

TOPOGRAPHIC MAP SKILLS

Directions: Use what you have learned in your reading lesson to answer the questions below.

True or False: If the answer is false, correct it to make it true.

- T 1. A topographic map shows details of the Earth's surface.
- T 2. The contour interval remains constant on any one topographic map.
- T 3. A standard USGS map is always oriented to true north.
- F 4. Lines of latitude are the lines on the map that run from the north geographic pole to the south geographic pole. (*Longitudinal lines run north to south.*)
- T 5. The magnetic declination, scale, and coordinates are found at the bottom of the map or in the margins.
- F 6. A contour line spirals from sea level to the highest elevation of a mountain. (*A contour line never changes elevation.*)
- F 7. A V-shaped bend in the contour line indicates flow of a body of water and points downstream. (*The V-shaped bend indicates an upstream direction.*)
- T 8. A topographic map scale can be expressed by the length of a bar scale or as a ratio.
- T 9. Topographic maps can be measured in minutes and seconds.
- F 10. You would use an ordinary ruler to determine coordinates of any point on a map. (*You would use an engineer's scale.*)

Bonus Question:

If a point lies 60" east of the longitudinal line of $120^{\circ} 12'$, what would be the longitudinal location of that point in degrees, minutes, and seconds? ($120^{\circ} 11'$)

PRACTICE WITH SCALE, LATITUDE, AND LONGITUDE

Directions: These problems will give you practice in using map skills involving scale, latitude, and longitude. In doing the problems, remember that more than one step may be necessary to answer the questions. For problems 4-7, it may help to draw a picture.

1. The distance between Chicago, Illinois, and Cleveland, Ohio, on a map of the United States at a scale of 1:2,500,000 is 7.75 inches. What is the true distance between the two cities in miles?

$$\frac{1 \text{ in.}}{2,500,000 \text{ in.}} = \frac{7.75 \text{ in.}}{x \text{ in.}}$$

$$x = 2,500,000 \text{ in.} \times 7.75 \text{ in.} = 19,375,000 \text{ in.}$$

$$x = 19,375,000 \text{ in.} \left(\frac{1 \text{ ft.}}{12 \text{ in.}} \right) \left(\frac{1 \text{ mi.}}{5,280 \text{ ft.}} \right) = 305.8 \text{ mi.}$$

$$x = 305.8 \text{ mi.}$$

Answer: First we determine how many miles per inch at this scale. Remember the meaning of scale: 1 inch on the map equals 2,500,000 inches on the ground. So 2,500,000 inches divided by 12 inches per foot tells us that 1 inch equals 208,333.3 feet. Now we divide 208,333.3 feet by 5,280 feet per mile to get 39.46 miles.

Now we know that 1 inch on the map equals 39.46 miles on the ground. The distance between Chicago and Cleveland is found by multiplying the distance in inches times the number of miles per inch: 7.75 inches \times 39.46 miles = 305.8 miles.

2. The distance between San Francisco, California, and Durango, Colorado, is 25.7 centimeters on a map whose scale is 1:5,000,000. What is the true distance between the two cities in kilometers?

$$\frac{1 \text{ cm.}}{5,000,000 \text{ cm.}} = \frac{25.7 \text{ cm.}}{x \text{ cm.}}$$

$$x = 5,000,000 \text{ cm.} \times 25.7 \text{ cm.} = 128,500,000 \text{ cm.}$$

$$x = 128,500,000 \text{ cm.} \left(\frac{1 \text{ m.}}{100 \text{ cm.}} \right) \left(\frac{1 \text{ km.}}{1,000 \text{ m.}} \right) = 1,285 \text{ km.}$$

$$x = 1,285 \text{ km.}$$

Answer: First we determine how many kilometers per centimeter at this scale. Remember the meaning of scale: 1 centimeter on the map equals 5,000,000 centimeters on the ground. So 5,000,000 centimeters divided by 100 centimeters per meter tells us that 1 centimeter equals 50,000 meters. Now we divide 50,000 meters by 1,000 meters per kilometer to get 50 kilometers.

