NAME: _____ PERIOD: _____ DATE: _____

LAB PARTNERS: _____ LAB #6

DRAWING A CONTOUR MAP FROM A THREE DIMENSIONAL MODEL

INTRODUCTION

Since land distances and elevations on the earth's surface can be very great it is necessary to represent them on different kinds of maps for ease of study. Landform features with all their characteristics can accurately be represented on a contour (topographic) map. A contour map will show the elevation field of a region by using contour lines.

OBJECTIVES

During this laboratory investigation you will:
1. Draw a two dimensional contour map of an actual three dimensional model.
2. Analyze your contour map by answering laboratory summary questions.
3. Draw a contour map and match it with a cross sectional view of the same area.

MATERIALS

Clear plastic shoe box
Clear plastic cover
Three Dimensional Landform Model
Sheet white paper
Transparency
Wet erase marker
Colored water
400 or 600ml beaker
Colored pencils

APPROXIMATE TIME 2 Periods

PART 1

PROCEDURES

1. Mark off 1cm intervals on the outside of the clear plastic shoe box starting at the bottom of the box and continuing up toward the top. You should be able to get at least 7 intervals on the box.
2. Place the landform model into the clear plastic shoe box.
3. One lab partner should gently hold down the landform model. Another lab partner should carefully pour in enough water so it fills the box to the first 1cm interval mark.
4. Take a clear plastic sheet and tape it to the top of the plastic cover. Looking downward through the cover using the grease pencil, trace the outline of the water on the plastic sheet where it touches the landform model. This line is similar to a coastline.
5. Add enough water to bring the level up to the 2cm interval mark. Then trace this outline onto the plastic sheet as in step #4.
6. Continue to pour in water and trace the resulting outline until you have reached your highest interval mark.
7. You now have a contour map of that model. Each person in the lab group should now trace this contour map onto a piece of white paper by holding it up to the window. **Label** the cm intervals on each contour line.

8. Answer the laboratory summary questions for this part.
9. Complete Parts 2, 3, 4, and 5 using the procedures provided.

LABORATORY QUESTIONS PART 1 (answer in complete sentences)

1. What would happen to your contour lines on your map if you had used an interval of 2cm instead of 1cm on the outside of the shoe box?

