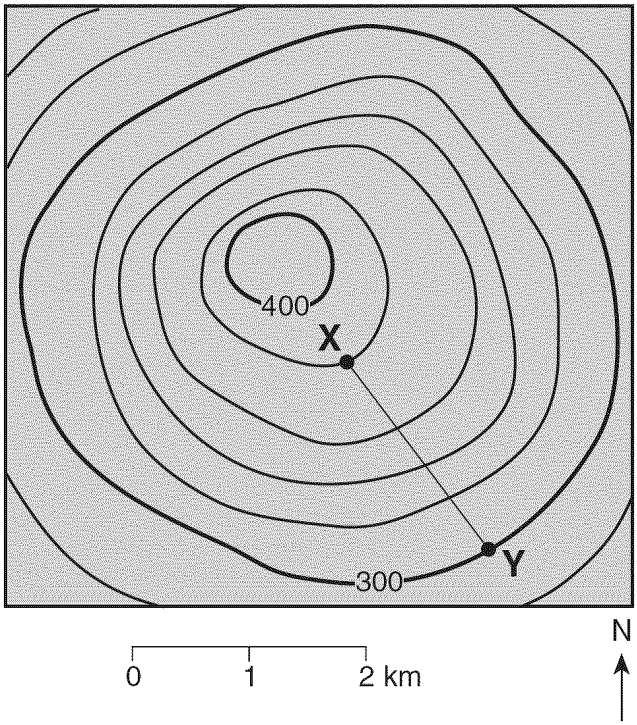
1. The topographic map below shows a hill. Points *X* and *Y* represent locations on the hill's surface. Elevations are shown in meters.



What is the gradient between points *X* and *Y*?

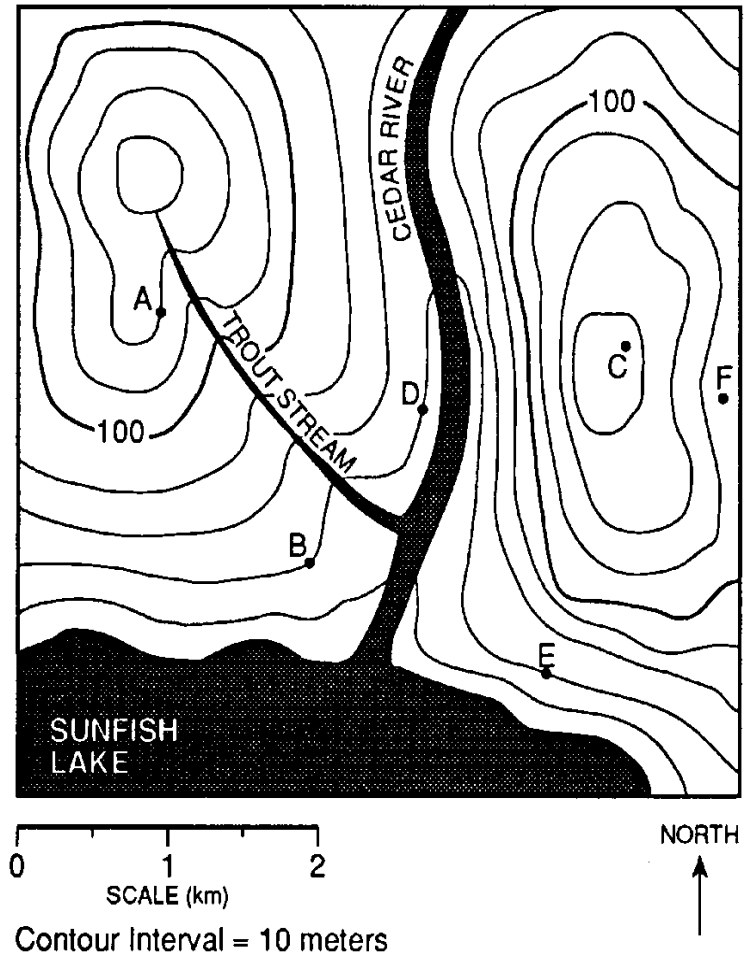
A) 40 m/km

B) 80 m/km

C) 100 m/km

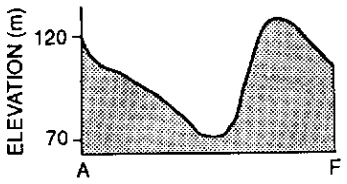
D) 120 m/km

2. Base your answer to the following question on the contour map below. Points *A* through *F* represent locations on the map.

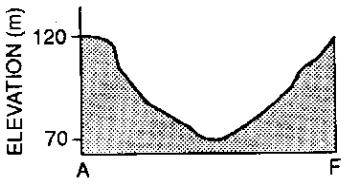


Which diagram best represents the topographic profile from location *A* to location *F*?