Now we know that 1 centimeter on the map equals 50 kilometers on the ground. The distance between San Francisco and Durango is found by multiplying the distance in centimeters times the number of kilometers per centimeter: 25.7 centimeters \times 50 kilometers per centimeter = 1,285 kilometers.

3. Use the method outlined in Figures 6 and 7 in the reading entitled *Topographic Map Skills* to determine the longitude of a point between $81^{\circ} 30'$ and $81^{\circ} 32' 30''$. If you want to determine the longitude to the nearest second ($''$), how many divisions do you need on your scale?

(First determine the interval between two lines of longitude by subtracting: $81^{\circ} 32' 30'' - 81^{\circ} 30' = 2' 30''$. Now determine the number of seconds in $2' 30''$, which determines the number of seconds between the two lines of longitude. Since there are 60 seconds per minute, there must be $60 \text{ seconds} \times 2 \text{ minutes} + 30 \text{ seconds} = 120 \text{ seconds} + 30 \text{ seconds} = 150 \text{ seconds}$. Therefore, we need 150 divisions on our scale to read to the nearest second.)

4. Using a scale, you determine that a point is 35 seconds west of longitude $113^{\circ} 28' 31''$. What is the longitude of the point?

$$\begin{array}{r} 113^{\circ} 28' 31'' \\ + \quad 35'' \\ \hline 113^{\circ} 28' 66'' = 113^{\circ} 29' 6'' \end{array}$$

5. Using a scale, you determine that a point is $1' 10''$ east of longitude $78^{\circ} 14' 02''$. What is the longitude of the point? ($78^{\circ} 14' 02'' = 78^{\circ} 13' 62''$)

$$\begin{array}{r} 78^{\circ} 13' 62'' \\ - \quad 1' 10'' \\ \hline 78^{\circ} 12' 52'' \end{array}$$

6. Using a scale, you determine that a point is $5' 12''$ north of latitude $36^{\circ} 30' 00''$. What is the latitude of the point?