_____

_____

2. Describe how a contour map shows areas of land that have steep gradient.

_____

3. Describe how a contour map shows areas of land that are gradually sloping.

_____

4. Explain how you can determine where a mountain peak is found on this contour map or any other contour map.

_____

_____

5. What does every point on the 3cm contour line have in common? Why?

_____

_____

PART 2
CONSTRUCING A 3D TOPOGRAPHIC MAP USING PETRI DISH BASE PLATES

MATERIALS

Petri dish base plates
Wet erase markers
Masking tape
Soft cloth to clean plates

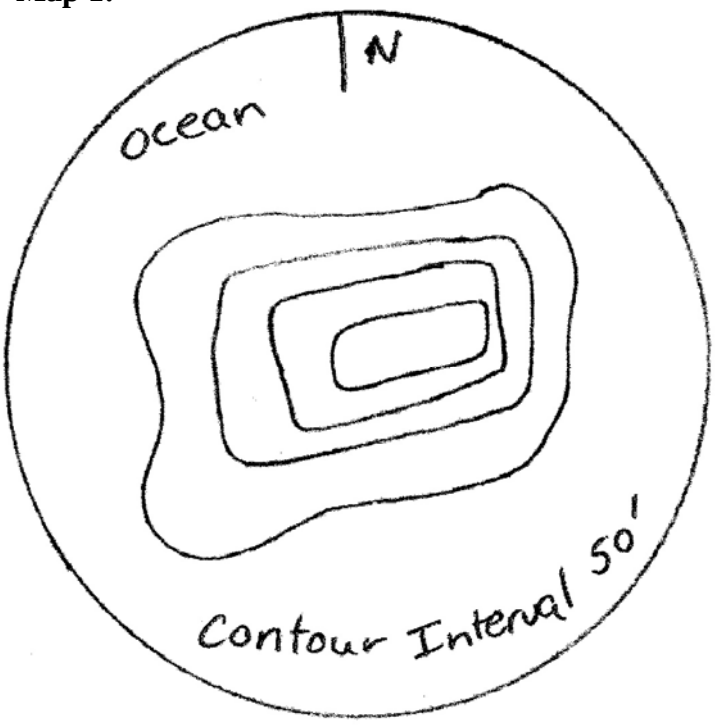
PROCEDURE

1. Write the elevation of each contour line on all maps on your topographic map sheet starting with 0 for the sea level.
2. On each Petri dish plate, write an elevation value that corresponds to one of the elevations on your map. (Write this near the edge of the plate)
3. Put one plate over your Map 1 (bottom side down) and trace all of the lines which equal the elevation value you wrote on that plate. Also trace the notch found at the top of the map (this will help you to line plates up later). Repeat until all lines on the map have been traced to your Petri plates.
4. Stack the plates in order from the lowest elevation value on the bottom to the highest value on the top. Place an unmarked lid on the top of the stack.
5. Look down through the Petri - dishes and view your 3D model.
6. In the description box write down your observations of the 3D model. (Ex: How many hills are present? Where is the slope the steepest? Is there a depression, if so where?)
7. Clean your Petri - dish with the soft cloth and repeat above steps for Map 2 and Map 3.
8. Clean your Petri - dish plates with the soft cloth and return your materials.
9. Answer the laboratory summary questions for this part.

Topographic Map Sheet

Write the elevation of all contour lines on each map (write number small but neat)

Map 1:



Description

_____

_____

_____

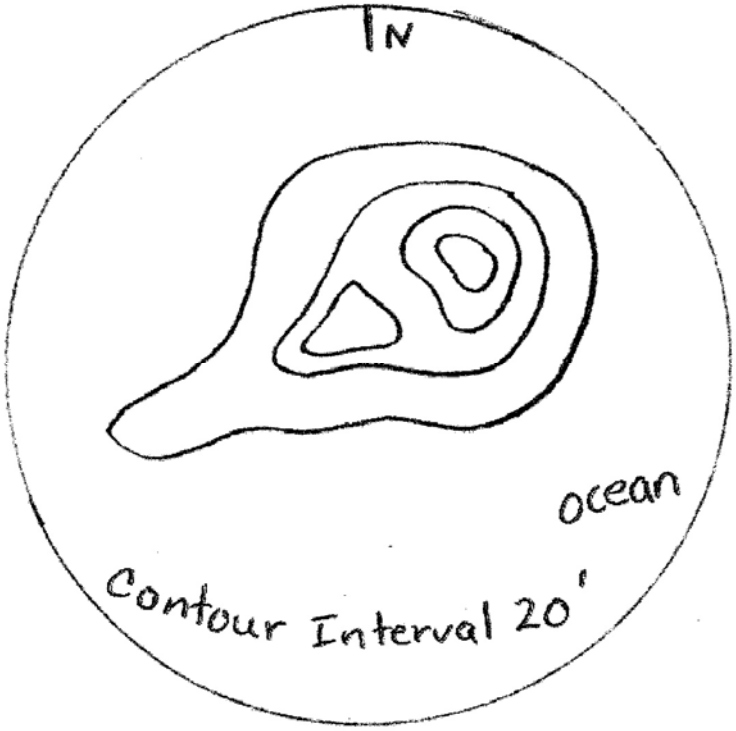
_____

_____

_____

_____

Map 2:



Description

_____

_____

_____

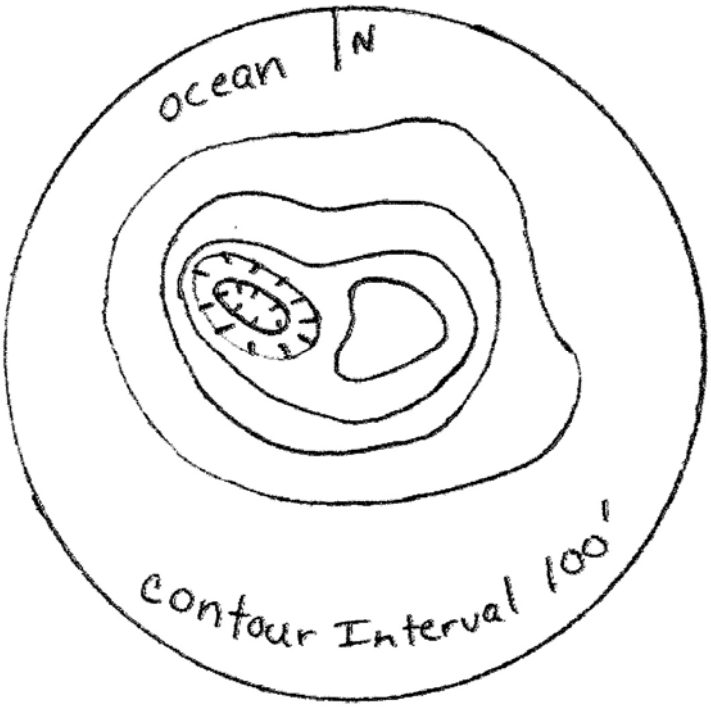
_____

_____

_____

_____

Map 3:



Description

_____

_____

_____

_____

_____

_____

_____

LABORATORY QUESTIONS PART II (answer in complete sentences)

1. What do you call the lines that you drew on the plates? What do they connect?

_____

_____

2. What does the distance between each of the stacked plates represent?

_____

_____

3. How do contour lines show areas of steep gradient? What do widely spaced contour lines indicate about the shape of the land?

