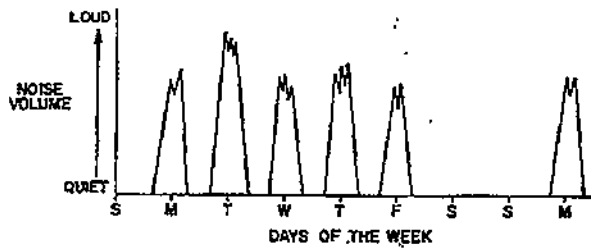1. The graph below shows the amount of noise pollution caused by factory machinery during a one-week period.

Which inference is best supported by the graph?

D

A) The machinery ran 24 hours a day.
B) The level of pollution remained constant during working hours.
C) The noise volume reached a peak on Friday.
D) The machinery was turned off on Saturday and Sunday.

2. The mineral shown below is of uniform composition and has a density of 4 grams per cubic centimeter. What is the mass of this mineral?

A
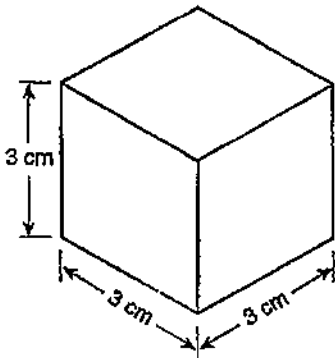
A) 108 g   C) 54 g
B) 9 g   D) 12 g

$$d = \frac{m}{V}$$

$$\frac{4}{1} = \frac{m}{27}$$

$$m = 108g$$

3. Which object best represents a true scale model of the shape of the Earth?

C

A) a pear   C) a Ping-Pong ball
B) a football   D) an egg

Version A

4. Base your answer to the following question on the *Earth Science Reference Tables*, the diagrams below, and your knowledge of Earth science. The diagrams represent five substances, A through E, at the same temperature. Some mass, volume, and density values are indicated for each substance. Substance C is a liquid in a graduated cylinder. [Note that 1 cubic centimeter = 1 milliliter. Objects are not drawn to scale.]
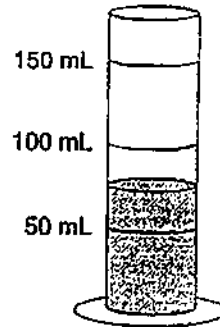
Mass = 8.0 g
Volume = 2.0 cm³
Density = 4.0 g/cm³
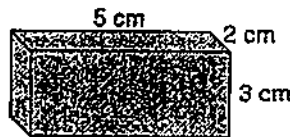
A

Mass = 9.0 g ·
Volume = 5.0 cm³
Density = ? g/cm³

B

150 mL

100 mL

50 mL

Mass of liquid = ? g
Volume of liquid = ? mL
Density of liquid = 1.2 g/mL
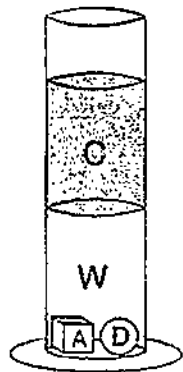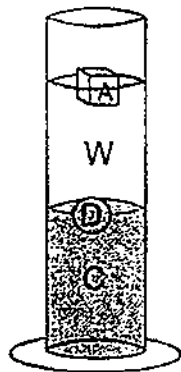
C

Mass = 0.8 g
Volume = ? cm³
Density = 0.4 g/cm³

D

5 cm
2 cm
3 cm

Mass = 54.0 g
Volume = ? cm³
Density = ? g/cm³
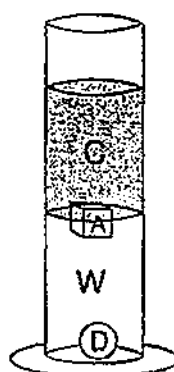
E

1.0

1.2   4.0   0.4

0.4 D
1.0 W
1.2 C
4.0 A

Water (W) was added to the graduated cylinder containing liquid C. Objects A and D were then dropped into the cylinder. Which diagram most accurately shows the resulting arrangement of these substances?
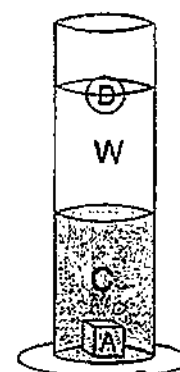
C
W
A D

A)

A
W
D
C

B)

C
A
W
D

C)

D
W
C
A

D)

5. The Earth's actual shape is most correctly described as

A) an oblate sphere
B) a perfect sphere
C) an eccentric ellipse
D) a circle

A

6. A gravity meter is used to measure the amount of gravitational pull at the Earth's North Pole and at the Earth's Equator. How would these readings of gravitational pull compare? [Assume both readings are taken at sea level.]

