Earth's Dimensions

Earth's shape

Evidence

Spheres of Earth:

1) Lithosphere-

includes:

2) Hydrosphere –

includes:

3) Atmosphere -

Selected Properties of Earth's Atmosphere: **Earth Science Reference Table page 14**

Name the boundary that separates each of the following:

(a) the troposphere and the stratosphere _____

(a) the stratosphere and the mesosphere _____

(b) the mesosphere and the thermosphere _____

Layer	Highest Altitude		Temperature Range (°C)	
	Miles	Kilometers		
Troposphere			From	to
Stratosphere			From	to
Mesosphere			From	to
Thermosphere			From	to

1. Which layer of the atmosphere is most of the water vapor is located. _____

2. Name the layer, closest to Earth's surface, where the temperature increases as you increase altitude _____

3. What happens to atmospheric pressure as you increase altitude. _____

4. What is the atmospheric pressure at sea level _____ atm

5. What is the temperature at the Tropopause? _____

6. At what boundary is the coldest temperatures found? _____

7. Name the boundary where the atmospheric pressure is approximately 10^{-3} atms.

_____

8. In which layers of the atmosphere can the temperature be 15 ºC? _____

_____

9. What is the highest concentration of water vapor? _____ g/m^3

10. In what layer is the highest concentration of water vapor found? _____

Average Chemical Composition of Earth's Curst, Hydrosphere, and Troposphere
Earth Science Reference Table Practice front page

1. _____ is the most abundant element in Earth's hydrosphere.
2. The chemical symbol for Calcium is _____
3. In Earth's crust, what is the percentage of magnesium by volume? _____ %
4. Name the two ways in which information regarding the Crust has been categorized. _____ and _____
5. Name the element that can be found in the crust, hydrosphere and troposphere.

   _____
6. What is the percentage of iron in the Earth's Crust (by volume)? _____ %
7. What is the most abundant element in the Troposphere? _____
8. What is the percentage of Aluminum in the Earth's Crust (by mass) ? _____ %
9. Name the two most abundant elements in the Earth's Crust by mass (include %)
   a. _____ _____ % b. _____ _____ %
10. Name the two most abundant elements in the Earth's Crust by volume (include %)
    a. _____ _____ % b. _____ _____ %
11. What are the two elements that compose the hydrosphere? (include %)
    a. _____ _____ % b. _____ _____ %
12. List the following in order from least to most dense.

    Hydrosphere *Atmosphere* *Lithosphere*

    Least dense _____

    _____

    Most dense _____
13. What is the percentage of calcium in the Earth's Crust (by mass)? _____ %
14. When comparing percent by mass and percent by volume in the Earth's crust, which element has a lower percentage by mass? _____
15. Name the only element found in the crust that is a higher percent by volume then percent by mass. _____

16. What is the percentage by mass that aluminum, iron and calcium combined make up? _____ %

17. Which two elements listed on the chart are not found in Earth's crust? _____ and _____

18. What percentage of Earth's crust by mass is made of silicon and oxygen combined? _____ %

19. What percentage of Earth's crust by volume is made of silicon and oxygen combined? _____ %

True or False?

20. _____ There is a greater volume of calcium in Earth's crust than there is sodium by mass.

21. _____ In the hydrosphere, hydrogen is the most abundant element by volume.

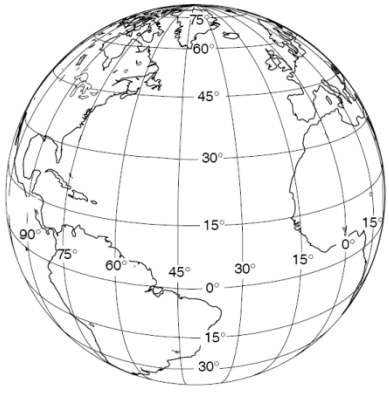
22. _____ In Earth's troposphere, most of the air we breathe is made up of oxygen.

23. _____ There is more silicon in the crust by mass than oxygen by volume

24. _____ Potassium is the only element found in Earth's crust.

25. _____ In Earth's crust (by mass) there is more magnesium than sodium.

Locating Positions on Earth



Coordinate system - _____

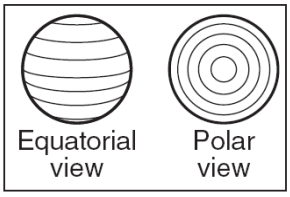
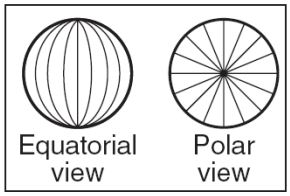
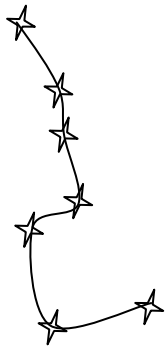
_____

_____

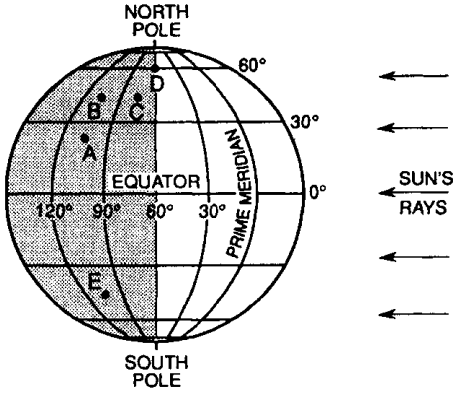
_____

_____

The coordinate system used on Earth is _____ and _____

Latitude		Longitude
	Where is 0˚	
	Lines are called	
	Lines run	
	Appearance	
	Lines measure degrees	
	Highest degree	
 	Miscellaneous	

Base your answers to questions **1** through **3** on the diagram of the Earth below. Some of the latitude and longitude lines have been labeled. Points A through E represent locations on the Earth's surface



1. What are the approximate latitude and longitude of location A?
   (1) 105 °N, 25 °W (3) 25 °N, 105 °E
   (2) 25 °N, 105 °W (4) 105 °S, 25 °E

2. What do locations A, B, and E have in common?
   (1) They are the same latitude.
   (2) They are in the same season.
   (3) They have the same local time.
   (4) They have the same prevailing wind direction