_____

_____

4. Why don't all maps have the same contour interval?

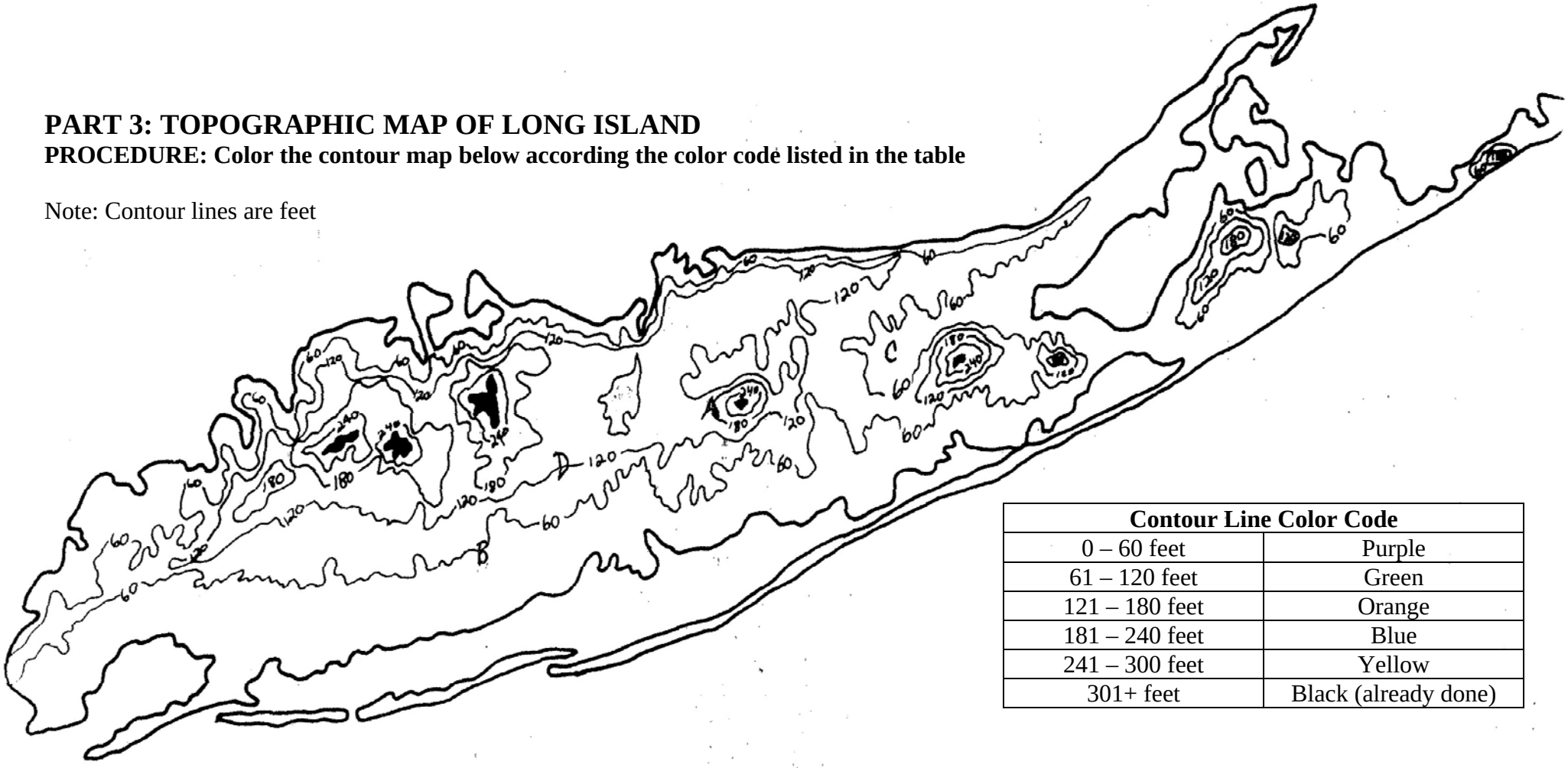
_____

_____

PART 3: TOPOGRAPHIC MAP OF LONG ISLAND

PROCEDURE: Color the contour map below according the color code listed in the table

Note: Contour lines are feet



Contour Line Color Code	
0 – 60 feet	Purple
61 – 120 feet	Green
121 – 180 feet	Orange
181 – 240 feet	Blue
241 – 300 feet	Yellow
301+ feet	Black (already done)