A) The readings would be the same at the North Pole and at the Equator.
B) The reading would be higher at the North Pole than at the Equator.
C) The reading would be lower at the North Pole than at the Equator.

B

N. Pole is closer to the Earth's center since Earth is flattened at poles

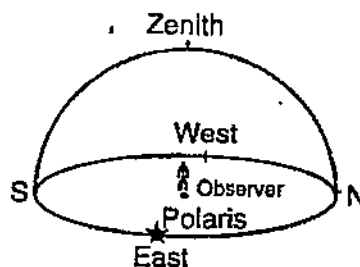**7.** The diagram below shows a student in New York State observing *Polaris*.

Polaris ★

Zenith ↑

48°

42°

Horizon ←
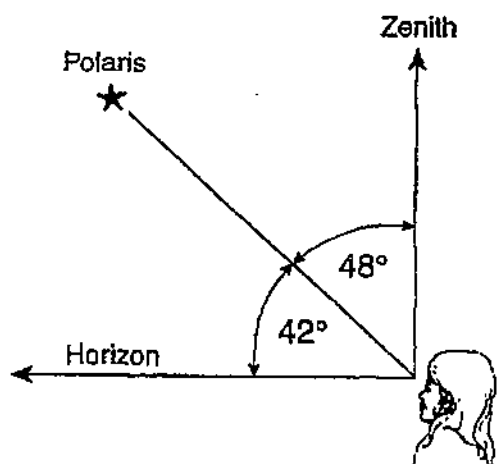
The student is located nearest to which city in New York State?

A) Albany   C) Kingston
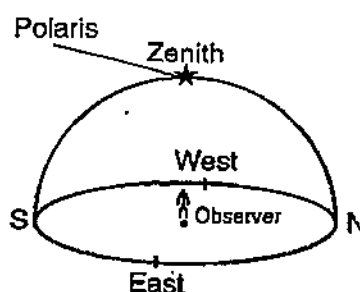B) New York City   D) Plattsburgh

C

8. Which diagram best represents the location of *Polaris* for an observer located at the Equator?

A)

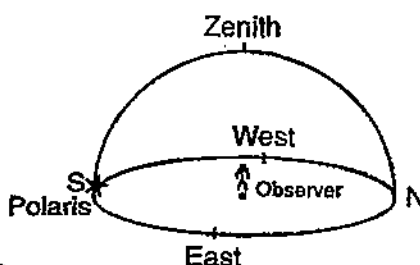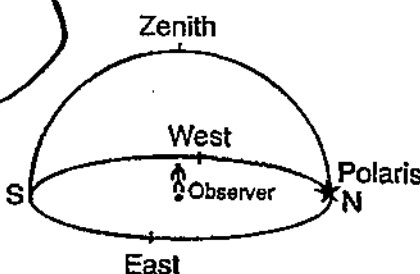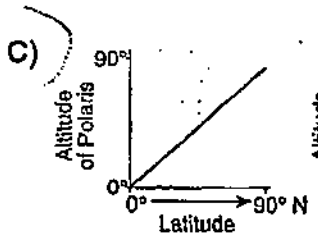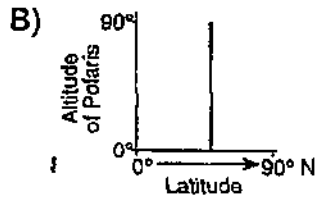Zenith
West
S · Observer · N
Polaris
East

B) Polaris

Zenith ★
West
S · Observer · N
East

C)

Zenith
West
S ★ · Observer · N
Polaris
East

D)