3. The latitude and longitude of which location are closest to those of New York State?
   (1) A (2) B (3) C (4) D

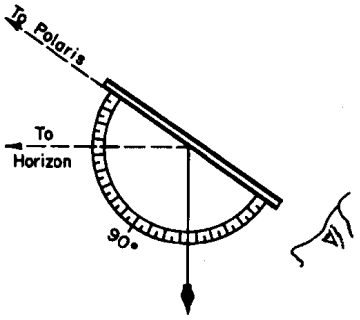
4. As a person travels due west across New York State, the altitude of Polaris will
   (1) decrease (3) remain the same
   (2) increase

5. At what latitude would an observer on the Earth find the altitude of Polaris to be 37 °?
   (1) 37° South (3) 37° North
   (2) 53° North (4) 90° North

6. A person knows the solar time on the Prime Meridian and the local solar time. What determination can be made?
   (1) the date
   (2) the altitude of Polaris
   (3) the longitude at which the person is located
   (4) the latitude at which the person is located

7. What could be the approximate location of an observer if he measured the altitude of Polaris to be 41 degrees above the horizon?
   (1) Watertown (3) Buffalo
   (2) Massena (4) New York City

8. What is the latitude of the observer shown in the diagram below?



   (1) 35° N (3) 90° N
   (2) 55° N (4) 125° N

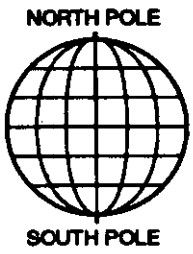
9. An observer on a moving ship notices that the altitude of Polaris increases each night. Local solar noon occurs at the same time each day. In what direction is the ship moving?
   (1) due east (3) due west
   (2) due south (4) due north

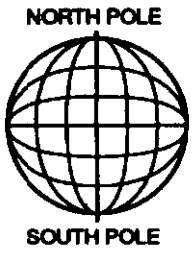
10. Which factor can be predicted most accurately from day to day?
    (1) chance of precipitation
    (2) direction of the wind
    (3) time of an earthquake occurring
    (4) altitude of the Sun at noon

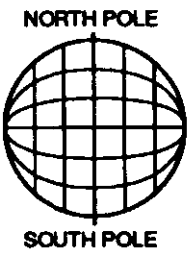
11. As a ship crosses the Prime Meridian, the altitude of Polaris is 65 °. What is the ship's location?
(1) 0° longitude, 65 ° South latitude
(2) 0° longitude, 65 ° North latitude
(3) 0° latitude, 65 ° West longitude
(4) 0° latitude, 65 ° East longitude

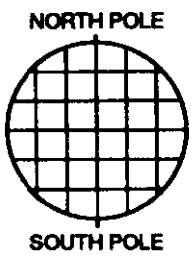
12. An observer on Earth measures the altitude of Polaris and finds it to be 0 degrees. This observer must be at the
(1) North Pole (3) Tropic of Cancer
(2) Arctic Circle (4) Equator

13. The diagrams below represent four systems of imaginary lines that could be used to locate positions on a planet. Which system is most similar to the latitude-longitude system used on the Earth?

(1)


(3)


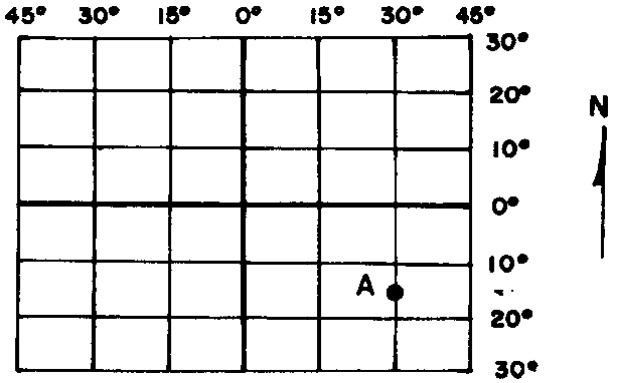
(2)


(4)


14. Which reference line passes through both the geographic North Pole and the geographic South Pole?
(1) 0° latitude (3) Tropic of Cancer
(2) 0° longitude (4) Tropic of Capricorn

15. Cities located on the same meridian (longitude) must have the same
(1) altitude (3) length of daylight
(2) latitude (4) solar time

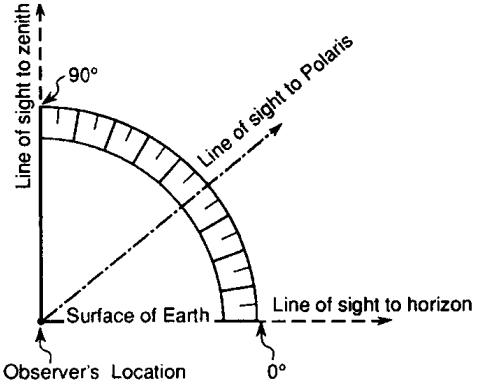
16. The diagram below represents a portion of a map of the Earth's grid system. What is the approximate latitude and longitude of point A?



(1) 15° N, 30° W (3) 15° N, 30° E
(2) 15° S, 30° W (4) 15° S, 30° E

17. 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.

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



What is the latitude of the observer?
(1) 10° N (3) 50° N
(2) 40° N (4) 90° N

Landscape Regions – Characteristics of the Earth's surface

Determined by the resistance of the bedrock & Movement of the Earth's Crust

Mountains

Valley

Plateau

Plains

List the New York State landscape regions that are found in the *Earth Science Reference Tables on page 2*