1. What is the gradient like on the north shore as compared to the south shore? _____

   _____

   Explain how you determined this: _____

   _____

2. Which point A, B, C, or D has the highest elevation? _____. What is the elevation of this point? _____

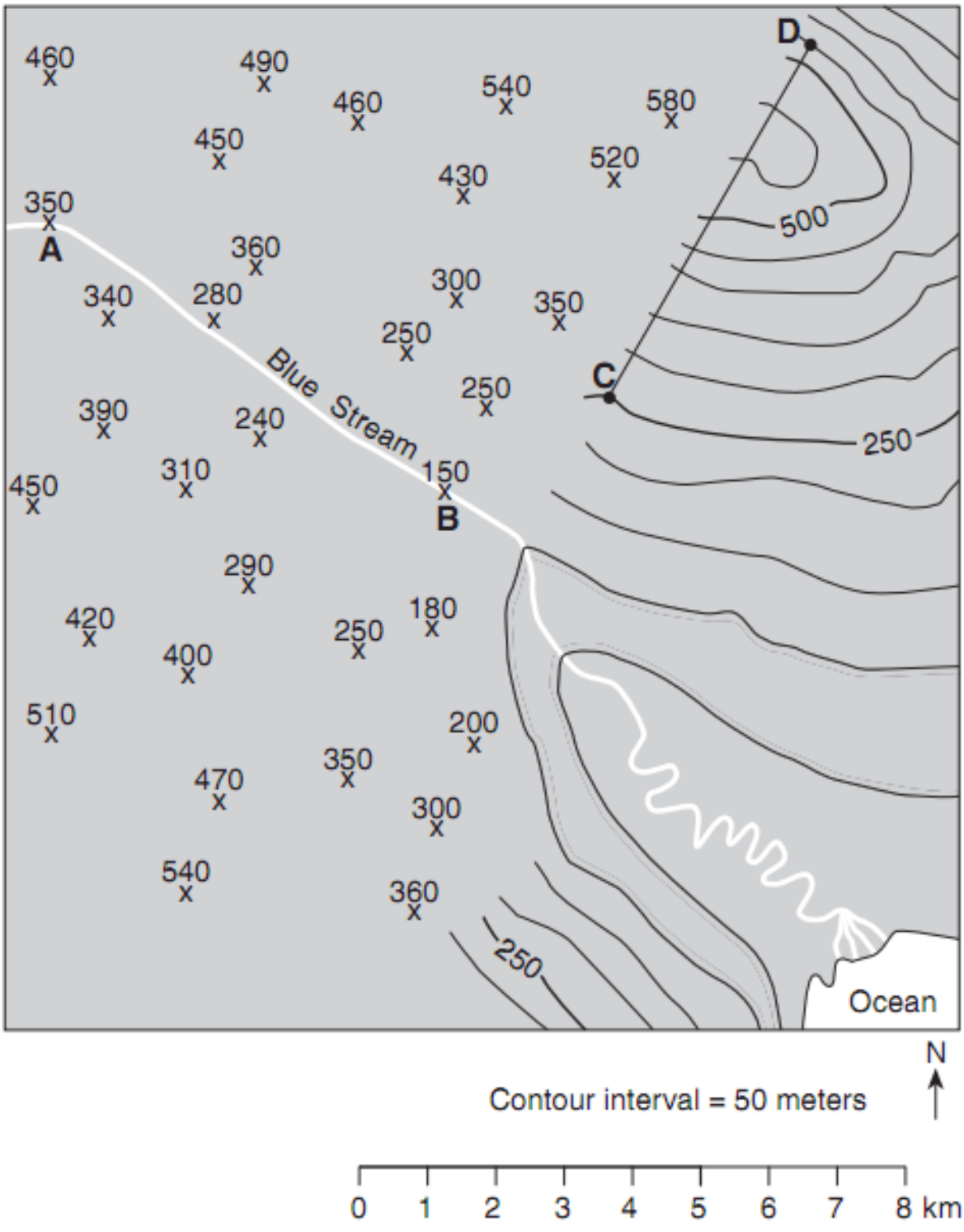
3. Place an "X" on the topographic map above of the approximate location of our school.

PART 4
CONSTRUCTING A CONTOUR MAP FROM ESTABLISHED ELEVATIONS

Finish drawing the 150, 200, 250, 300, 350, 400, 450, 500, and 550 contour lines. The 50 and 100 have already been drawn in for you as a guide.

Directions:

1. Don't let different contour lines touch each other.
2. Make sure your contour lines bend upstream.
3. Extend lines to edge of map when necessary.
4. Use a pencil**.**



PART 5

CONSTRUCTING A 3 DIMENSIONAL LANDFORM FROM A CONTOUR MAP

MATERIALS

Contour Map
Cardboard (Approximately 4 square feet)
Scissors or Single Edge Razor Blades
Glue
Magic Marker or Colored Pencils
Earth Science Reference Tables
Graph Paper

PROCEDURES

1. Do questions 3, 4, and 5 **before** you construct the map
2. Construct a 3 dimensional cardboard model from the attached contour map (optional).
3. NOTE: DO NOT THROW AWAY THE CUT UP PIECES OF THE CONTOUR MAP. TRANSFER ALL POINTS, NUMBERS AND OTHER INFORMATION FROM THE CONTOUR MAP ONTO YOUR CARDBOARD MODEL.

QUESTIONS (answer in complete sentences)

1. On your completed cardboard model, locate the most probable location for a stream. Then draw in the stream on your cardboard model. Explain how you determined your location to draw the stream.

