

Part A: Topography Map Basics

- Topography is the surface shape of the land.
- A topographic map shows the shape of the Earth's surface by using contour lines.
- A **contour line** is a line on a topographic map that connects points of equal elevation. For example, in figure 1, every where on that line is 7000 meters.
- The difference in elevation between contour lines is called the **contour interval**.

Questions: (answer in complete sentences 2 pts each)

1. What is topography?

2. What is the difference between a topographic map and a road map?

3. What are contour lines?

4. What is the contour interval? In figure 1 above, what is the contour interval?

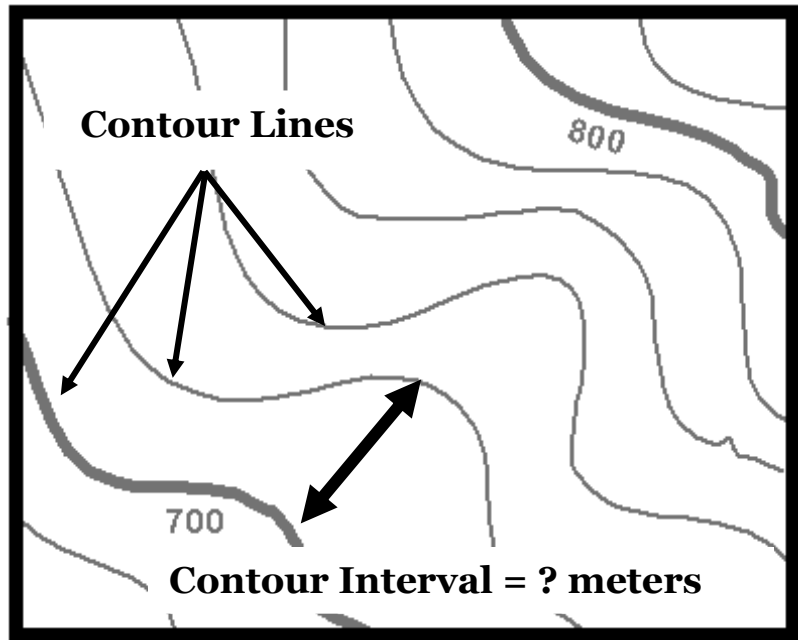
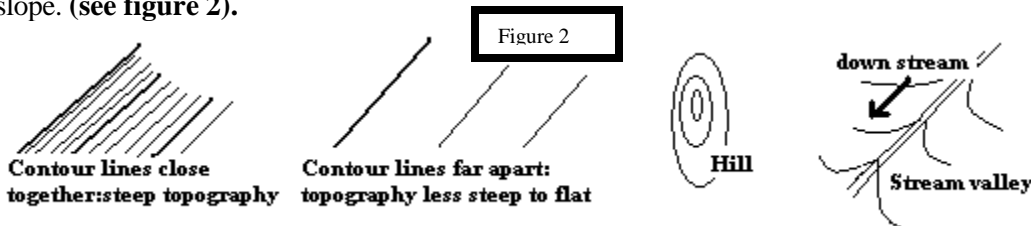


Figure 1

Part B: Contour Rules

1. Contour lines never cross.
2. A series of closed circular contours (the contours make a circle) represents a hill. If the closed contours are hachured it indicates a closed depression (see figure 2).
3. Contour lines crossing a stream valley will form a "V" shape pointing in the uphill (and upstream) direction
4. Contour lines either close on themselves or reach the end of the map. They never stop in the middle of the map.
5. The closer the contour lines the steeper the slope or gradient and the farther apart the contour lines, the flatter the slope. (see figure 2).



Questions: (answer in complete sentences 2 pts each)

1. What do V's on a topographic map represent?

2. What is the slope if the contour lines are spaced far apart? What about contour lines that are close to each other?

3. What do circular contour lines represent on a topographic map represent?

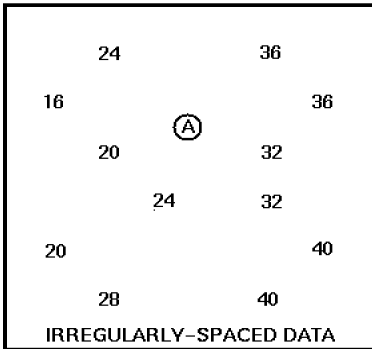
4. Do contour lines ever cross or stop?

Part E: Drawing Contour Lines

Directions: read through the following step by step instructions to learn how to draw contour lines. When you are done, complete map 5 at the bottom.

(Map 1) Contour maps are made by drawing contour lines.

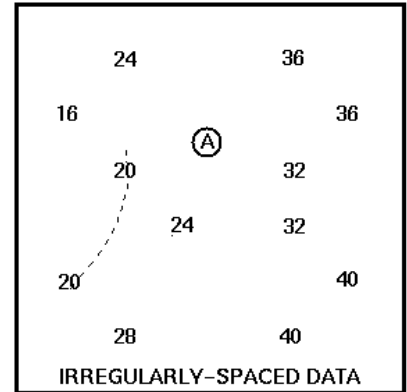
We will start with the plot of scattered data points shown to the left. Basically, a contour line is a line that connects locations that have the same data value. Let's draw a contour line for 20 meters. Since we have 2 data points that are 20, we can draw a line connecting them.