Plateau (highlands)	Plains (lowlands)
Mountains	

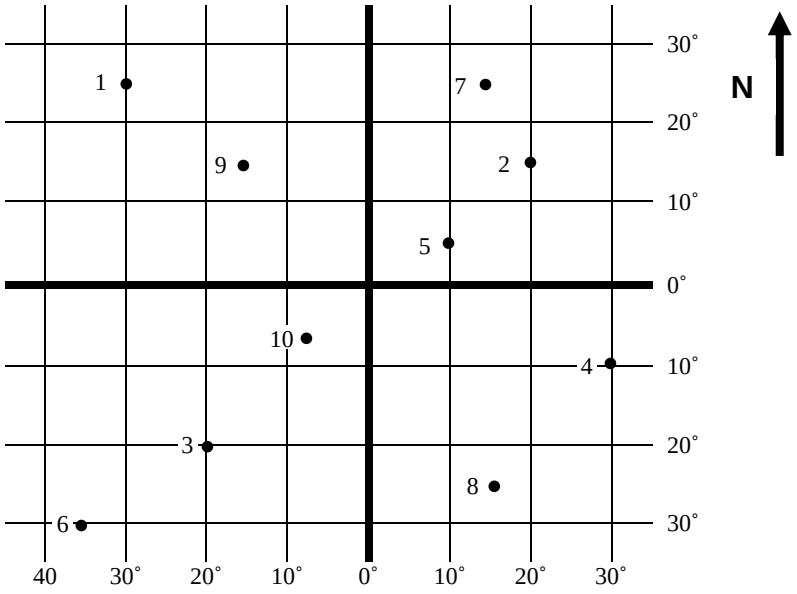
Practice: Map Reading

Using the Earth Science Reference Tables, page 2 & 3, determine the landscape region for each of the follow:

Location	Landscape Region	Location	Landscape Region
Albany		Niagara Falls	
Binghamton		Old Forge	
Buffalo		Oswego	
Elmira		Plattsburg	
Ithica		Riverhead	
Jamestown		Rochester	
Kingston		Slide Mountain	
Messena		Syracuse	
Mt. Marcy		Utica	
New York City		Watertown	
Connecticut		Pennsylvania	
Massachusetts		Vermont	
New Jersey		Long Island	

1. What is the elevation of Lake Erie? _____
2. What is the elevation of Lake Ontario? _____
3. How many rivers are shown on the map on page 3? _____
4. Find the map scale. What is the largest number listed for miles? _____
5. Find the map scale. What is the largest number listed for kilometers? _____
6. What is the straight line distance, in miles, from Buffalo to Elmira? _____ miles
7. What is the straight line distance, in km from Watertown to Syracuse? _____ km
8. What is the name of the town located on Long Island? _____

Positions Review:



Position	Latitude	Longitude
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

1. What is the latitude of the equator? _____ °
2. What is located at 0˚ latitude? _____
3. What is the highest degree North latitude? _____ ° ___
4. What is the highest degree South latitude? _____ ° ___
5. What is the highest degree longitude? _____ °
6. What is located at the highest degree longitude? _____
7. Which way do the lines of latitude run? _____
8. Which way do the lines of longitude run? _____
9. Name the city is at approximately 42º06' N. lat & 75º55' W. long? _____
10. What city does an observer measure the altitude of Polaris to be 41º? _____
11. Name two cities located at approximately the same latitude as Binghamton, NY.

    _____ and _____
12. Name the city that has the approximate same longitude of Ithaca, NY. _____
13. What can an observer determine if they know the altitude of Polaris? _____
14. What happens to the altitude of Polaris if an observer travels due North? _____
15. What happens to the altitude of Polaris if an observer travels due West? _____
16. What landscape region is located at 44ºN, and 75ºW? _____
17. What is located at 43º30'N and 78ºW? _____
18. Which general direction does the Niagara River flow? _____

Mapping Fields

Field - _____

_____

Isolines - _____

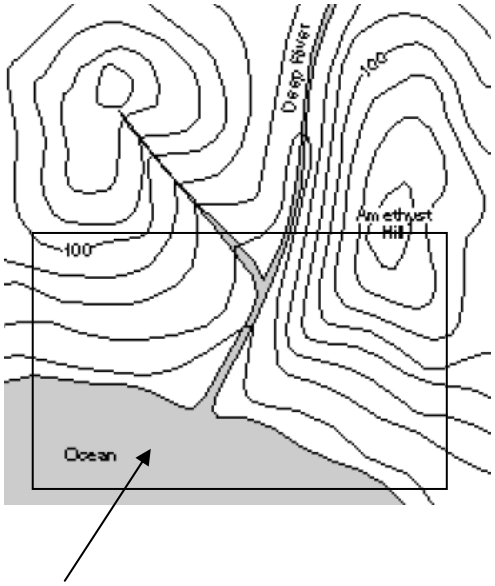
_____

Isotherms - _____

_____

Isobars - _____

_____



Maps _____

_____

_____

Contour lines - _____

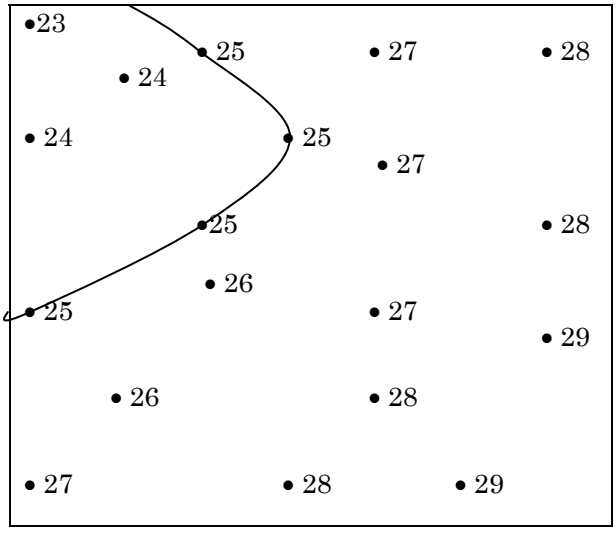
_____

Contour interval _____

_____

Drawing isolines:

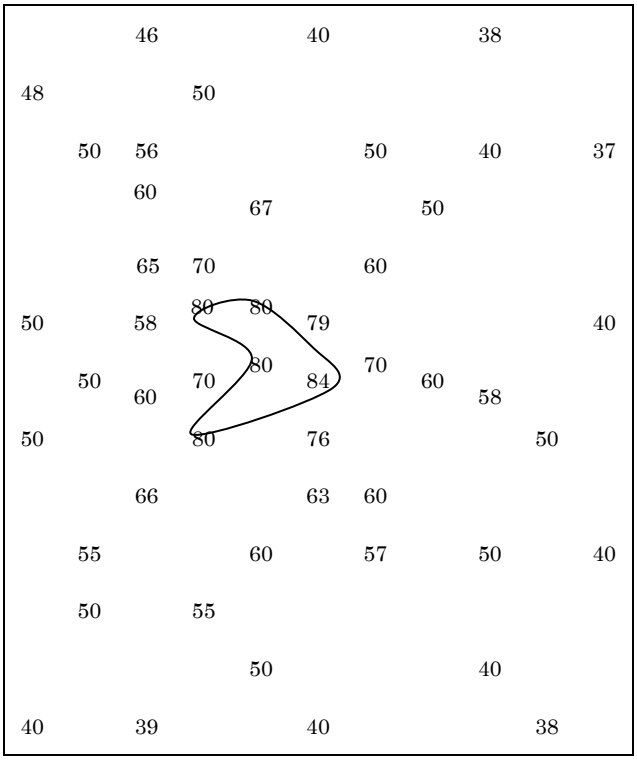
- Try to locate a pattern where numbers may be bunched together
- The 25 isoline has been drawn on the map to the right
- Follow a similar pattern for the line drawn
- When drawing the 26 isoline, make sure it falls between the 25 and 27 values
- Using a pencil, softly draw a line connecting equal values



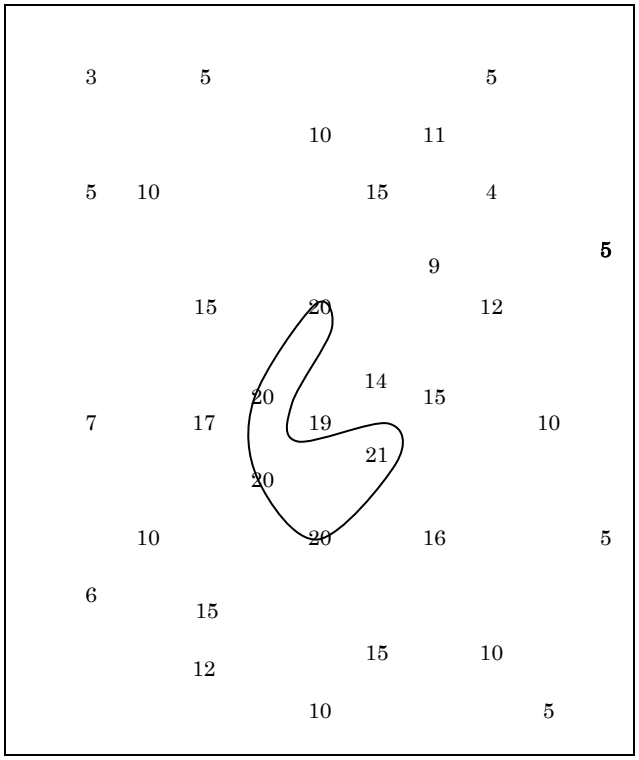
Use an interval of 5 for the following field

•57	•57	•60	•65	•65	• 65	•60	•58	•53	•50	•45	•40
•60	•65	•70	•70	•68	•65	•62	•57	•55	•50	•39	•37
•65	•70	•75	•75	•70	•65	•62	•60	•52	•45	•40	•36
•65	•75	•75	•70	•68	•66	•61	•58	•50	•44	•40	•36
•64	•70	•70	•69	•65	•62	•60	•55	•49	•43	•40	•34
•60	•63	•64	•60	•59	•56	•54	•50	•45	•42	•39	•35
•58	•56	•57	•56	•55	•53	•48	•46	•44	•41	•39	•30
•54	•54	•53	•51	•50	•47	•45	•43	•41	•40	•30	•29