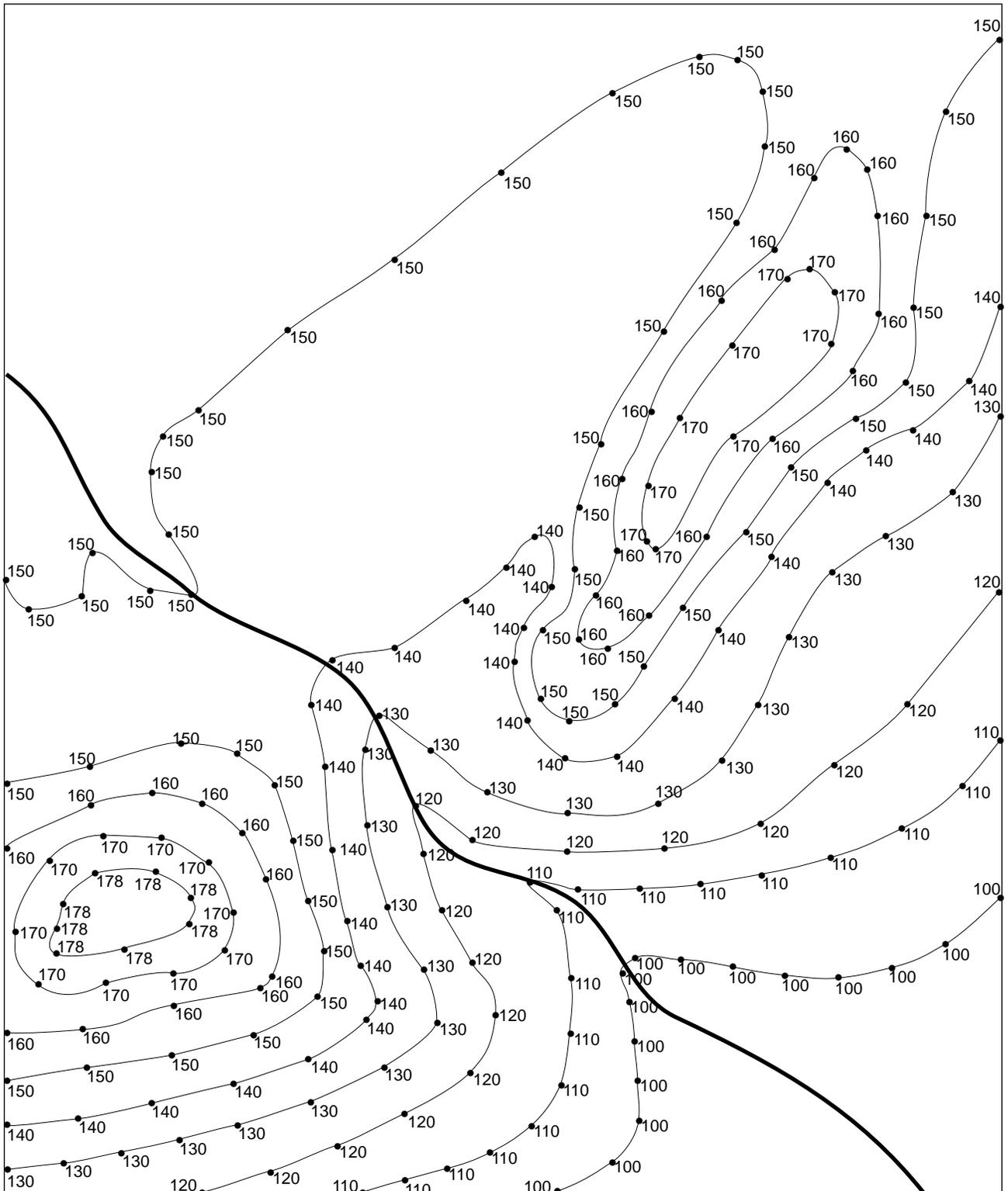
$$\begin{array}{r} 36^{\circ} 30' 00'' \\ + \quad 5' 12'' \\ \hline 36^{\circ} 35' 12'' \end{array}$$

7. Using a scale, you determine that a point is $11' 20''$ south of latitude $22^{\circ} 10' 28''$. What is the latitude of the point?

$$\begin{array}{r} 22^{\circ} 10' 28'' \\ - \quad 11' 20'' \\ \hline 21^{\circ} 59' 08'' \end{array}$$

CONTOURING

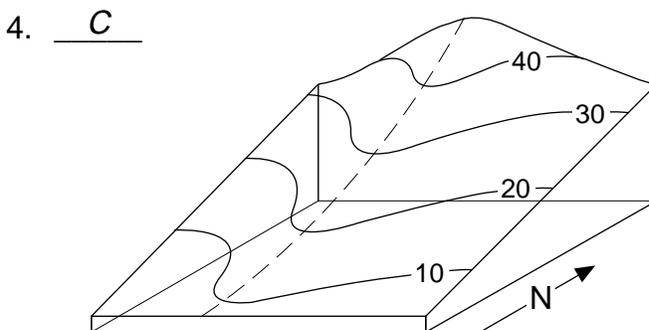
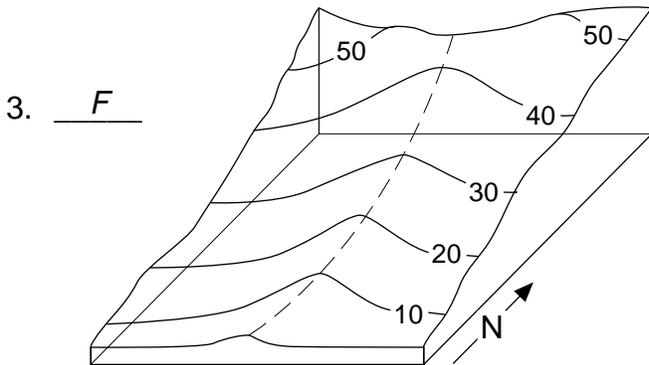
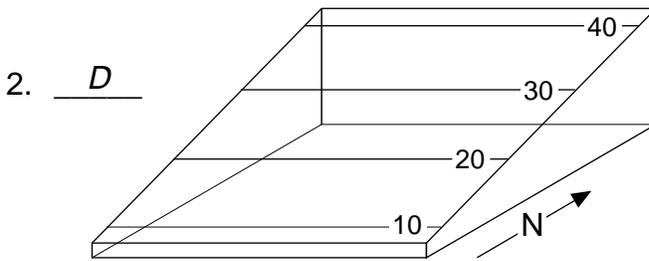
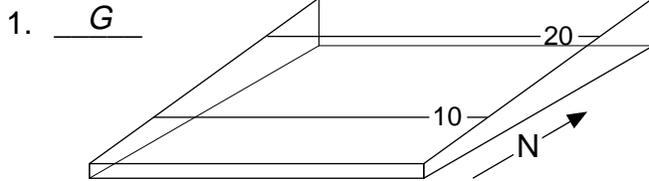
Directions: On a topographic map contour lines connect points of equal elevation. Make a topographic map by connecting points of equal elevation to form contour lines. Start with the highest contour.



