

O-0212
MEASURE DISTANCE ON A MAP

CONDITIONS

Given a objective topographical or aeronautical map with bar scales, a piece of paper, pencil, and straight edge. You are away from mission base, mounted or dismounted, and must move to another location. You have plotted your position on the map, and the position to which you are to move. Now you want to determine the distance you will have to move.

OBJECTIVES

1. Determine the straight-line distance between two points with no more than five percent error, within 2 minutes.
2. Determine the road distance between two points with no more than 10 percent error, within 2 minutes.

TRAINING AND EVALUATION

Training Outline

1. Background information:

- a. Distance can be straight line (if you are walking cross country) or along a curved road or path.
- b. Distance for mounted travel should be determined in miles, since car odometers are graduated in miles. Distance for walking should be determined in meters, so you can use your pace count. There are 0.62 miles in a kilometer (1000 meters) and 1600 meters in a mile.
- c. All topographical maps are drawn to scale (1:24,000:, 1:62,500:, etc.). This means that a one millimeter of map distance equals 24,000 millimeters (24 meters) ground distance for a objective 1:24,000 USGS quadrangle.

2. Methods of Measuring Straight-line Distance:

- a. One method of determining ground distance from a map is to use a ruler to measure the distance between two map points and multiply that by the scale factor. However, this involves doing somewhat complicated multiplication in the field.
- b. A simpler way is to use the bar scales located at the bottom of the map. These scales are usually printed in meters, yards, and miles. By taking the ruler or the edge of a piece of paper and mark on it the straight-line distance between the two map points. Then put the ruler or piece of paper under the appropriate bar scale and read the ground distance in the appropriate units.

3. To find the road distance between two points on a map, place a tick mark on edge of the piece of paper and then place the tick mark at the first point. Align the paper with the road edge until you come to a curve, mark the paper and the map at the curve. Pivot the paper so that it continues to follow the road edge to the next curve. Repeat the process until you get to the second point, where you make the final tick mark on the paper. At this point you can take the paper to the appropriate bar scales and determine the ground distance between the first and last tick marks. This will be the road distance between the two points on the map.

Additional Information

More detailed information on this topic is available in Chapter 5 of the Ground Team Member and Leader Reference Text.

Evaluation Preparation

Setup: On an appropriate topographical map, mark two points on the map as A and B (these points should be 3,000 to 4,000 meters apart in ground distance). On a road or trail on the map, mark two points C and D at least 3,000 meters apart ground distance. Give the student the map, a pencil, a strip of paper, and a ruler.

Brief Student: Tell the student to determine the straight-line distance between points A and B to within a 5 percent error and the road distance from C to D to within a 10 percent error.

Evaluation

Performance measures

Results

The individual calculates the Straight-line Distance:

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|--|---|---|
| 1. Measures the straight line distance using the straight edge | P | F |
| 2. Determines the straight-line distance on the bar scale within 5 percent | P | F |
| 3. Completes the above within 2 minutes | P | F |

The individual calculates the Road Distance:

- | | | |
|--|---|---|
| 4. Measures the road distance using the piece of paper | P | F |
| 5. Determines the road distance on the bar scale within 10 percent | P | F |
| 6. Completes the above within 2 minutes | P | F |

Student must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.