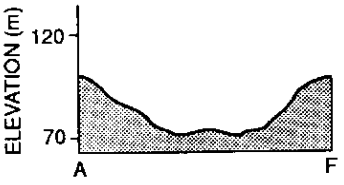
A)



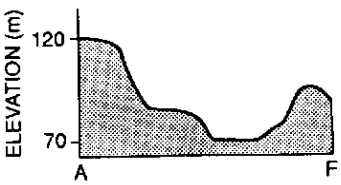
B)



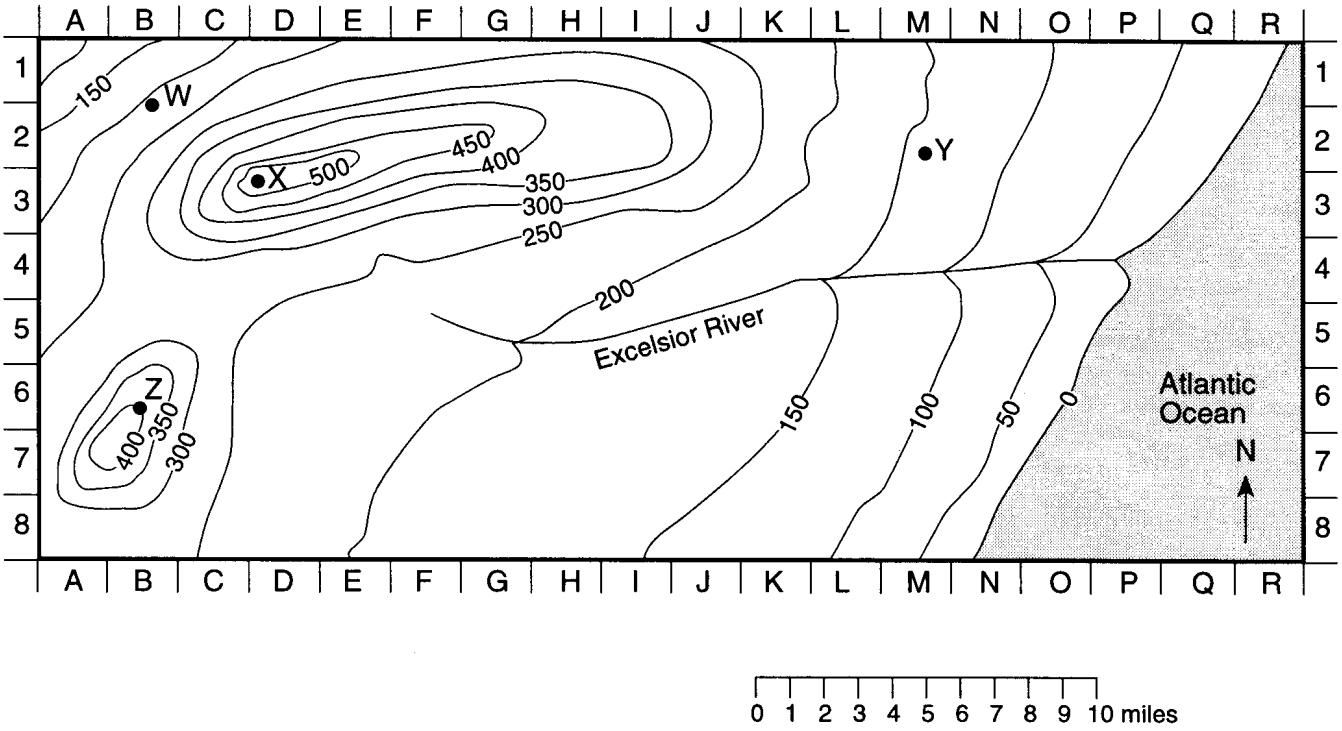
C)



D)



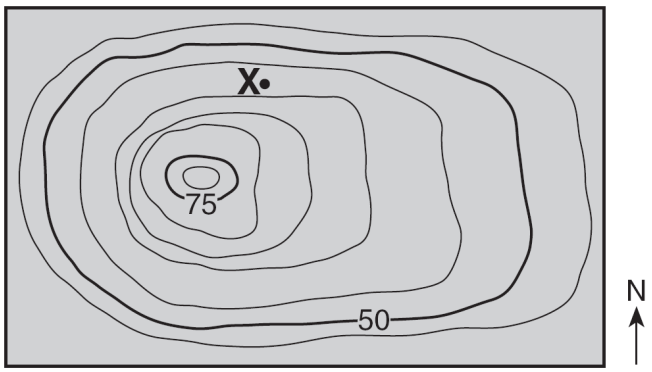
3. Base your answer to the following question on the topographic map below that represents a location in North America. A grid system of letters and numbers along the edges of the map is provided to assist in finding locations. Elevations are expressed in feet.



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

A) 488 ft **B) 548 ft** C) 550 ft D) 600 ft

4. Base your answer to the following question on Point *X* is a location on the topographic map below. Elevations are measured in meters.

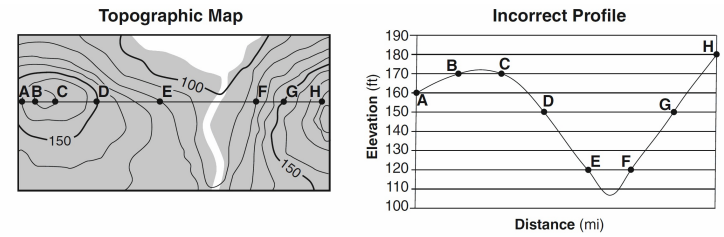


What is a possible elevation, in meters, of point *X*?

A) 55 **B) 57**

C) 68 D) The Moon

5. A topographic map and an *incorrectly* constructed profile from point *A* to point *H* on the map are shown below.



What mistake was made in the construction of this profile?