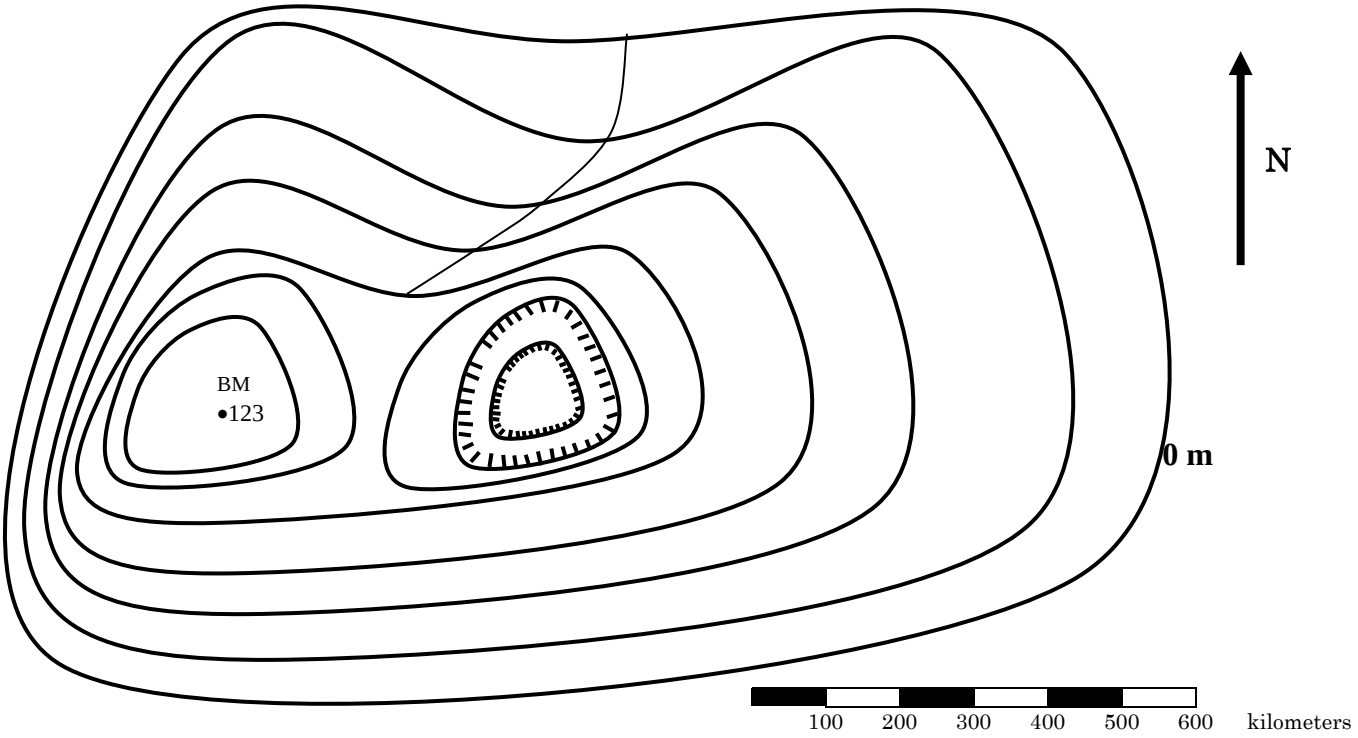
Contour interval = 10



Contour interval = 5

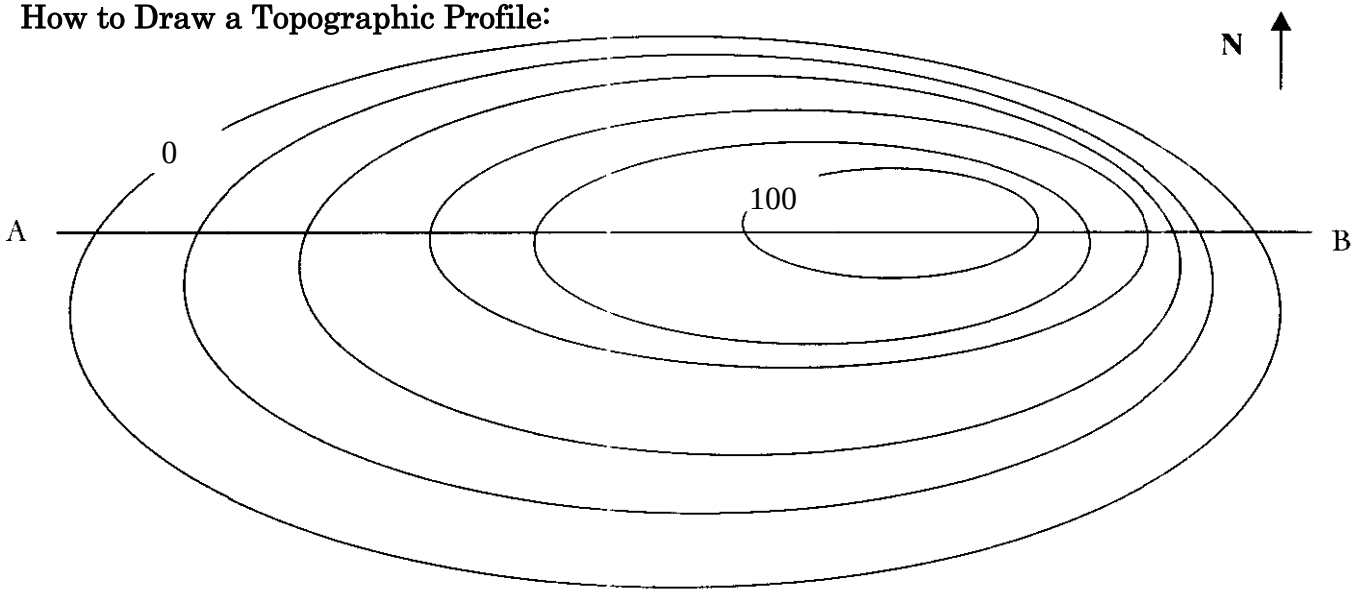


D. Topographic Maps:



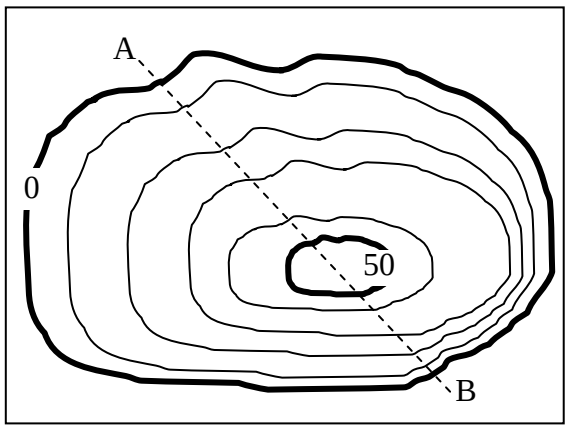
Map Scale
Contour interval
Direction of stream flow
Steepest section
Bench mark
Depressions
Islands
Highest elevation

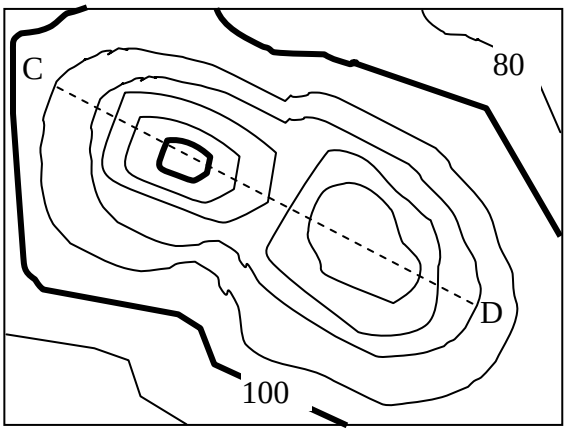
How to Draw a Topographic Profile:

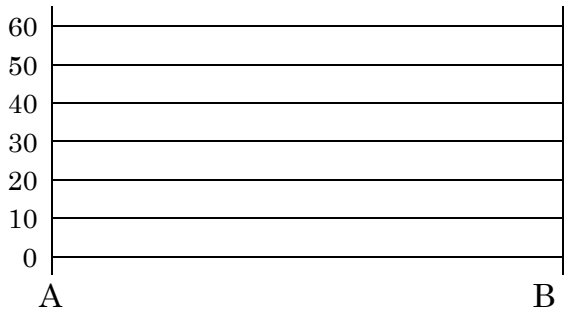


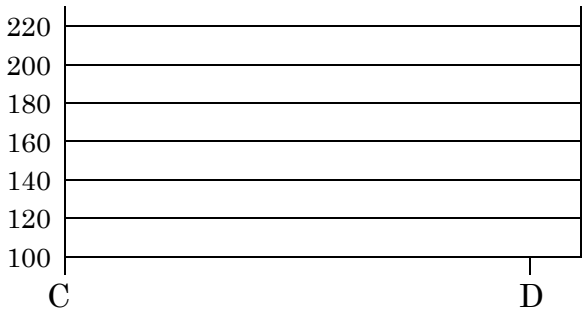
1
2
3
4
5
6

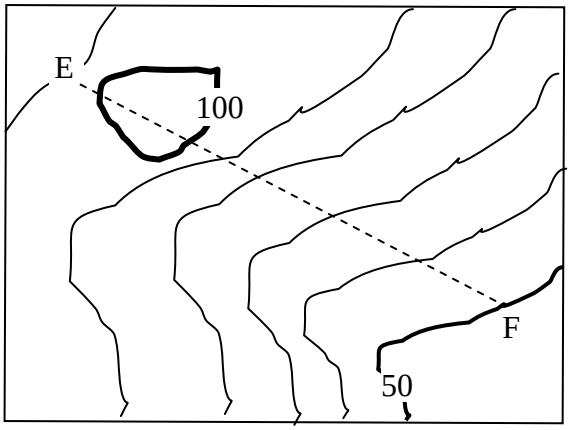
Draw Profiles for the following maps:

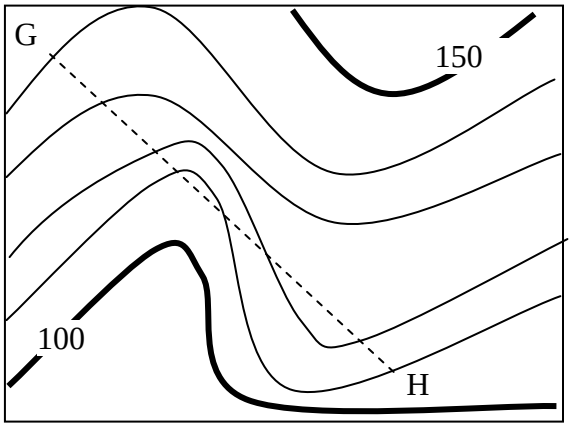




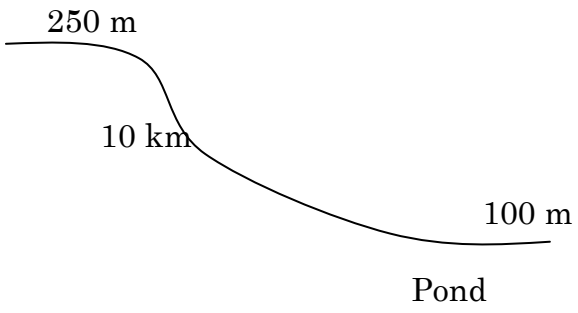








Gradient =



A stream begins at an elevation of 250 m and flows into a pond that is at an elevation of 100 m. The length of the stream is 10 km. What is the gradient?

Formula:

Substitute Numbers

Solution (with units)

A map shows two locations A and B. They are 15 kilometers apart. Location A has an elevation of 525 meters and location B has an elevation of 150 meters. What is the gradient between the two locations?

Formula:

Substitute Numbers

Solution (with units)

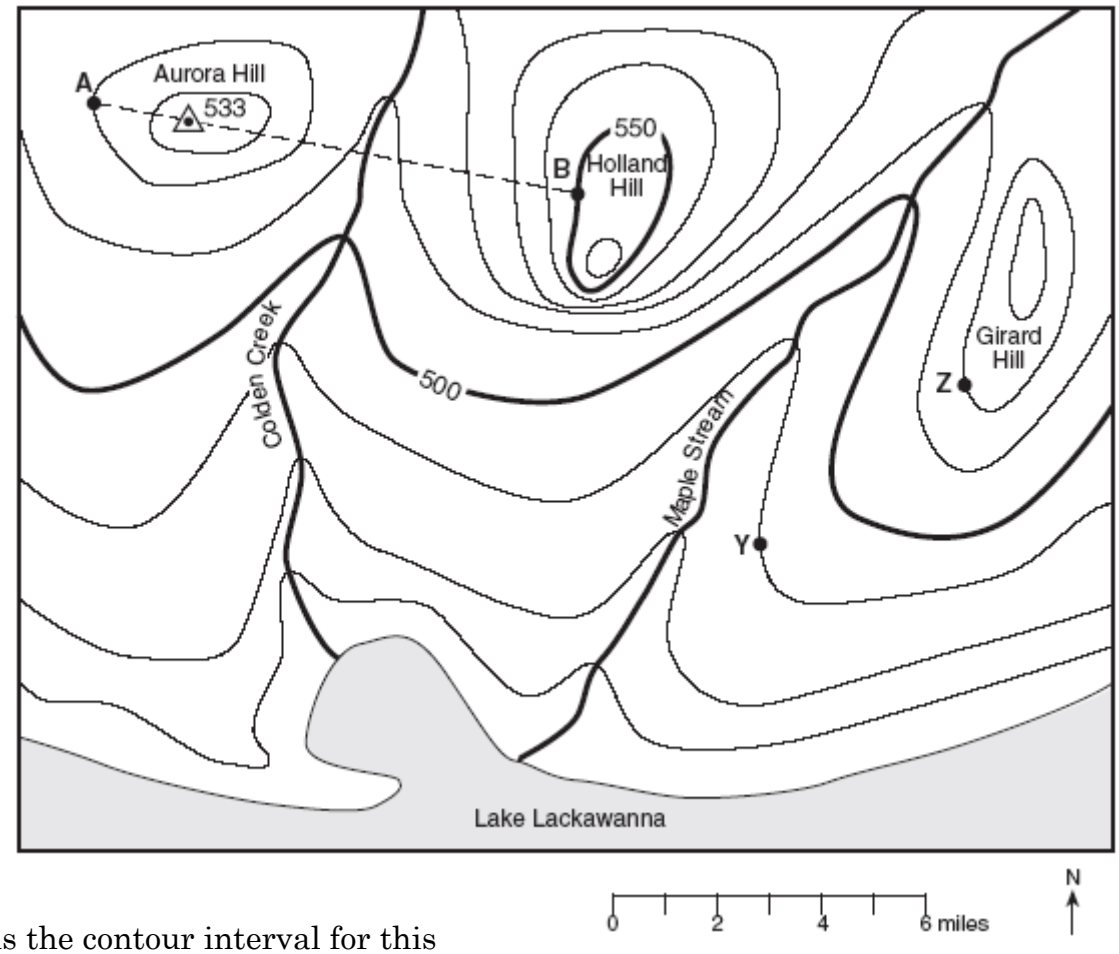
The difference in elevation between two locations is 800 meters. The distance between them is only .05 kilometers. What is the gradient between the two points?