(Map 1)

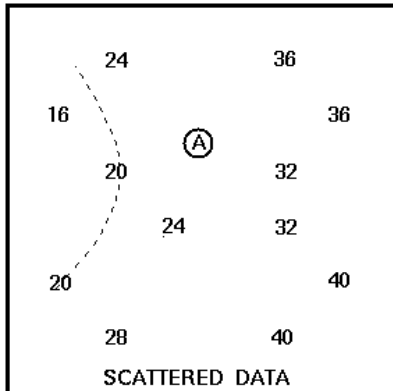
(Map 2) This is how the plot should look. What do we do now? Well, there are no other data points that are 20 meters, but we do have two points in the upper left corner that are 16 and 24 meters. This means that somewhere between these points, the elevation should

be 20 meters. Therefore, we can draw our line between these two points, so the plot looks like Map 3.



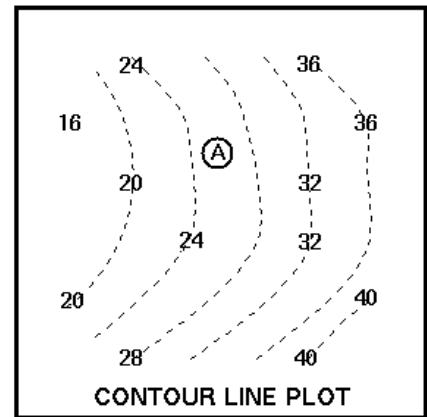
(Map 2)

(Map 3) We have now completed the contour line for 20 meters. Notice, any point to the left of the dashed line is lower than 20 meters, and any point to the right of the line is higher than 20 meters.



(Map 3)

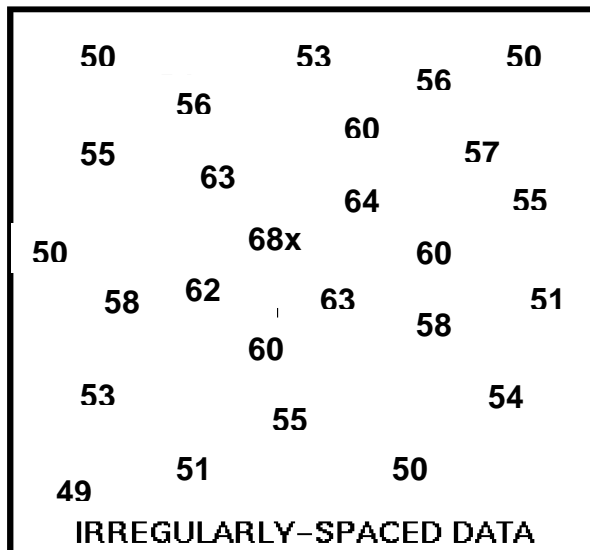
(Map 4) Contour lines are drawn at a fixed intervals--for example, every 2, 5, 10, 20 meters. Here, we will draw lines every 4 meters. Thus, there will be contour lines for 20, 24, 28, 32, 36 and 40 meters. When you are done, the contour analysis should look like Map 4.



(Map 4)

Now it's your turn!

Map 5 contains random elevation data. Your job is to draw contour lines at 50, 55, 60, and 65 meters. (10 points)



Part F: Hawaii Contour Map (25 points)