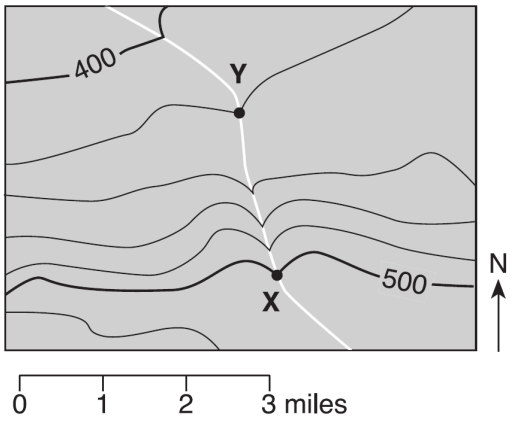
A) using a contour interval of 10 feet

B) plotting points *A* through *H* the same distance apart horizontally

C) drawing a curved line instead of a straight line from point *B* to point C

D) increasing the elevation from point *F* to point *H*

6. The topographic map below shows a stream crossing several contour lines and passing through points *X* and *Y* . Elevations are measured in feet.

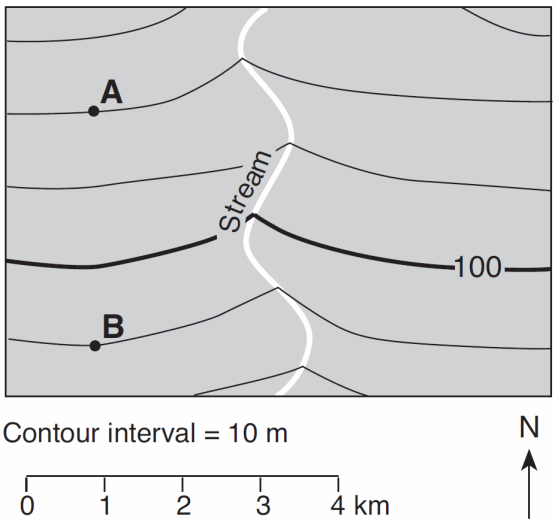


What is the approximate gradient between point *X* and point *Y*?

A) 10 ft/mi B) 20 ft/mi

C) 40 ft/mi D) 80 ft/mi

7. The topographic map below shows the location of a stream. Points *A* and *B* are locations on Earth's surface.



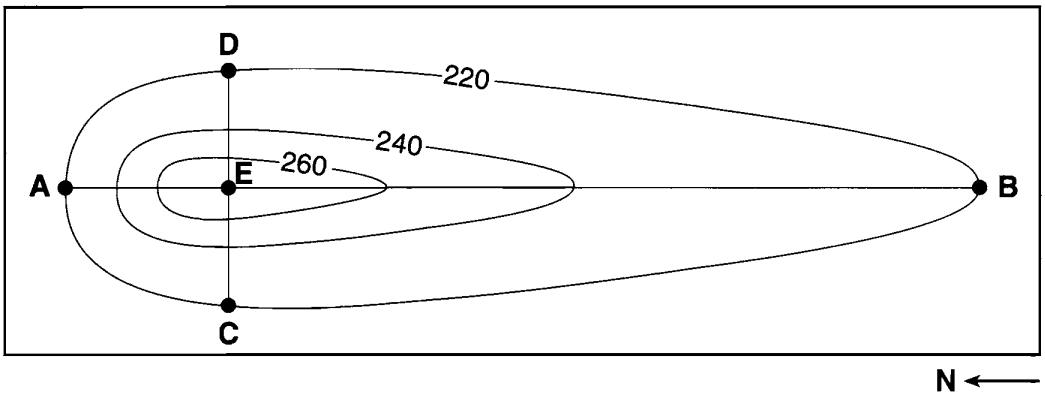
What is the gradient between points *A* and *B*?

A) 1 m/km B) 2 m/km

C) 10 m/km D) 20 m/km

8. Base your answer to the following question on the contour map below, which shows a hill formed by glacial deposition near Rochester, New York. Letters *A* through *E* are reference points. Elevations are in feet.

Contour Map



Which description best compares the gradients of this hill?