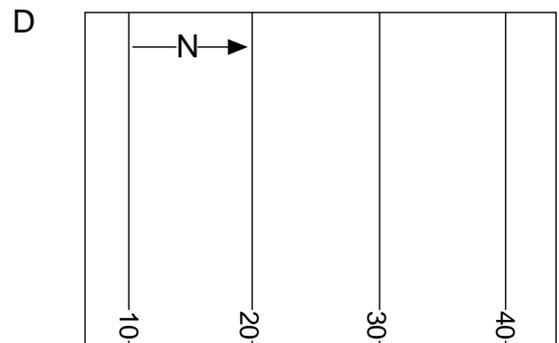
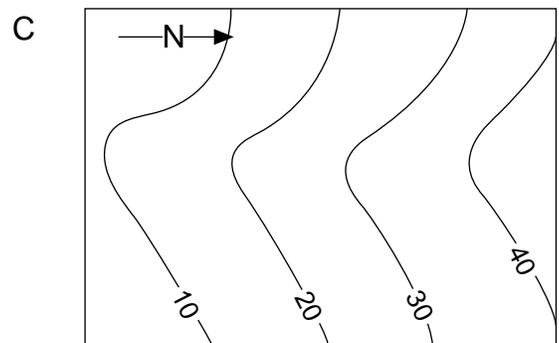
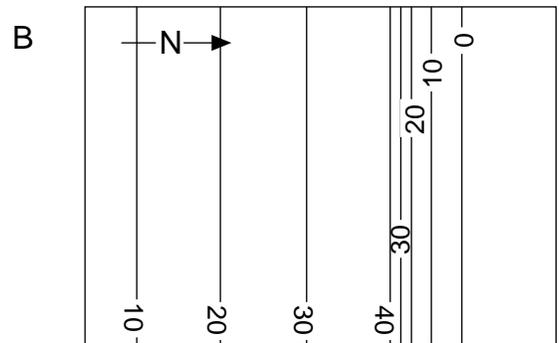
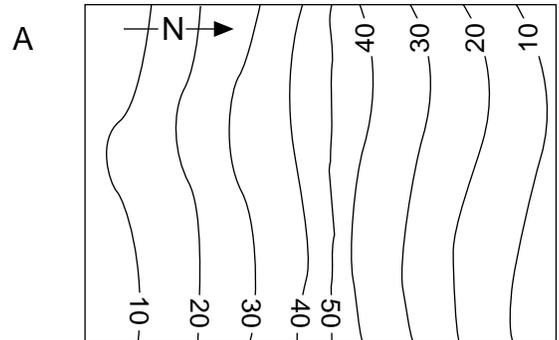
TOPOGRAPHIC MAPS OF LANDSCAPES

Directions: Look at the block diagrams that represent landscapes and match them to the correct topographic maps by writing the letter of the map in the blank.