Zenith
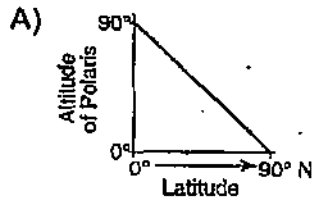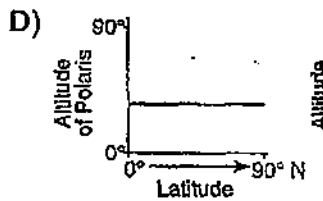West
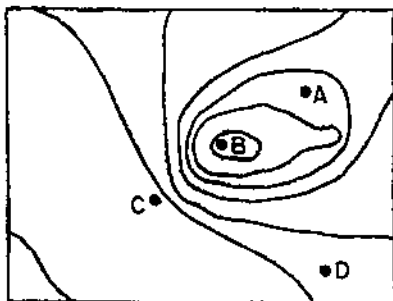S · Observer · N
Polaris ★
East

9. Which graph best represents the altitude
   of *Polaris* observed at northern latitude
   positions on the Earth's surface?

A)

B)

C)

C

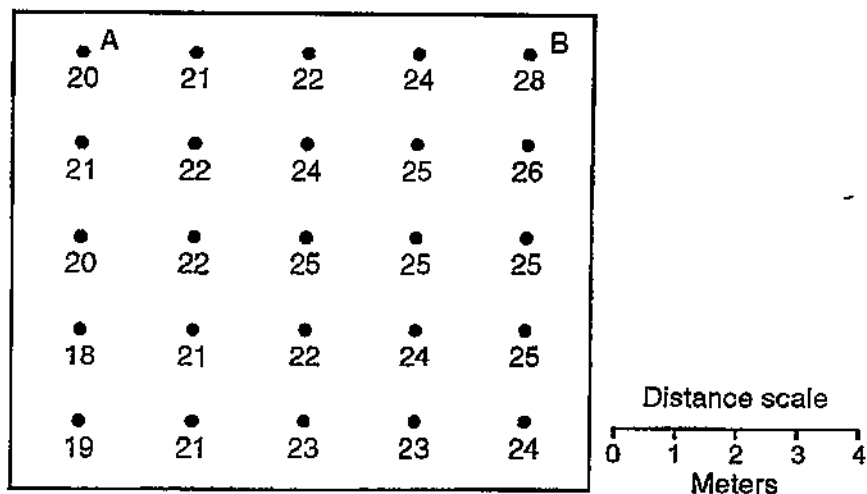Altitude = Latitude!

D)

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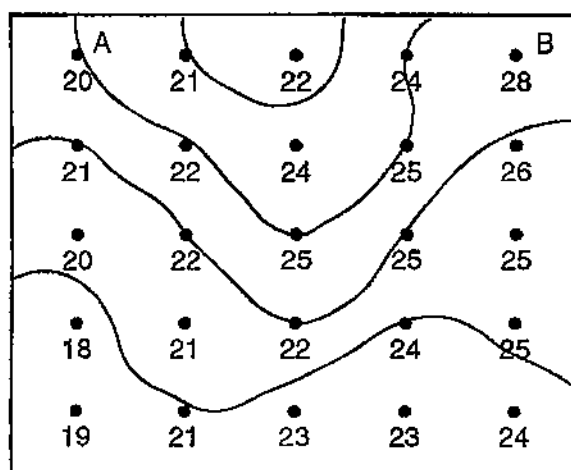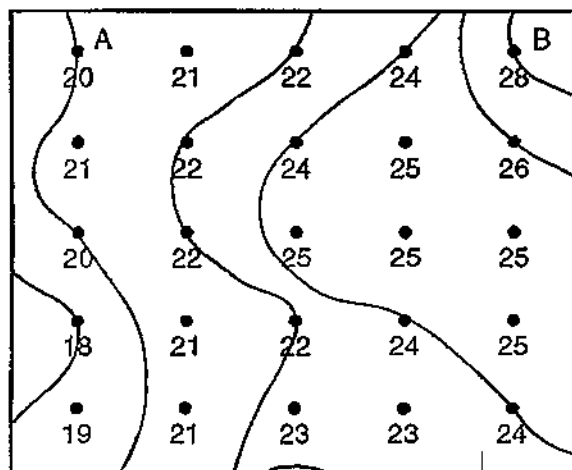   Between which two points is the slope of
    the hill steepest?

B

A) *A* and *B*   C) *C* and *D*
B) *B* and *C*   D) *A* and *D*

11. 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.

•A 20	• 21	• 22	• 24	•B 28
• 21	• 22	• 24	• 25	• 26
• 20	• 22	• 25	• 25	• 25
• 18	• 21	• 22	• 24	• 25
• 19	• 21	• 23	• 23	• 24

Distance scale

0   1   2   3   4
Meters

Which temperature field map shows correctly drawn isotherms?