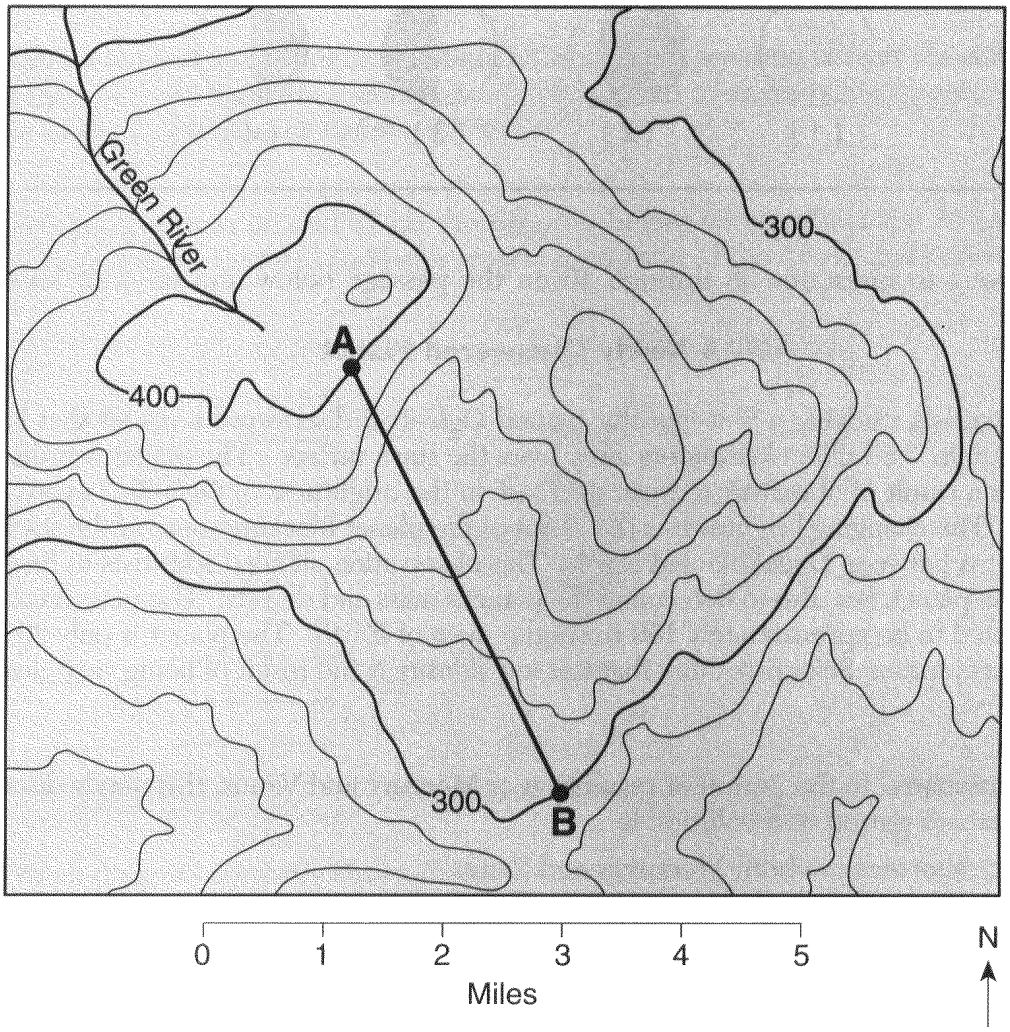
A) *AE* and *EB* have the same gradient.

B) *AE* has a steeper gradient than *EB*.

C) *CE* has a steeper gradient than *ED*.

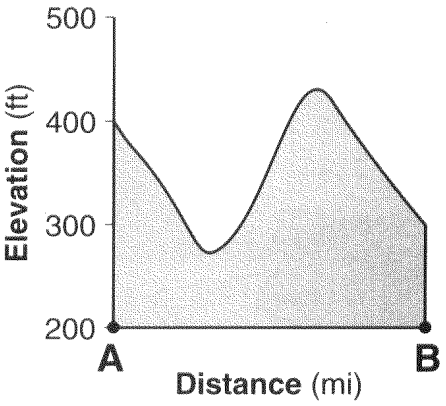
D) *CE* and *AE* have the same gradient.

Base your answers to questions **9** through **11** on the topographic map below. Elevations are in feet. Point A and B are locations on the map.

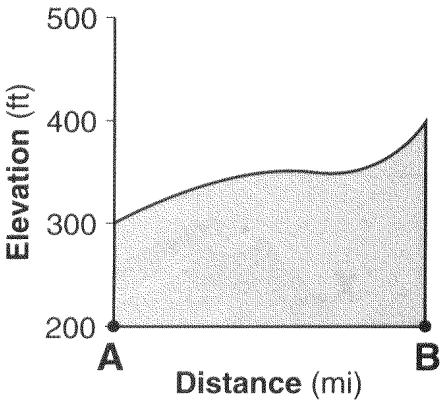


9. Which graph best represents the profile along line *AB*?

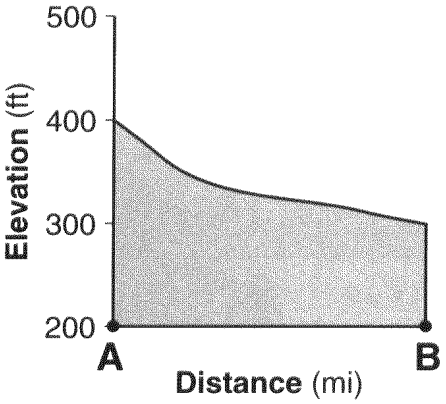
A)



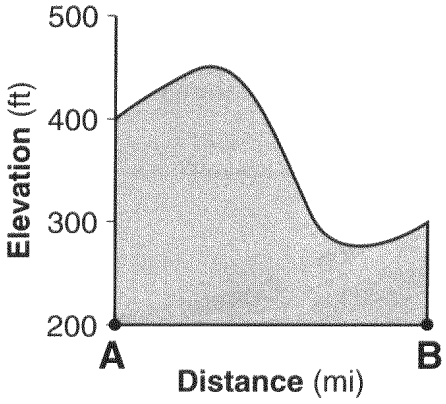
B)



C)



D)



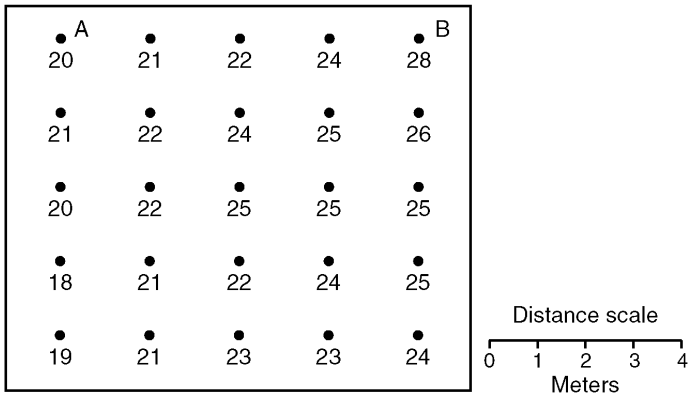
10. What is the gradient along the straight line between points A and B?

