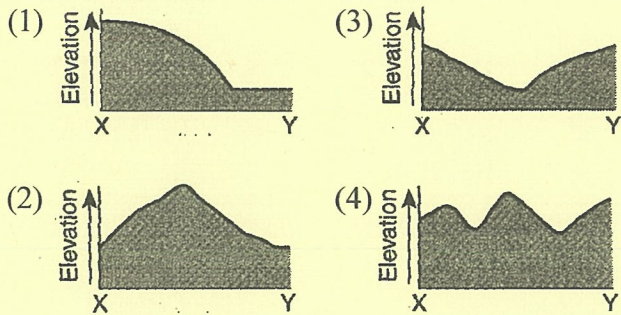
Which diagram best represents the topographic profile from location *C* to location *B*?

- (1)
- (2)
- (3)
- (4)

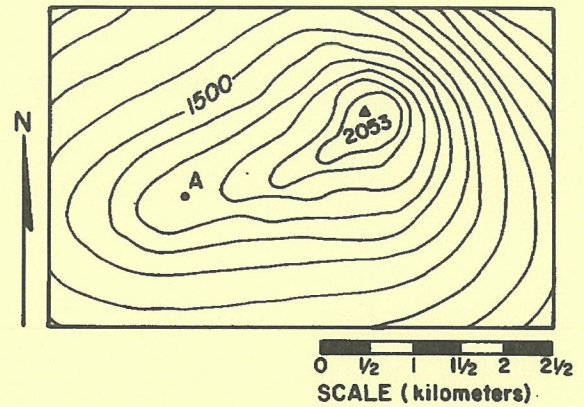
19. Base your answer on the topographic map below. Points *A*, *B*, *C*, *D*, *E*, *F*, *X*, and *Y* are locations on the map. Elevation is measured in feet.



Which diagram best represents the profile along a straight line between points *X* and *Y*?



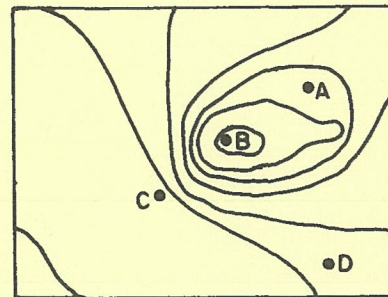
20. Base your answer on the topographic map shown below.



Which section of the map shows the steepest gradient?

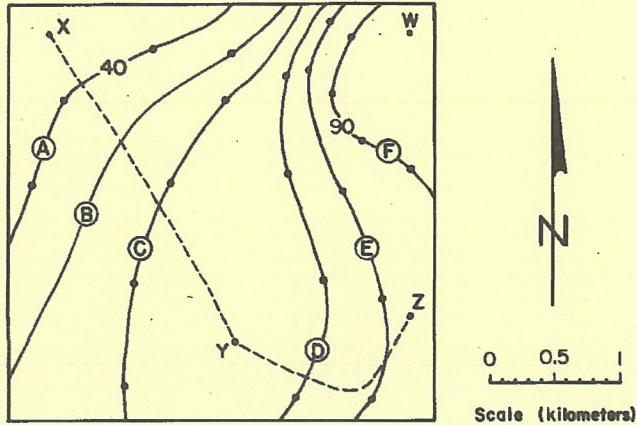
- (1) southeast
- (2) northeast
- (3) southwest
- (4) northwest

21. The diagram below is a contour map. Between which two points is the slope of the hill steepest?



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

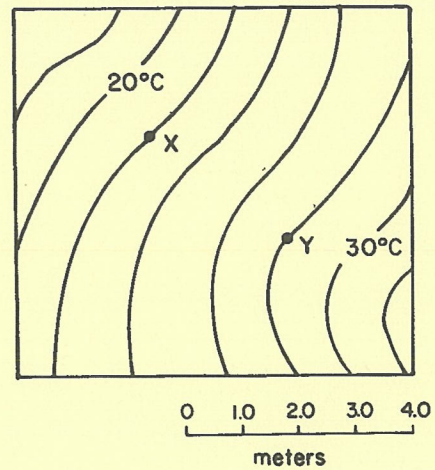
22. Base your answer on the information provided by the diagram. The diagram represents a sketch drawn in a notebook by an earth science student. Lines *A*, *B*, *C*, *D*, *E*, and *F* are isolines. The points along the isolines indicate the only locations where actual measurements were made. Points *W*, *X*, *Y*, and *Z* are reference locations in the field diagram.



What is the approximate distance from point *X* to point *Z* along the dashed line *XYZ*?

- (1) 1.5 km
- (2) 3.5 km
- (3) 4.0 km
- (4) 4.5 km

23. The diagram below represents a temperature field in degrees Celsius. What is the approximate temperature field gradient between points *X* and *Y*? [Refer to the *Earth Science Reference Tables*.]



- (1) 0.5 °C/m
- (2) 2 °C/m
- (3) 3 °C/m
- (4) 6 °C/m