_____

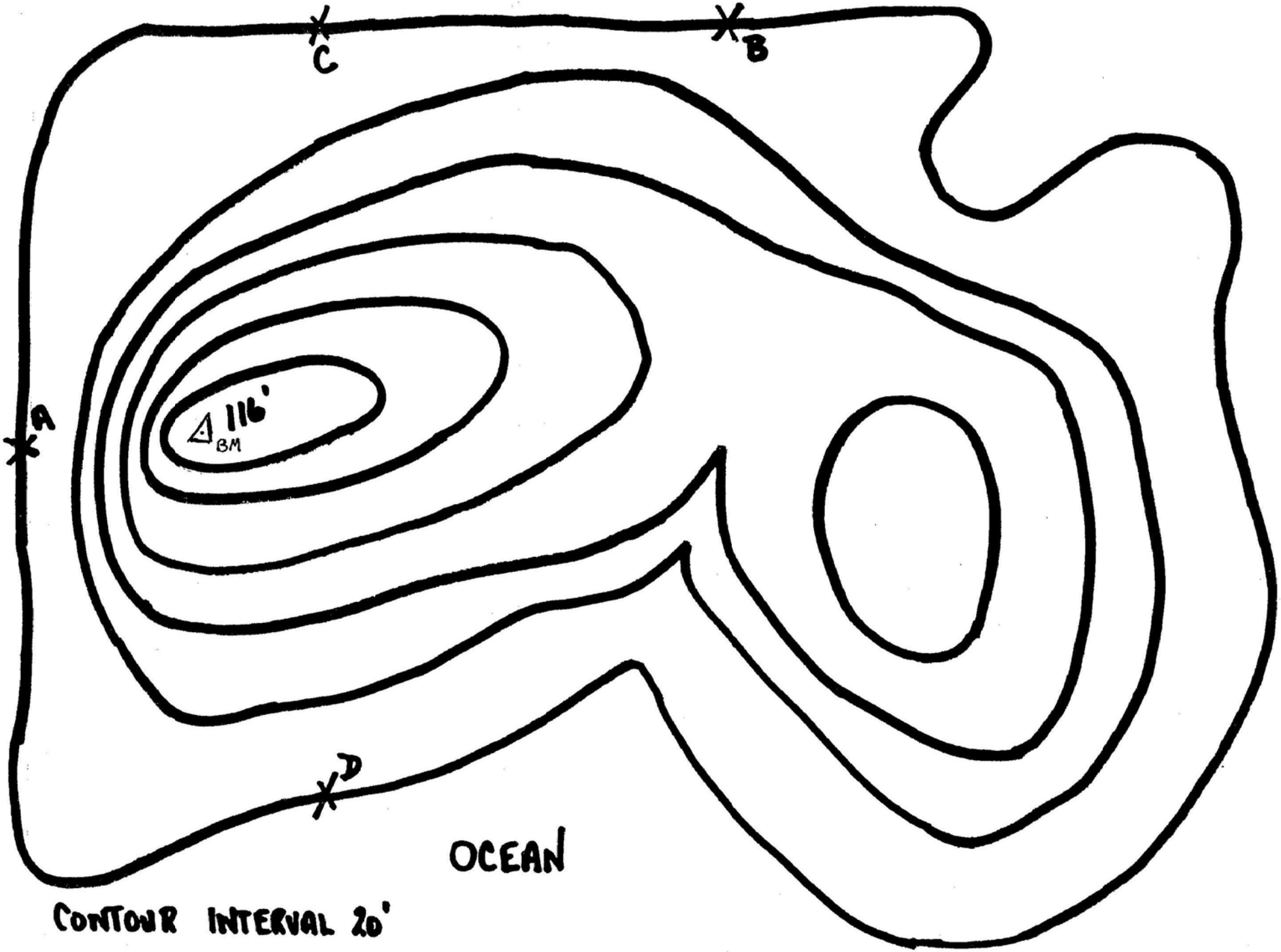
_____

2. On your cardboard model draw a distance scale of 1" = 5 miles.

3. Calculate the gradient between the bench mark (BM) and point A. Show equation, all work, and the answer rounded to the nearest tenth with the correct units.

4. Calculate the gradient between the bench mark (BM) and point B.
   Show equation, all work, and the answer rounded to the nearest tenth with the correct units.

5. On the grid below, construct a profile between points C and D.


C
B
A
116'
BM
D
OCEAN
CONTOUR INTERVAL 20'