A)

C)

B)

D)
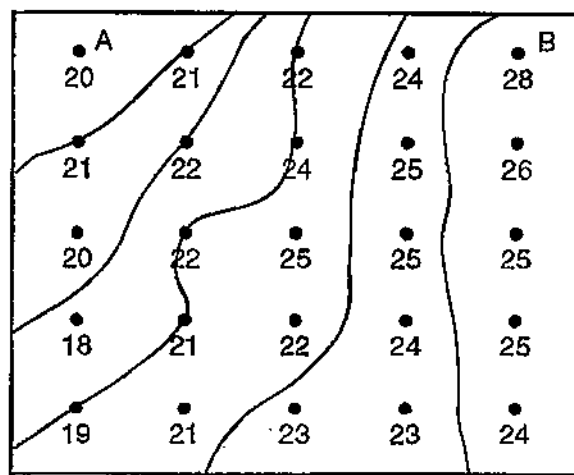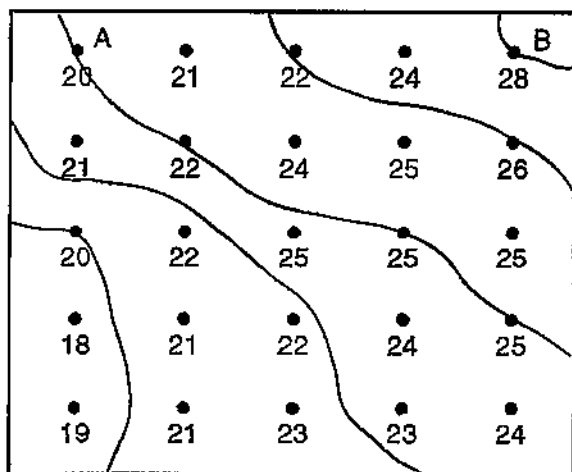
12. The diagram below is a three-dimensional model of a landscape region.
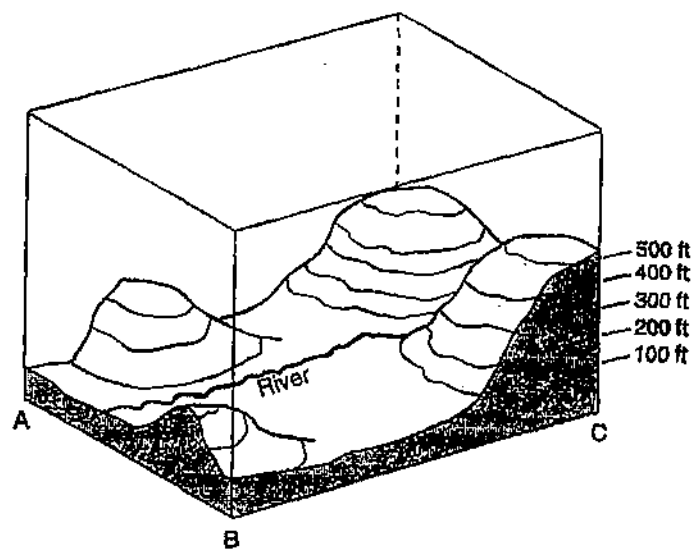
Which map view best represents the topography of this region?

A)

C)

B)
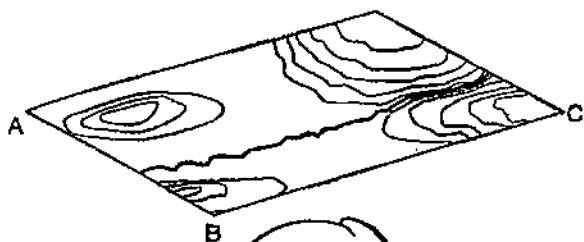
D)