A) 10 ft/mi B) 20 ft/mi **C) 25 ft/mi** D) 35 ft/mi

11. Toward which direction does the Green River flow?

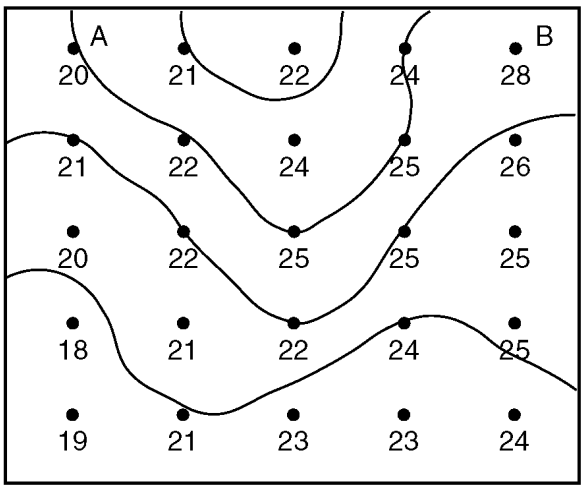
A) northeast **B) northwest** C) southeast D) southwest

12. The field map below shows air temperature measurements, in degrees Celsius, taken at the same elevation within a closed room. Two reference points, *A* and *B*, are shown.

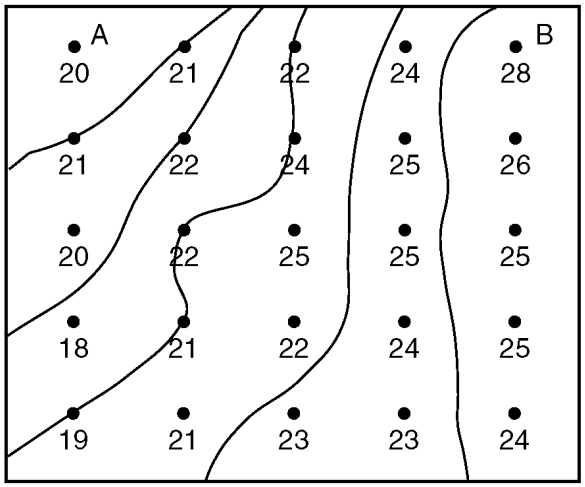


Which temperature field map shows correctly drawn isotherms?

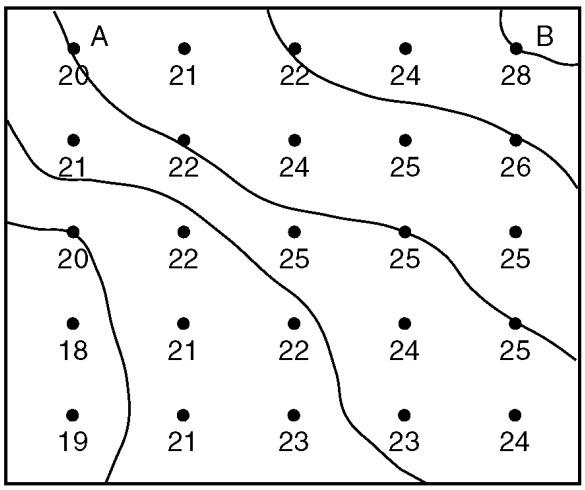
A)



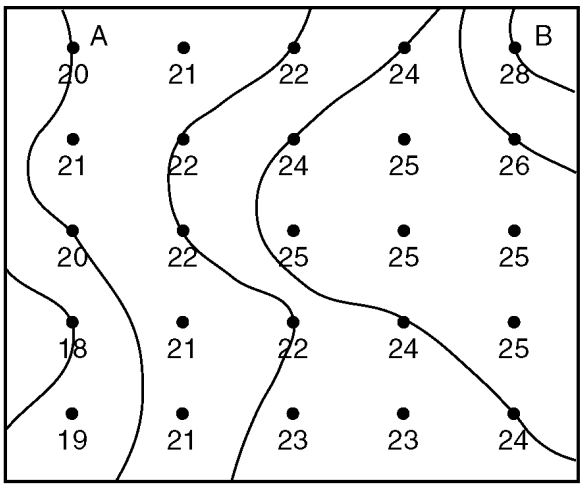
B)



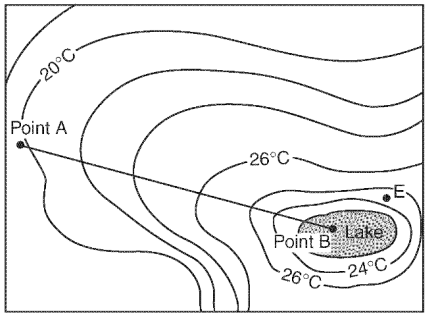
C)



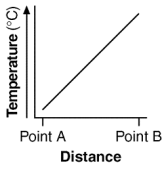
D)

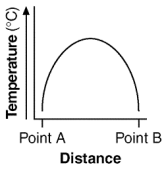


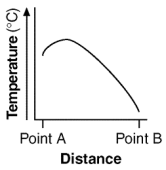
13. The temperature field map below represents surface air temperatures within a park. The location of a lake within the park is also indicated.