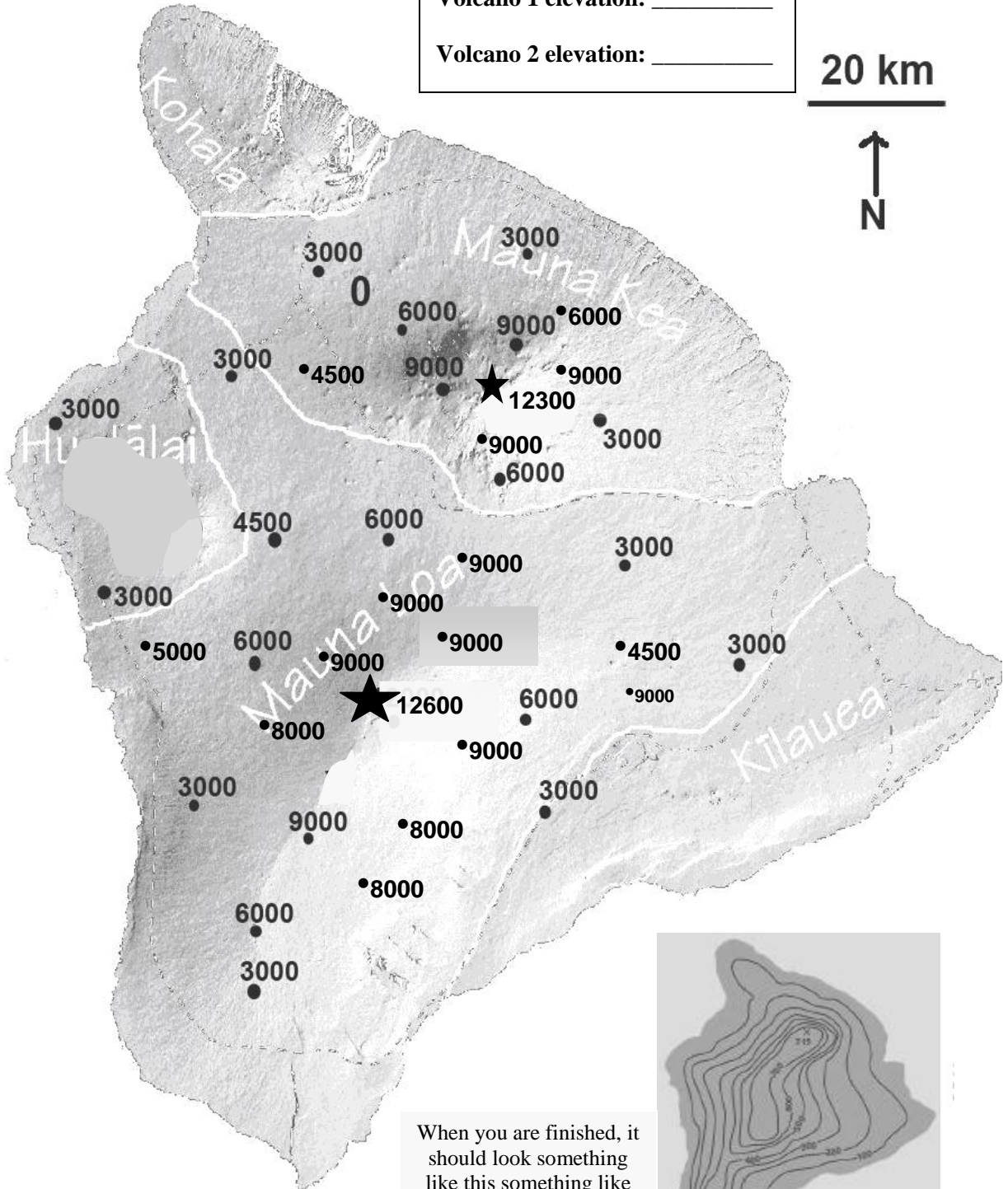
The Big Island of Hawaii is a shield volcano. Where is the summit or peak of the volcano? Your job is to find the 2 highest locations by drawing contour lines. Basically, you will be making a topographic map of Hawaii. The shaded relief gives you clues about how the contour lines show elevation. Remember; do not let contour lines cross or touch. Along every contour line you should have lower elevations on one side of the line and higher on the other. Draw contour lines at 3000 ft, 6000ft, 9000ft, and 1200ft. (15 points)

At what elevation is the top of the 2 volcanoes?

Volcano 1 elevation: _____

Volcano 2 elevation: _____

20 km



When you are finished, it should look something like this something like this, but with less contour lines



Part H:

Grand Canyon Profile

Directions: Your job is to construct a profile for part of the Grand Canyon. A profile shows a side view from a flat topographic map.

1. What is the contour interval on the is map? *Hint:* it is 250ft between the bold dark lines _____ft
2. What is the elevation along the Colorado River? _____ft
3. What is the elevation at location (A) _____ft
4. What is the elevation at location (B) _____ft
5. **What is a Profile?**

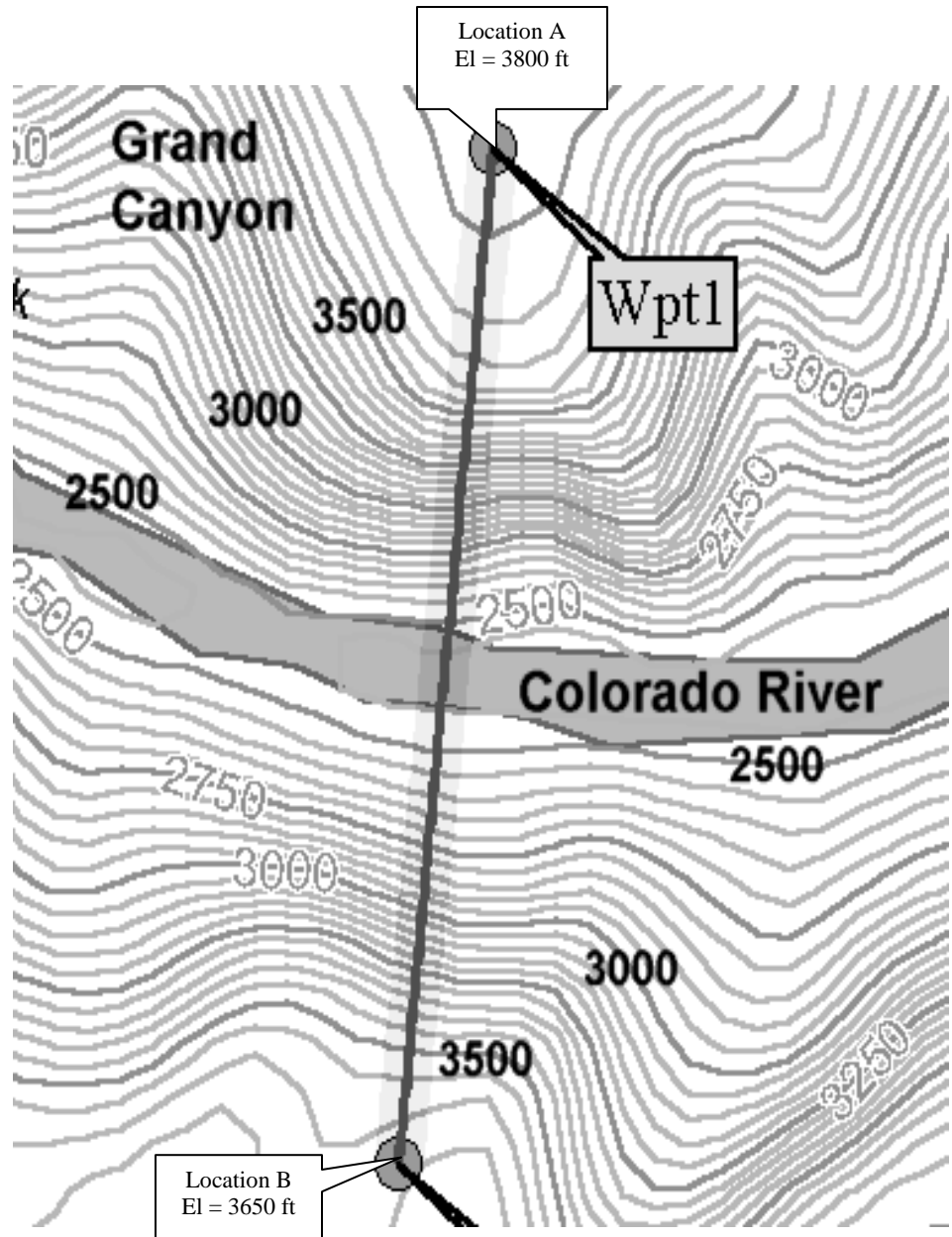
Profile Instructions: (20 pts)