13. The diagram below represents contour lines on a topographic map with cross-section line *AB*.

Gentler side   Steep side
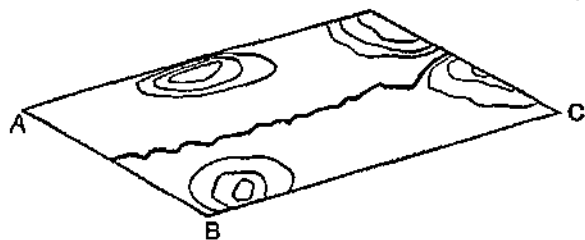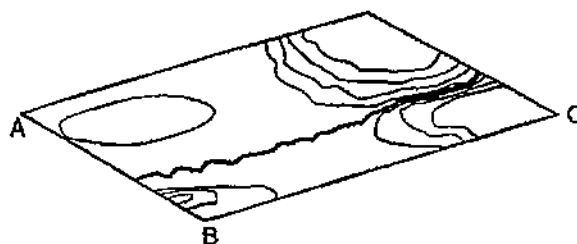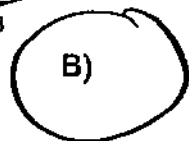A ——————————————— B
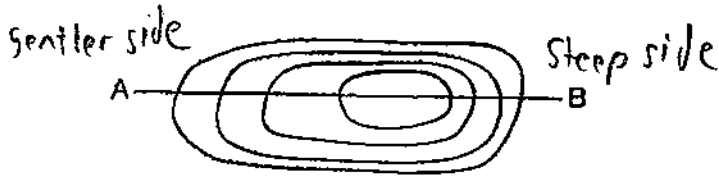
Which diagram best represents the topographic profile along line *AB*?

A)
A ——————————— B

B)
A ——————————— B

C)
A ——————————— B

D)
A ——————————— B
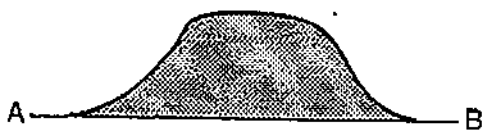
14. The diagram below represents the direction of Earth's rotation as it appears from above the North Pole. Point *X* is a location on Earth's surface.

Point X

North Pole

Sun's rays

Direction of rotation

The time at point *X* is closest to

A) 12 noon   C) 6 p.m.
B) 12 midnight   D) 6 a.m.

C

$30° = 2$ hours
west is less

International
Dateline

10am 12pm 2pm

| 90° | 120° | 150° | 180° | 150° | 120° | 90° | 60° | 30° | 0° | 30° | 60° |

Asia

North America

Pacific Ocean

South America

Africa

Australia

Atlantic Ocean

Indian Ocean

Europe

| 90° | 120° | 150° | 180° | 150° | 120° | 90° | 60° | 30° | 0° | 30° | 60° |

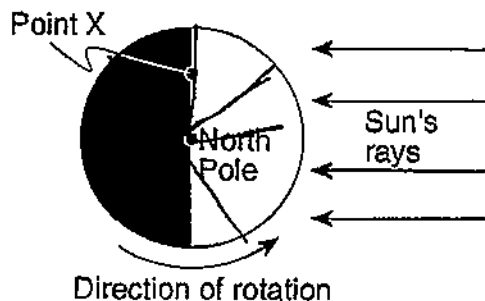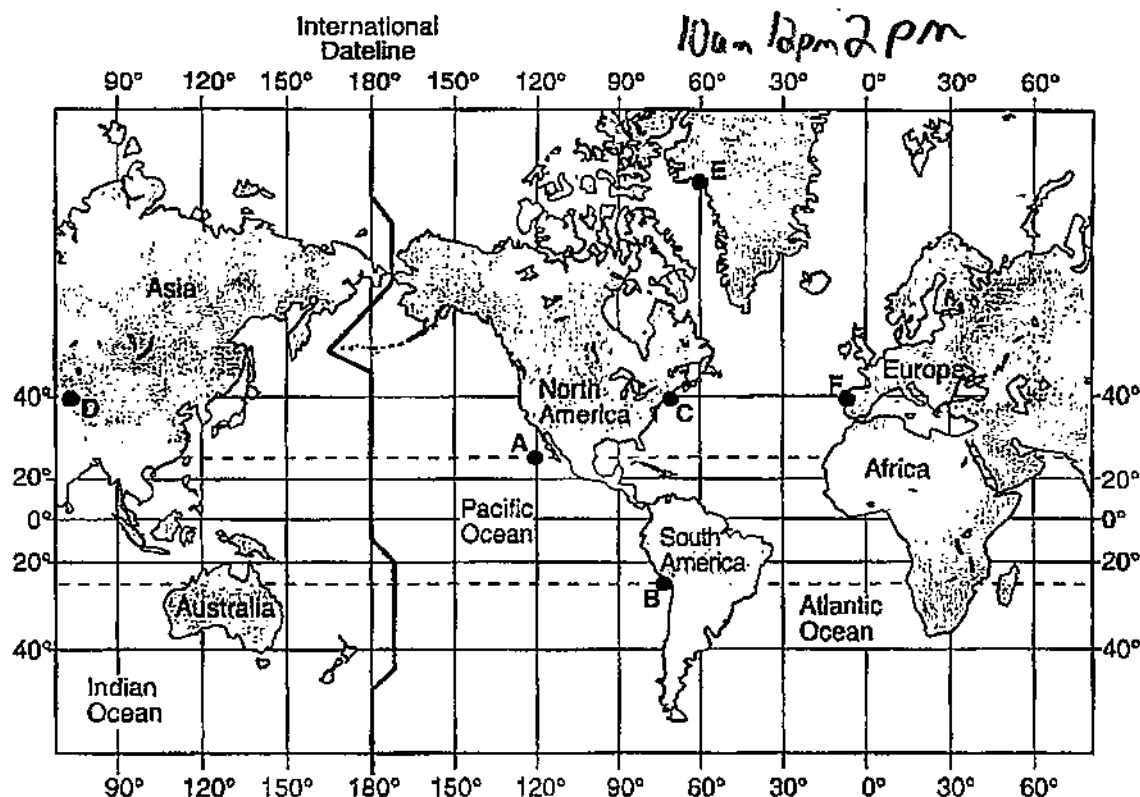15. Solar time is based on the position of the Sun. If the solar time at the Prime Meridian is 2 p.m., at which location is the solar time is 10 a.m.?