Which graph best represents the temperature profile along a straight line from point *A* to point *B*?

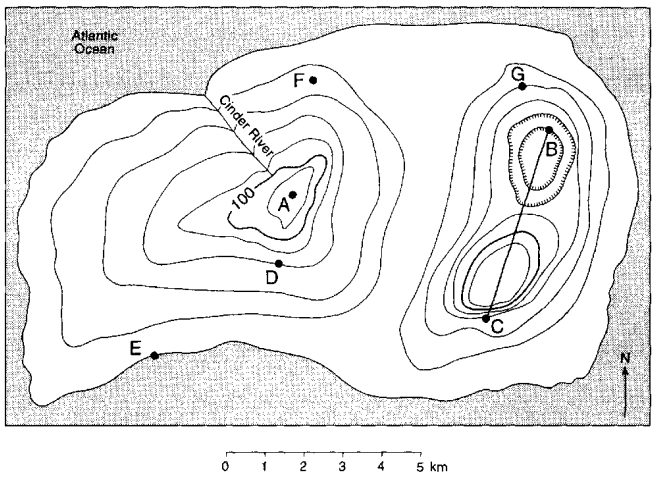
A) 

B) 

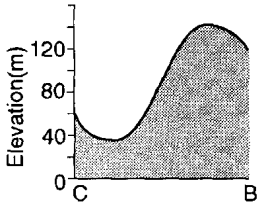
C) 

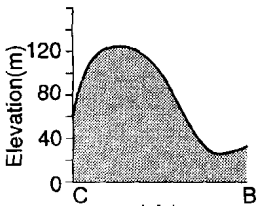
D)

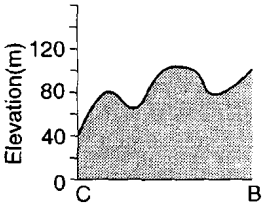
Base your answers to questions **14** through **18** on the contour map of an island below. Points *A* through *G* represent locations on the island. Elevations are in meters.

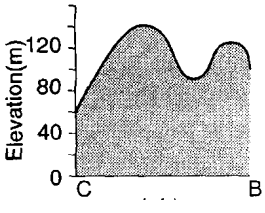


14. Which diagram best represents the topographic profile from location *C* to location *B*?

A) 

B) 

C) 

D) 

15. Which two points have the same elevation?

A) *G* and *F* B) *B* and *D* **C) *C* and *D*** D) *G* and *C*

16. What is the contour interval for this map?

A) 10 m B) 15 m **C) 20 m** D) 25 m

17. In which direction does the Cinder River flow?

A) southeast B) southwest C) northeast **D) northwest**

18. Which point is located on the steepest slope?

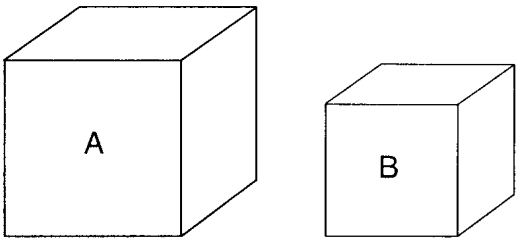
A) *F* B) *B* **C) *C*** D) *D*

19. As air on the surface of Earth warms, the density of the air

A) decreases B) increases

C) remains the same

Base your answers to questions **20** and **21** on the diagrams below, which represent two different solid, uniform materials cut into cubes *A* and *B*.



Mass of A = 320 g
Volume of A = 64 cm^3

Density of B = 3 g/cm^3
Volume of B = 27 cm^3

(Not drawn to scale)