First, find the elevation at every bold dark line. Notice, they are 250 feet apart.

Next, line a piece of paper up with the **A-B** transect line.

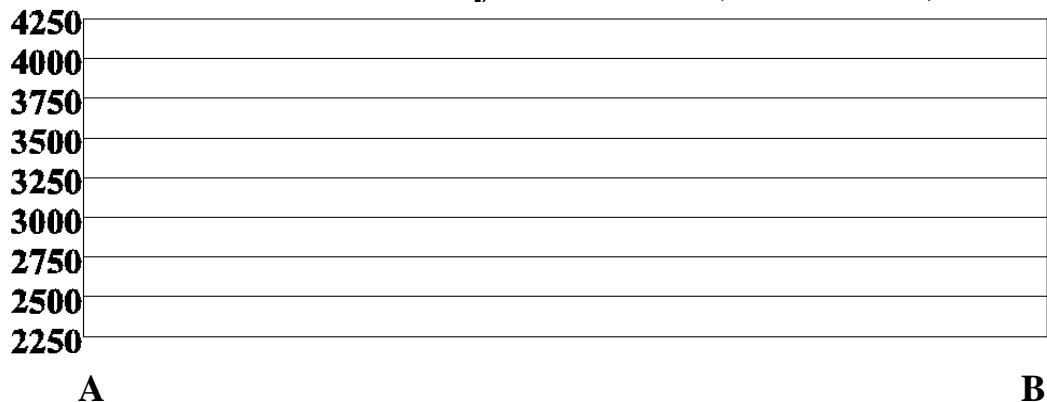
Starting from the location (A) working towards location (B), find the record the elevations you just found by making "Tick" marks on the side of your paper every 250 feet at the following elevations: 3800(A), 3750, 3500, 3250, 3000, 2750, 2500, Colorado River, 2500, 12750, 3000, 3500, and 3700(B) feet.

Finally, take your paper to the profile below and graph your data to construct the final profile.



Grand Canyon Profile (cross-section)

30 points



Part E: Matching

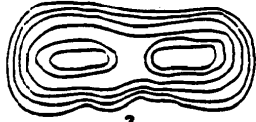
Match the profile to the appropriate topographic map by analyzing the contour lines.



1



2



3



4



5



6



A



B



C



D



E



F

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

Part G: Constructing a Profile

To the right is an example of a profile. A profile shows a side view from a flat topographic map. In order to make profile or cross-section, first, follow the directions below.

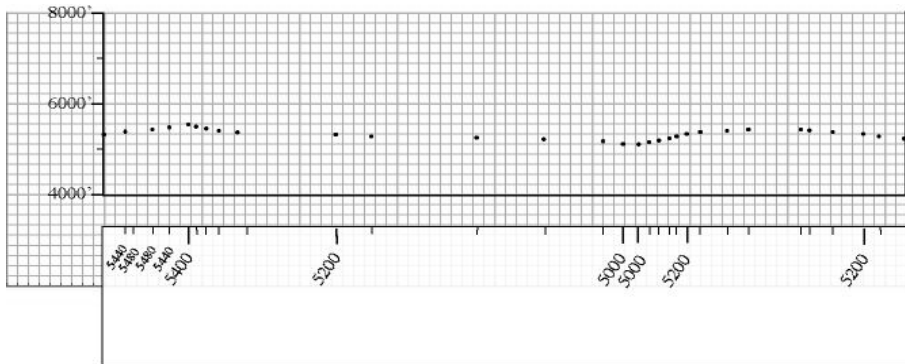
1 First find the transect line, this is a line that runs across the map crossing through a number of contour lines (See Figure 3).

