ES202 Topgraphic Map Exercises – Part 2 **More on Contour Mapping and Topographic Profiles**

1. Scaling Problems – SHOW ALL OF YOUR MAP WORK
   a. Convert the following fractional scales to equivalent ground distances measured by select map distances

      i. 1:24,000 1 inch on map = 2000 feet on ground
      ii. 1:31,680 3 inch on map = 1.5 miles on ground
      iii. 1:48,000 1 inch on map = 0.76 miles on ground
      iv. 1:1,000,000 1 cm on map = 10 kilometers on ground

   b. A map of unknown scale shows two cell towers that are 1.2 inches apart on the maps page, and the actual ground distance between them is 1,000 feet. What is the fractional scale of the map? SHOW ALL YOUR MATH WORK.

   c. A straight stretch of road on an aerial photo was found to be 500 meters long in actual ground distance. The same segment on the photograph is 0.75 inches; what is the fractional scale of the photograph? SHOW ALL YOUR MATH WORK.

   d. A map has a fractional scale of 1:500,000. How many kilometers on the ground are represented by 10 centimeters on the map? SHOW ALL YOUR MATH WORK.

2. Read the section entitled "Contour Lines" on pages 242-244 in the AGI lab manual (10th edition). Using the base map on the attached Figure 1, complete the following tasks.
   a. Construct a topographic map from the spot elevations, drawing contour lines (connecting points of equal elevation) using a contour interval of 20 ft. Pay attention to the Law of V's when crossing stream channels (i.e. contour lines for a V-shape with vertex pointing up stream as they cross a valley).
      i. USE A PENCIL SO YOU CAN ERASE LINES AS YOU WORK THROUGH THE PROBLEM. Hint: start at the edge of the map at lower elevations, and work upstream to successively higher elevations.
   b. Using your topographic map in 2a above, construct a topographic profile along line X-Y, using the graph paper below Figure 1.
   c. Using a ruler and the bar scale in figure 1, determine the fractional scale of the map. SHOW ALL OF YOUR MATH WORK.

   d. Using a ruler and the y-axis scaling, calculate the vertical (fractional) scale of your topographic profile in the graph below. SHOW ALL OF YOUR MATH WORK.

   e. Calculate the vertical exaggeration of your topographic profile. SHOW ALL OF YOUR MATH WORK.

   f. Add vector arrows to the streams on your map to show their direction of flow.
   g. Determine the maximum relief for the map area. Express in feet and meters.

3. Read over the section on Stream gradient, p. 292, Fig. 11.6 in the AGI lab manual (10th edition).
   a. For your map in 2 above, calculate the stream gradient of the main stem of "Babbling Brook" in feet per mile and in ft per ft (dimensionless ratio). SHOW ALL OF YOUR MATH WORK.