20. If a parcel of air is heated, its density will

A) decrease B) increase

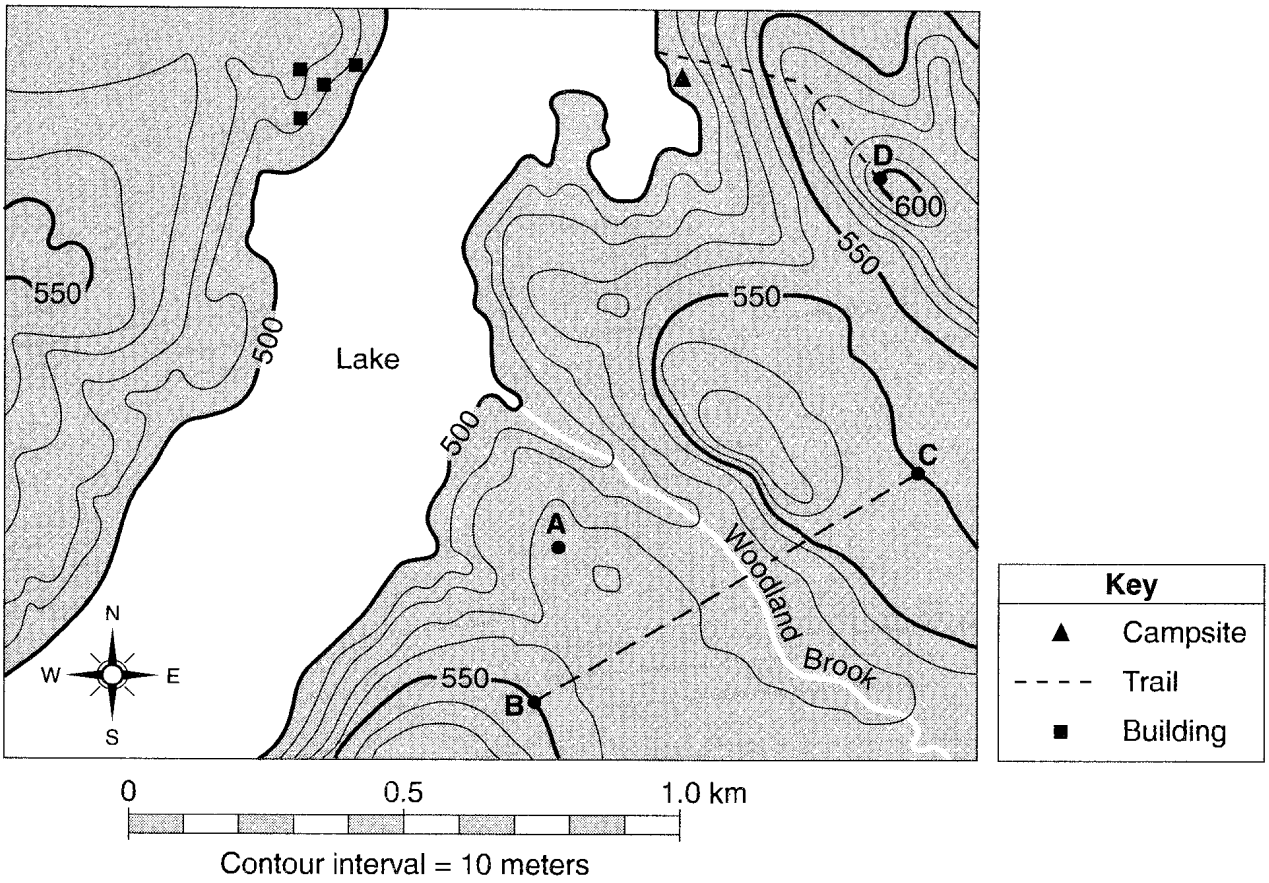
C) remain the same

21. Assume cube *B* was broken into many irregularly shaped pieces. Compared to the density of the entire cube, the density of one of the pieces would be

A) less B) greater

C) the same

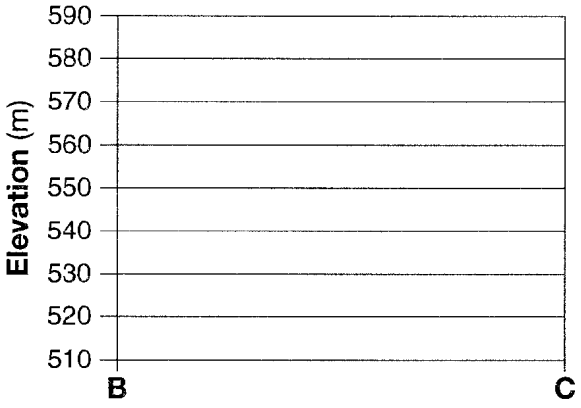
Base your answers to questions **22** through **24** on your knowledge of Earth science. The map shows an area of New York State that includes"a ,campsite, trail, and buildings near a lake. Points *A, B, C*, and *D* represent locations on the map.