2 Place a blank piece of paper along the line (See Figure 4). On both the blank paper and the map, mark clearly the starting and ending points.

3 Make a tic mark wherever the paper crosses a contour line on the map (See Figure 4). Write the elevation of the contours line next to the tics on your paper (See Figure 4).

4 Once you are certain you have all of the appropriate tic marks and elevations, remove your paper from the map.

5 Place your paper with the tic marks along the bottom (x-axis) of the profile (See Figure 5)

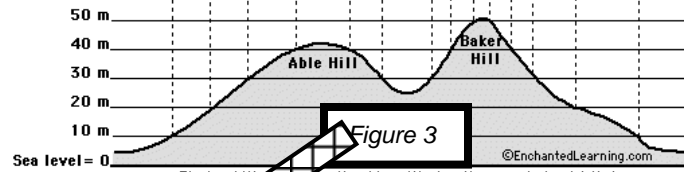
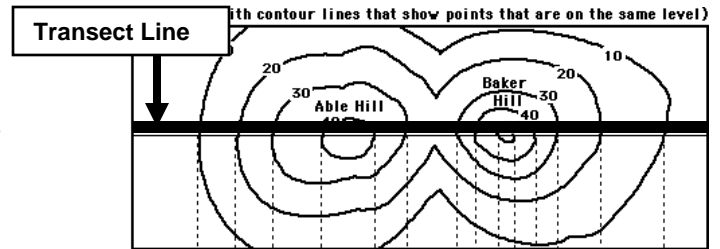


6 Beginning with your starting elevation, go directly above the tic mark on your paper and make a small dot on the graph paper at the corresponding elevation (See Figure 6).

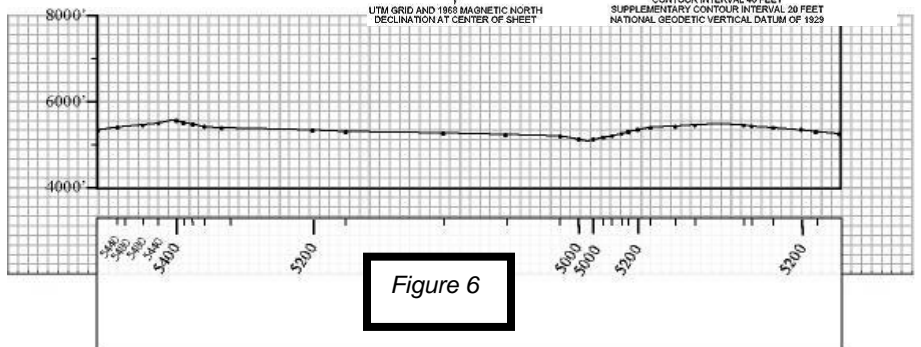
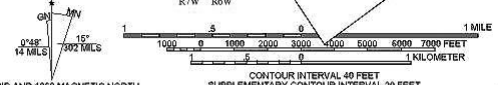
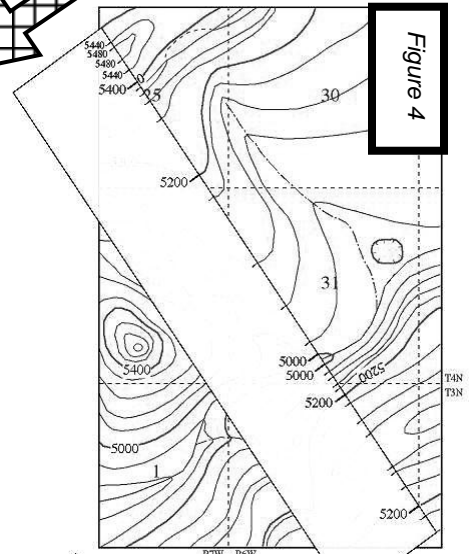
7 Connect the dots on the graph paper, and you have a topographic profile! (See Figure 6)

Questions: (Answer in complete sentences- 2pts each)

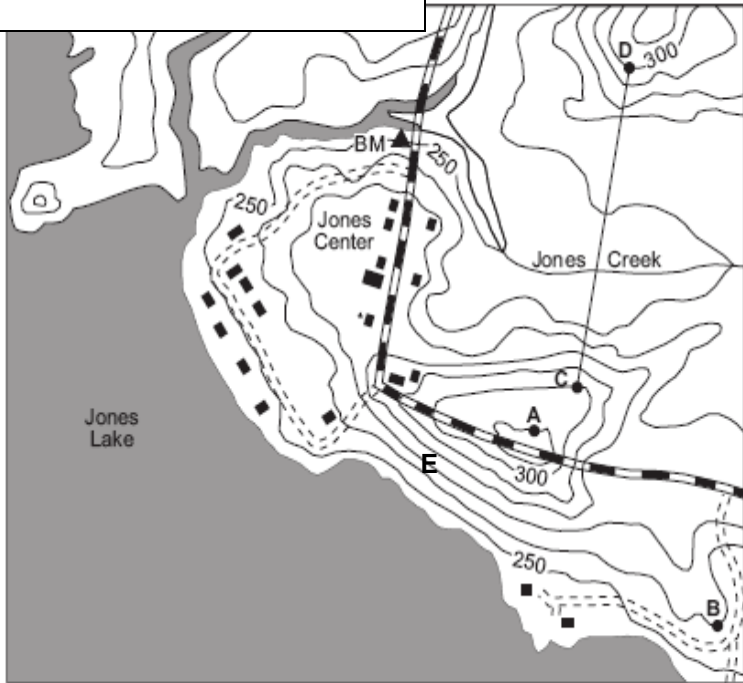
1. What is profile?
2. What is a transect line and what do they cross?
3. What is happening in figure 4?
4. What should you write or record where every "tic" mark crosses a contour line?
5. What is happening in figure 5?
6. What do you do after you have made all of your elevation marks?