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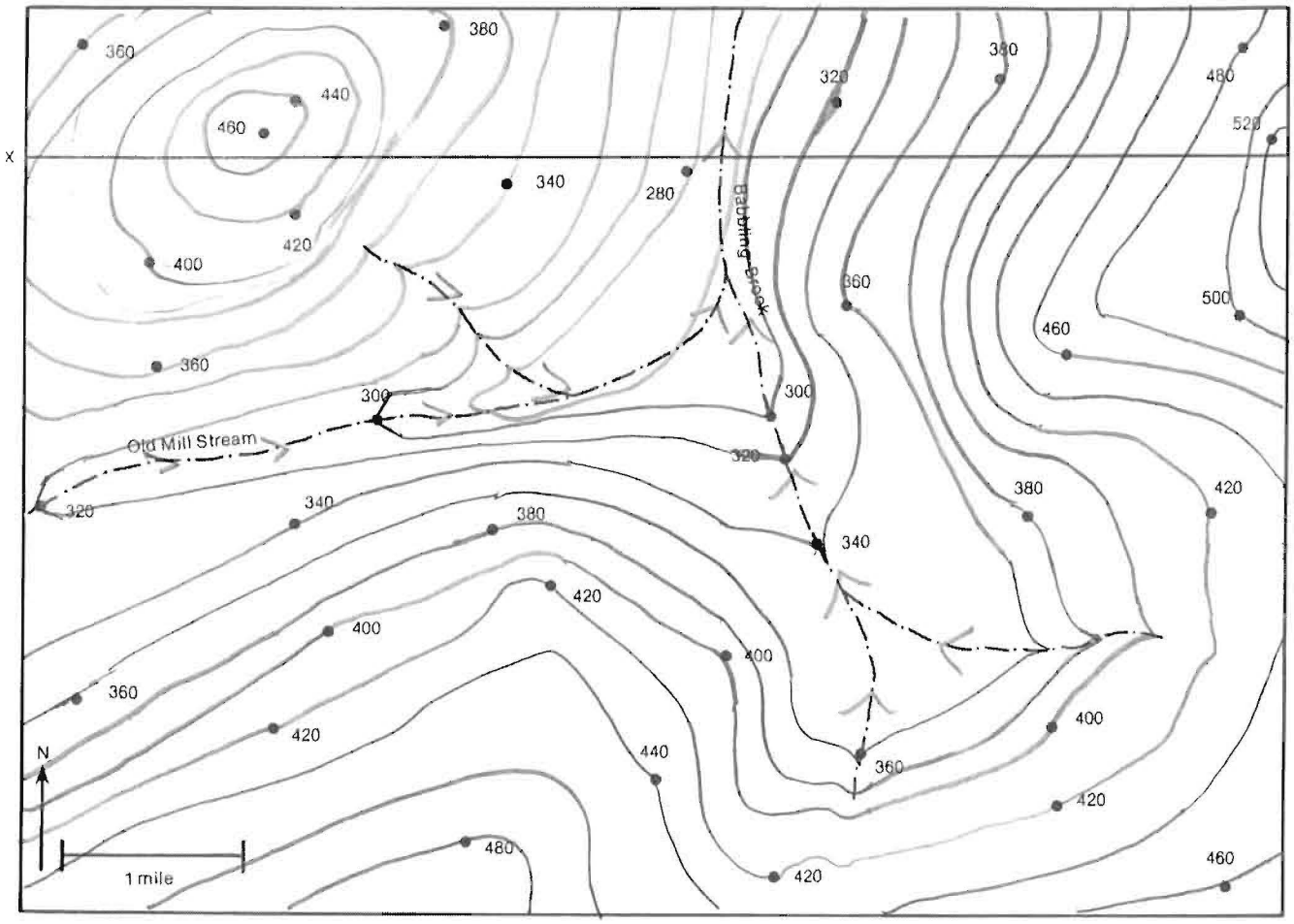

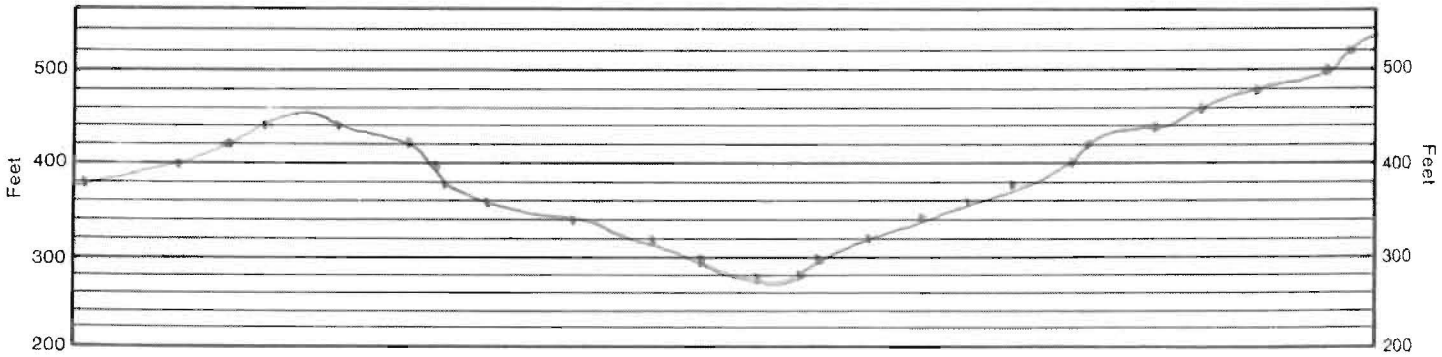

Topographic contouring exercise.

FIG. 1