A) *A*   B) *B*   C) *C*   D) *E*

16. An observer at location *C* sees a full Moon at its highest point in the sky. When the observation is being made at location *C*, at which other location would it be impossible for a second observer also to see the full Moon?

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

_____

Version A

Base your answers to questions 17 through 20 on the contour map of an island below. Points *A* through *G* represent locations on the island. Elevations are in meters.
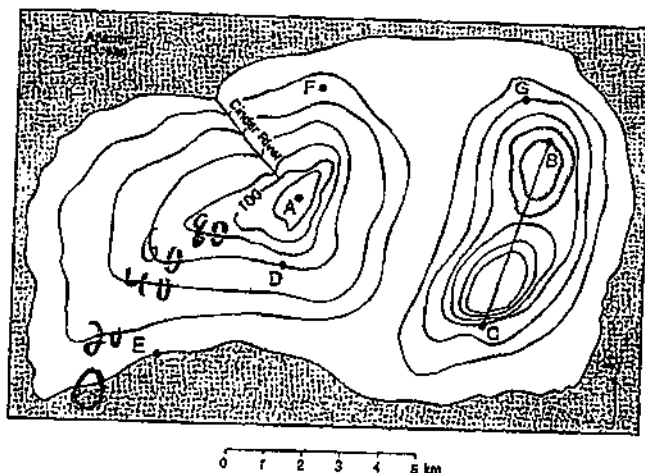
17. Which point is located on the steepest slope?
    A) *F*
    B) *B*
    C) *C*
    D) *D*

C

18. In which direction does the Cinder River flow?
    A) northwest
    B) southeast
    C) southwest
    D) northeast

A

19. What is the contour interval for this map?
    A) 25 m
    B) 20 m
    C) 10 m
    D) 15 m

B

Ocean is 0!

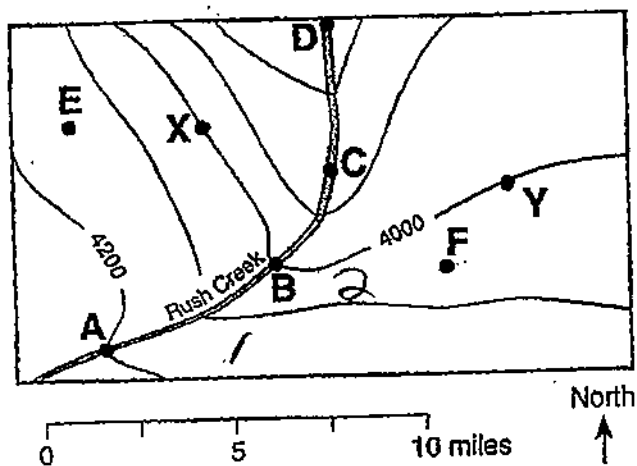20. Which two points have the same elevation?
    A) *G* and *F*
    B) *B* and *D*
    C) *C* and *D*
    D) *G* and *C*

both 60m

C

ase your answers to questions **21 through 23**
n the topographic map below. Points *A, B, C,*
‚ *E, F, X,* and *Y* are locations on the map.
levation is measured in feet.