The two hills from the side, with elevations marked and dotted pointing to the corresponding contour lines.



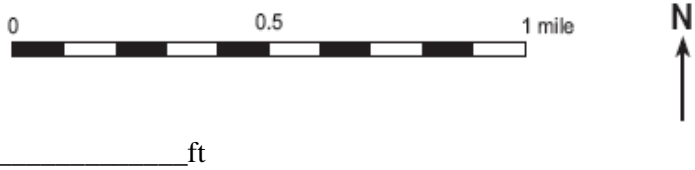
Part I: Map Basics



Directions: Examine the map to the left and answer the following questions. When you are finished, construct a profile for Transect Line C-D on the map. **(1 point each)**

Questions: Answer in complete sentences **1pt each**

1. What is the contour interval for this map?
_____ft
2. What is the elevation at location **B**?
_____ft
3. What is the elevation at location **A**?
_____ft
4. What is the change in elevation from point **A** to point **B**?
_____ft
5. What is the highest elevation on this map? _____ft
6. At what elevation is Jones Lake?



- _____ft
7. At which point is the terrain or topography the steepest? _____
 8. **Construct a profile for transect D-C (5 points)**

If you need help, revisit the instructions at the beginning of part C, or ask me for help!

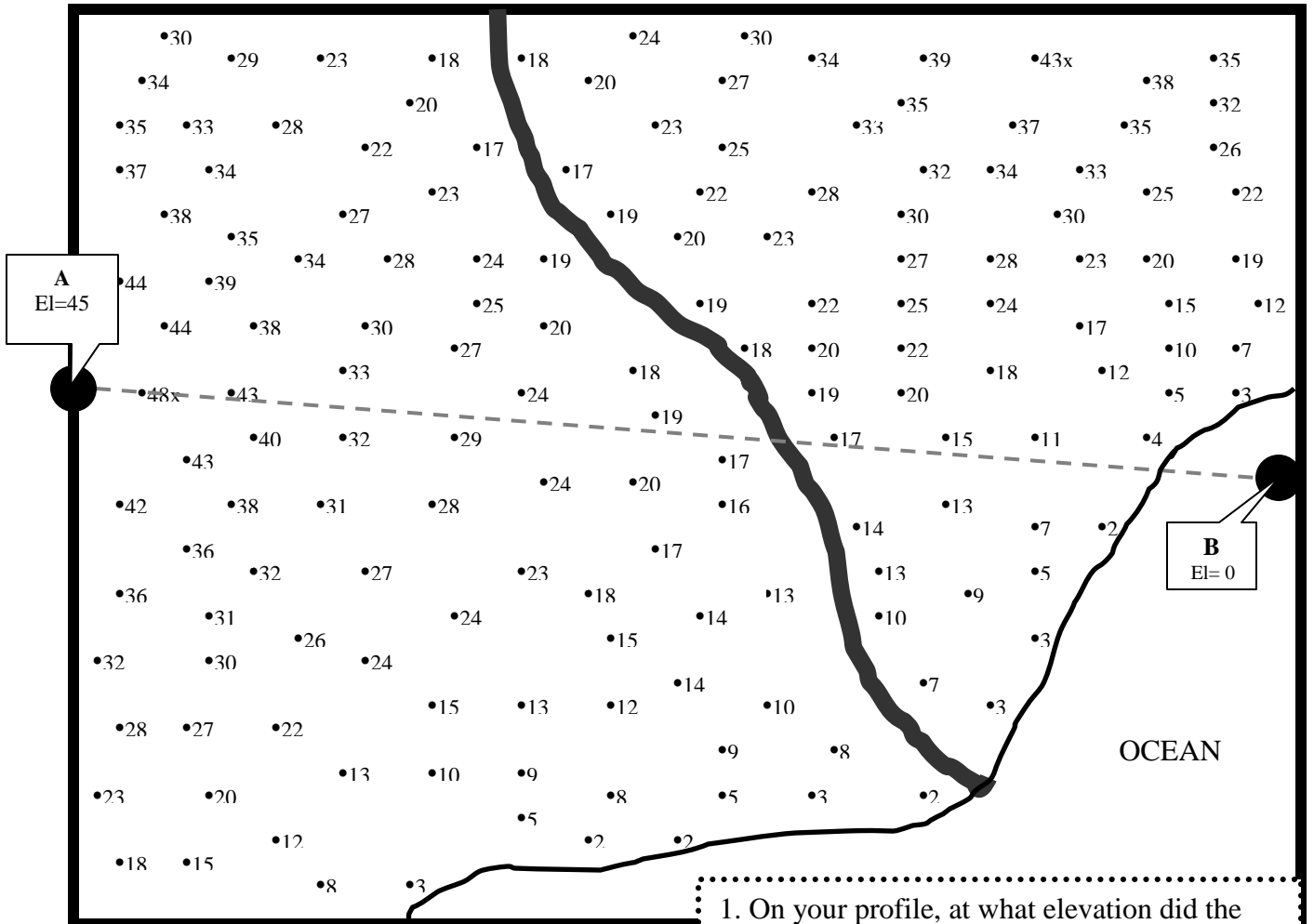
Part J: Matching

Match the profile to the appropriate topographic map by analyzing the contour lines. (1 point each)