Formula:

Substitute Numbers

Solution (with units)

Points *A, B, Y,* and *Z* are reference points on the topographic map. The symbol △533 represents the highest elevation on Aurora Hill.



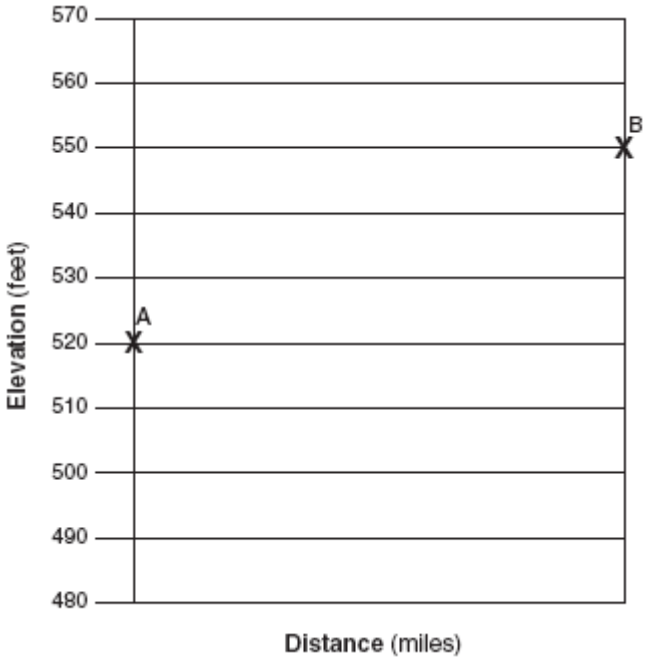
1. What is the contour interval for this map?

2. State the general compass direction in which Maple Stream is flowing.

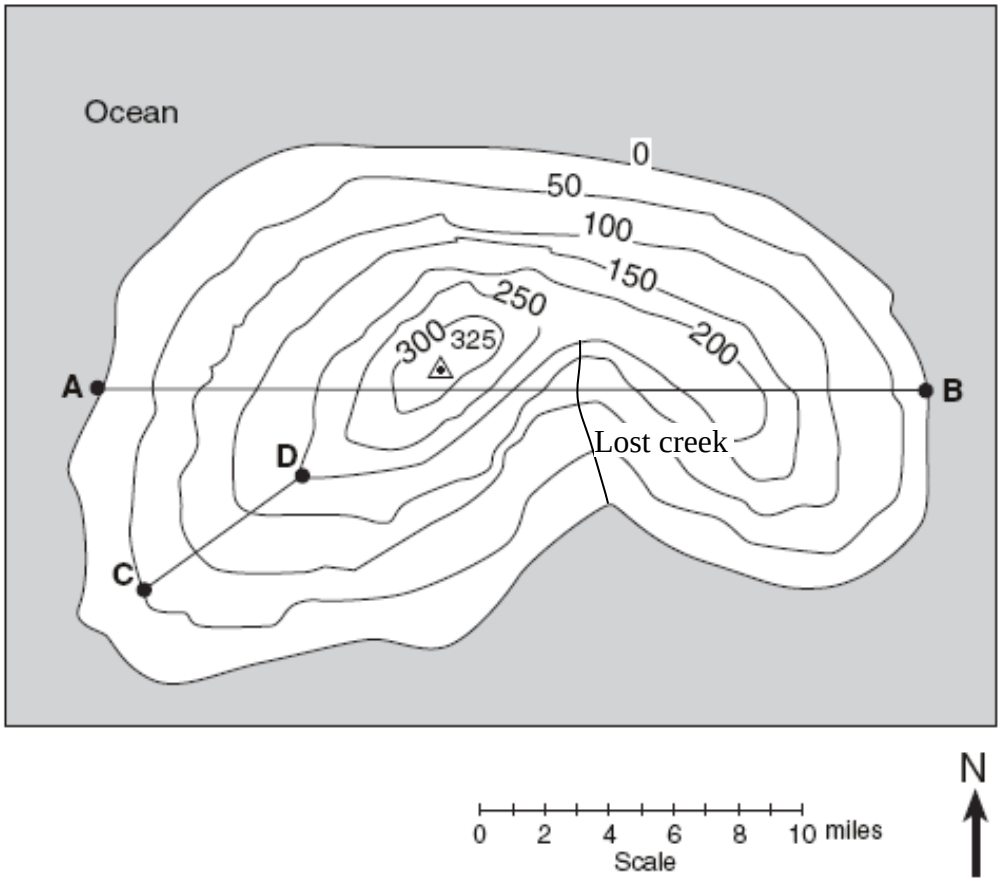
3. Calculate the gradient between points *Y* and *Z* on the map, and label the answer with the correct units.

4. Describe the evidence shown on the map that indicates that the southern side of Holland Hill has the steepest slope.

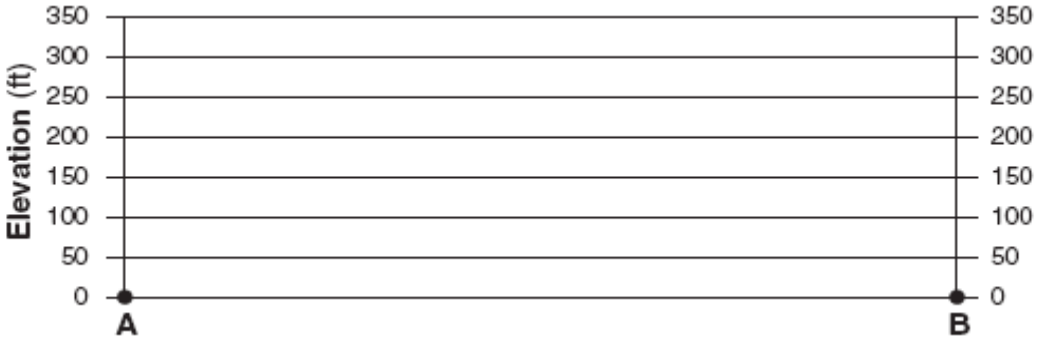
5. On the grid provided to the right, construct a topographic profile from point *A* to point *B.*



Below is a topographic map of an island. Elevations are expressed in feet. Points A, B, C, and D are locations on the island. A triangulation point shows the highest elevation on the island.