21. What is the contour interval used on this map?

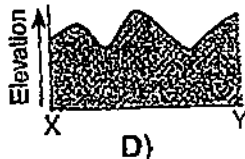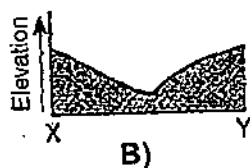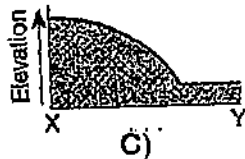 A A) 100 ft   C) 50 ft
    B) 20 ft   D) 200 ft
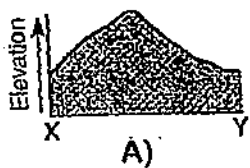
$$\frac{200\ Ft}{2\ zones} = \frac{100\ Ft}{zone}$$

22. The gradient between points *A* and *B* is closest to

 B A) 200 ft/mi   C) 80 ft/mi
    B) 40 ft/mi   D) 20 ft/mi

$$\frac{200ft}{5\ mi} = \frac{40\ ft}{mi}$$

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

 B

Version A

26. On the grid below, construct a topographic profile of the land surface along line AB by plotting an X for the elevation of each contour line that crosses line AB. Connect the X's with a smooth, curved line to complete the topographic profile.

27. Toward which compass direction is Snapper Creek flowing?
    Southeast or South

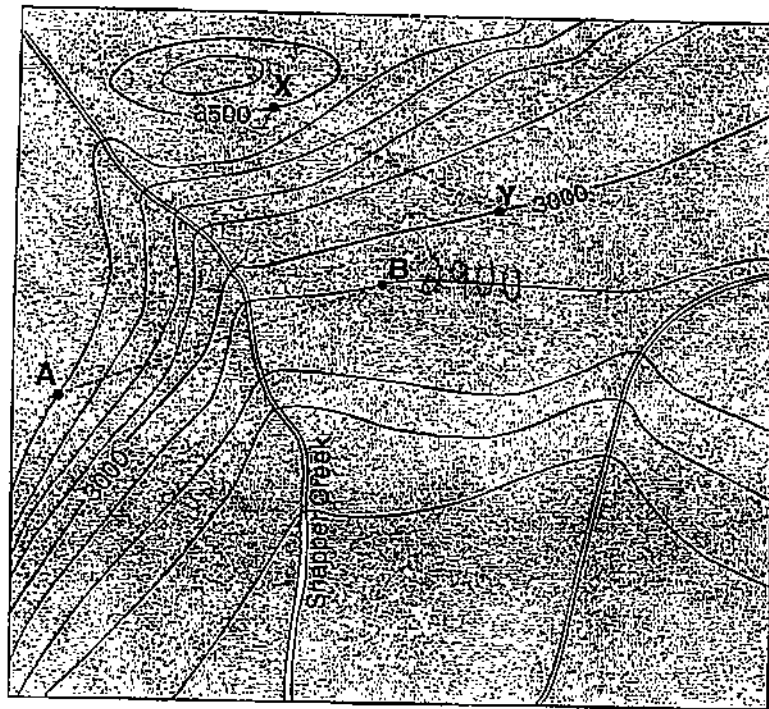28. Calculate the gradient between points X and Y. Correct units must be included in your answer.

Formula for Gradient	Gradient = $\dfrac{\text{Change in value}}{\text{Change in distance}}$
Plug in your data	$\dfrac{500 \text{ ft}}{1.6 \text{ mi}}$ $G = \dfrac{500 \text{ ft}}{1.6 \text{ mi}}$
Solve with correct units	$G = 294.1 \dfrac{ft}{mi}$

312.5 ft/mile is correct! 294.1 is an error. Sorry!

Profile from A to B

Elevation (feet): 3600, 3500, 3400, 3300, 3200, 3100, 3000, 2900, 2800, 2700

Distance (miles)

N ↑

0   1   2   3 miles   Contour interval = 100 feet