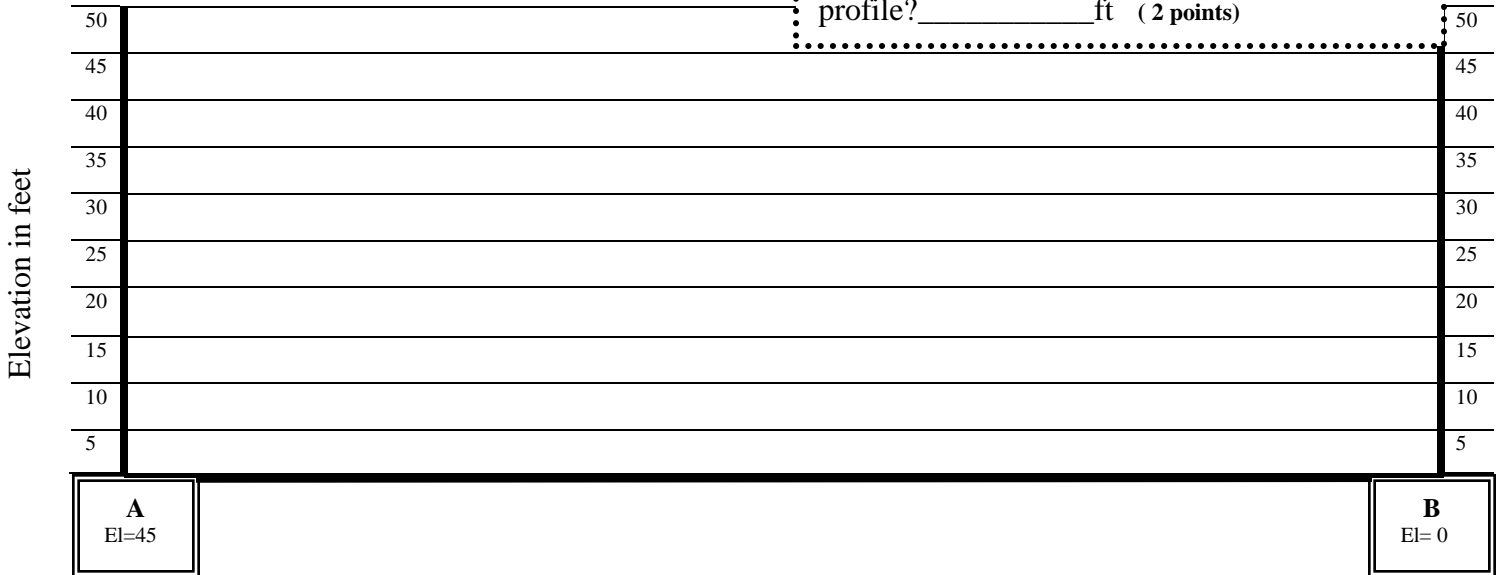
		1 _____
		2 _____
		3 _____
		4 _____
		5 _____
		6 _____

Part K: Make Your Own Map and Profile!

Your mapping days are almost over. But first, you have to make your own map! First, you need draw in contour lines. Look below, what do you think the contour interval should be? 2 feet? 5 feet? 10 feet? 20 feet? 50 feet? Well, I'll make it easy on you; use a contour interval of 5 feet. Obviously start at 0, and work along the edge of the map. Don't forget your V's along the river. Oh yeah, and please label the elevation of each contour line. When you are finished, make a profile across transect A-B.! Good Luck! (30 points)