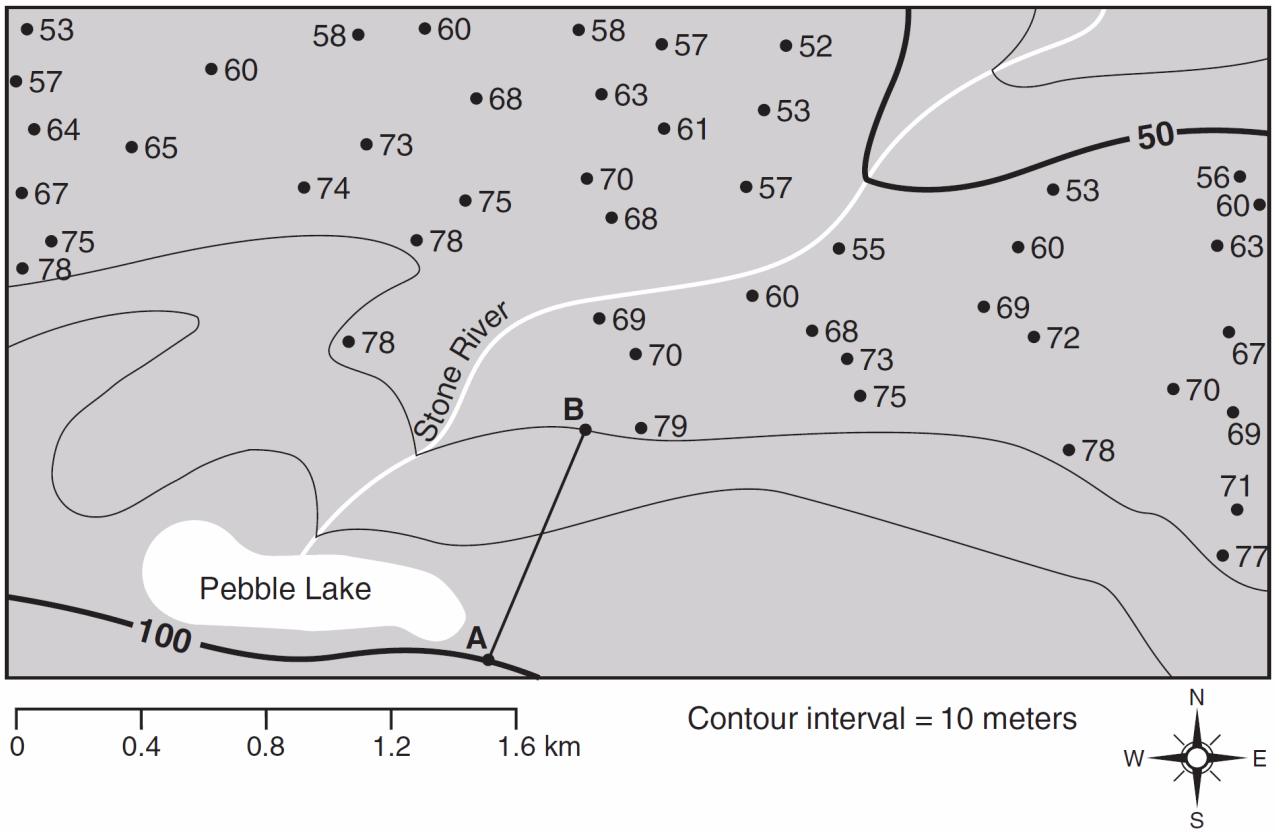
22. Campers hiked along the trail from the shoreline of the lake to point *D* to view the landscape. Determine the average gradient, in meters per kilometer, of the route they took on their hike.

23. Circle the phrase that indicates the direction of flow of Woodland Brook. Describe the contour-line evidence that supports your answer.

24. On the grid, construct a topographic profile along line *BC. Plot the elevation of each contour line that crosses line BC. Connect all seven plots with a line to complete the profile.*



Base your answers to questions **25** and **26** on the topographic map below and on your knowledge of Earth science. Some contour lines have been drawn. Line *AB* is a reference line on the map.



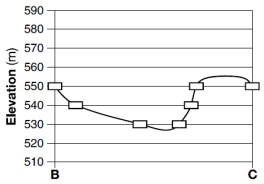
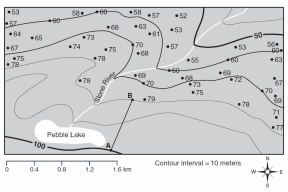
25. Calculate the gradient along the reference line from *A* to *B*, in meters per kilometer.

26. On the map, draw the 60-meter and 70-meter contour lines. The contour lines should extend to the edges of the map.

- 2.DESCRIBING THE EARTH (23)
  - 2.B.Positions on Earth (18)
    - 2.B.ii.Position Description (18)
      - 2.B.ii.a.Field Quantities (2)
      - 2.B.ii.b.Topographical Maps/Gradient (16)
  - 2.C.Constructed Response II (5)
- 1.PROLOGUE (3)
  - 1.B.Simple Measurements (3)
    - 1.B.ii.Density (3)
      - 1.B.ii.a.Qualitative Answers (3)

#	QID#	Ans	Thinking Skills	Standards
1	5579	A		2.B.ii.a.
2	1669	A		2.B.ii.a.
3	40469	B		2.B.ii.b.
4	38017	B	Organizing	2.B.ii.b.
5	7116	B		2.B.ii.b.
6	6853	C	Applying	2.B.ii.b.
7	6761	C	Applying	2.B.ii.b.
8	6698	B		2.B.ii.b.
9	5675	C		2.B.ii.b.
10	5674	C		2.B.ii.b.
11	5673	B		2.B.ii.b.
12	5029	D		2.B.ii.b.
13	4805	D		2.B.ii.b.
14	3297	D		2.B.ii.b.
15	3296	C		2.B.ii.b.
16	3295	C		2.B.ii.b.
17	3294	D		2.B.ii.b.
18	3293	C		2.B.ii.b.
19	4646	A		1.B.ii.a.
20	4345	A		1.B.ii.a.
21	4344	C		1.B.ii.a.
22	7746	n/a		2.C.
23	7745	n/a		2.C.
24	7744	n/a		2.C.
25	7655	n/a		2.C.
26	7653	n/a		2.C.

Answer Key
Map Making

1. **A**
2. **A**
3. **B**
4. **B**
5. **B**
6. **C**
7. **C**
8. **B**
9. **C**
10. **C**
11. **B**
12. **D**
13. **D**
14. **D**
15. **C**
16. **C**
17. **D**
18. **C**
19. **A**
20. **A**
21. **C**
22. – 185 m/km - 215 m/km
23. – The contour lines bend away from the lake where they cross the stream.
    - The lones do not go straight across, but curve to the southeast when they cross Woodland Brook.
    - The contour lines that cross Woodland Brook show the lowest elevation where the brook enters the lake.
    - law of the Vs/Contour lines make a V shape that points uphill where they cross a stream.
    - A river flows from a higher elevation to a lower elevation.
24. 

25. any value from 22 m/km to 29 m/km
26.