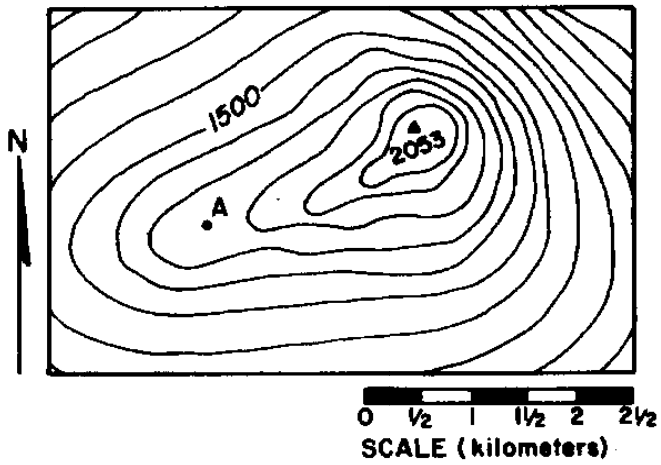


1. What is the contour interval of this map? _____
2. Toward which compass directions does Lost Creek flow? _____
3. Draw a profile of the island between points A and B.



4. What is the average gradient, in feet per mile, along the straight line from point *C* to point *D*?

Base your answers to questions 1 through 5 on the topographic map shown below. Elevations are in meters.



1. Which section of the map shows the steepest gradient?

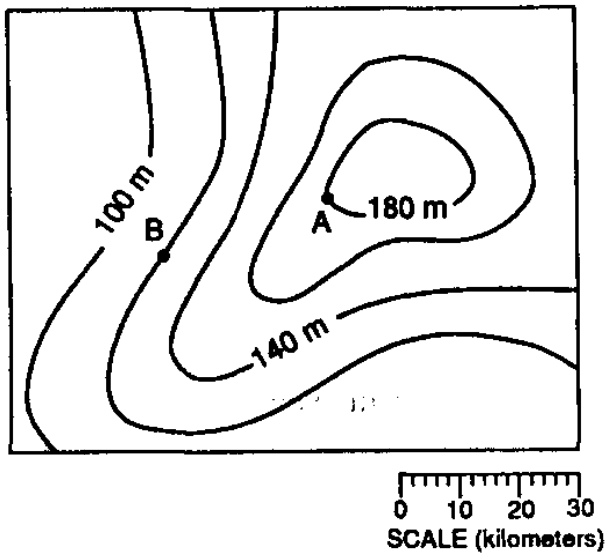
2. What is the contour interval?

3. What is the most likely elevation of point A?

4. What is the distance from point A to the 2053 elevation mark?

5. What is the gradient from point A to the 2053 elevation mark? (show work)

Base your answers to questions 6 through 10 on the topographic map shown below.



6. What is the contour interval?

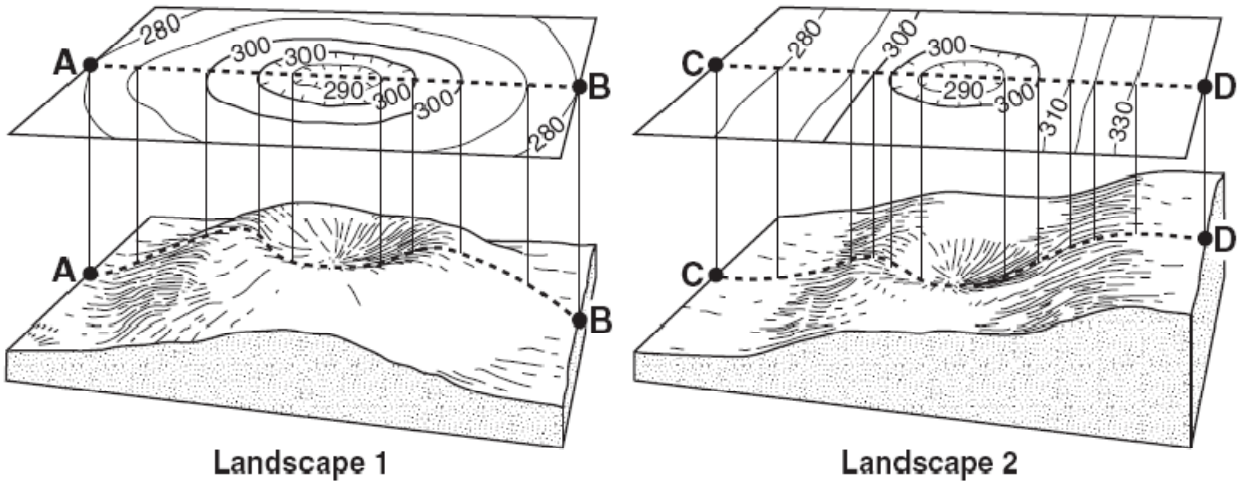
7. What is the elevation of the highest contour line?

8. What is the highest possible elevation on the map?

9. What is the distance between A and B?

10. What is the gradient between A and B? (show work)

Base your answers to questions 11 and 12 on the topographic maps and block diagrams of two landscape regions shown below. The block diagrams show a three-dimensional view of the topographic maps directly above them. Elevations are measured in feet. Points *A*, *B*, *C*, and *D* are locations on Earth's surface.



11. Which contour interval is used on both topographic maps?
(1) 10 ft (2) 20 ft (3) 30 ft (4) 40 ft

12. A stream begins to flow downhill from point *D* toward the depression. After a period of time, the depression fills with water. Overflowing water from the depression moves downhill toward point *C*. Which topographic map shows the most likely resulting change in the contour lines?