Block Diagrams

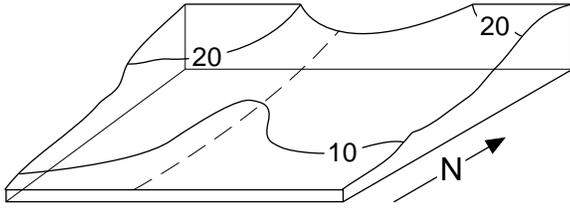


Topographic Maps

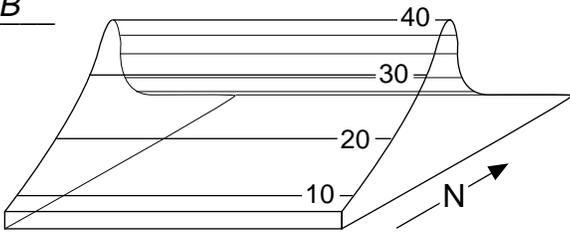


Block Diagrams

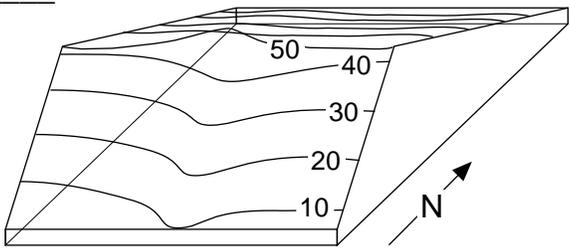
5. H



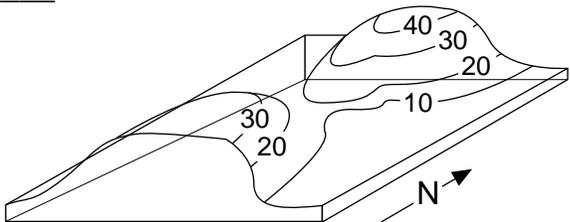
6. B



7. A

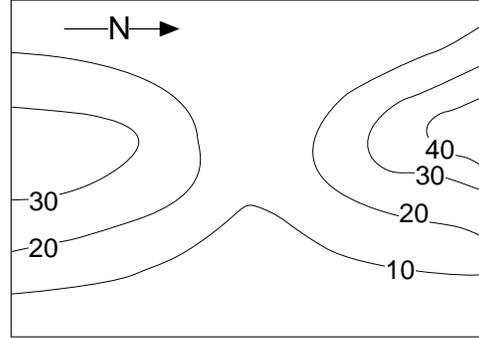


8. E

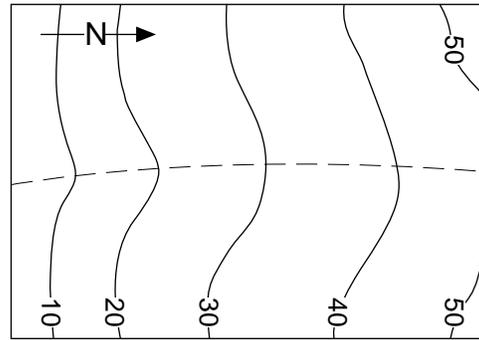


Topographic Maps

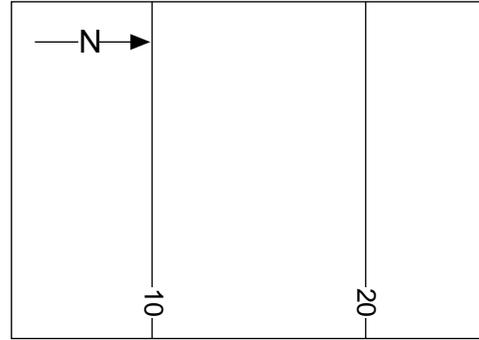
E



F



G



H