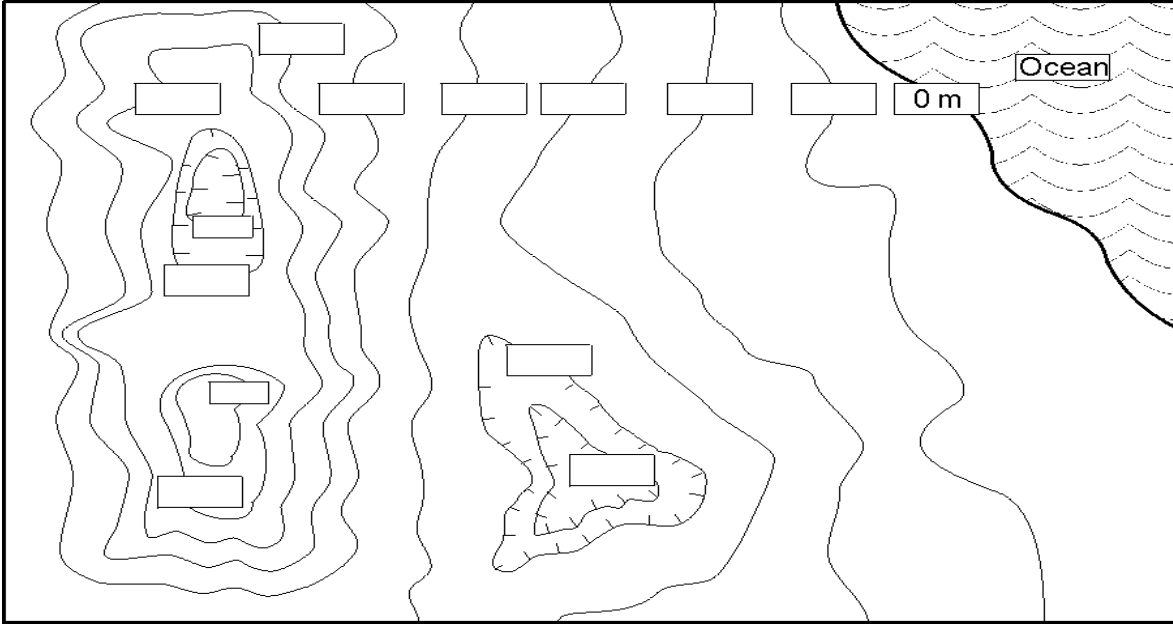


1. On your profile, at what elevation did the river cross? _____ ft (2 points)
2. What was the highest point on your profile? _____ ft (2 points)



Part C: Find the Contour Interval

Label the contours on the map below. The countour interval is 20 meters. Look for depressions with repeated contours! (13 pts)

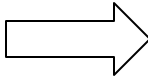


Contour Interval = 20 m

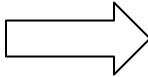
Part D: Contour Sketches

Make simple sketches of how contour lines express the following features (profile views are given) If you need help, see figure 2 in Part B:

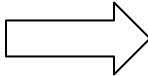
1. 2 pts



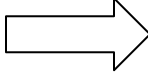
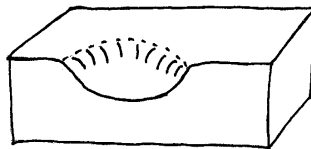
2. 2 pts



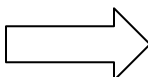
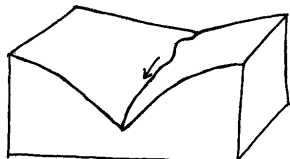
3. 2 pts



4. 2 pts

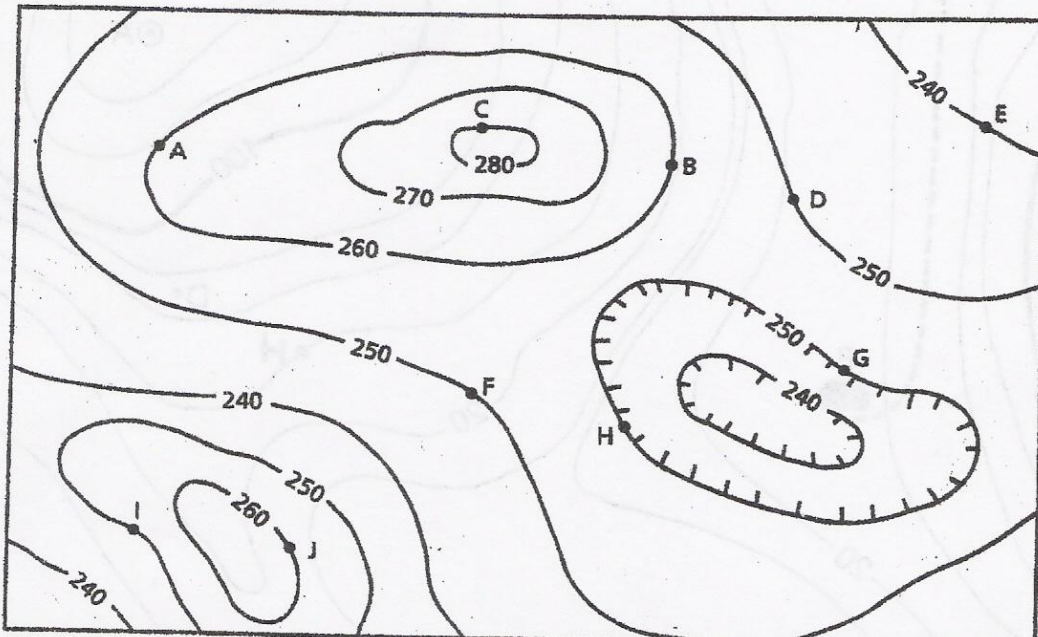


5. 2 pts



Topographic Maps PAGE 2: Reading a Topographic Map

Directions: Study the simple topographic map shown below. This map shows an area with hills and a depression. Unlike many actual topographic maps, the elevations are in meters and the distances are in kilometers. Answer the questions that follow the map.



Elevations are in meters

1 cm = 1 km

- How many hills are on this map? _____
- How many depressions are on this map? _____
- What is the contour interval? _____
- List the elevation of each location in meters.

A _____	C _____	E _____	G _____	I _____
B _____	D _____	F _____	H _____	J _____