

O-0213
CONVERT BETWEEN MAP AND COMPASS AZIMUTHS

CONDITIONS

Given a gridded map and an aviation map, each with magnetic variation information.

OBJECTIVES

Perform each of the following within one minute each: convert a magnetic azimuth to a grid azimuth, convert a grid azimuth to a magnetic azimuth, convert a magnetic azimuth to a true azimuth, and convert a true azimuth to a magnetic azimuth.

TRAINING AND EVALUATION

Training Outline

1. In order work with a map and compass, you must understand the concept of *Magnetic Variation (sometimes called declination)*:

a. There are 360 degrees in a circle, with 0° (which is also 360°) pointing north, 90° pointing east, 180° pointing south, and 270° pointing west.

b. There are actually three different “norths”: true, grid, and magnetic. You must be able to work with all three.

1) True North is the direction along the earth’s toward the north pole. Lines of longitude are “true north” lines, since they converge at the north pole. Aviation charts are “True North” maps.

2) Grid North is used by maps that are not gridded in longitude (such a military UTM maps). Grid lines are straight and do not converge at the north pole, so grid north can be different from true north, especially as you get near either pole.

3) Magnetic North is direction along the earth’s surface toward the north MAGNETIC pole. This is NOT the same as the north pole -- the north magnetic pole drifts slowly each year, and is never exactly at the north pole. In Maryland, for example, magnetic north is 10° - 11° off of True North. This is important, because your compass will point to magnetic north, but your map will either be drawn to true north or Grid North.

2. Converting from map to compass headings:

a. To convert between Magnetic North and True North on a True North Map:

1) Find the Magnetic Variation (sometimes called declination on non-aviation maps).

a) On an aviation chart, there will be magenta lines running generally from north to south on the chart with degree markings on them (for example “10° W”). Choose the line halfway between the two points you have marked on the chart.

b) On other maps, look to the legend. It should note the magnetic variation, or declination, of the map.

2) Note the number of degrees and whether it labeled East or West

3) To convert True (map) azimuths to Magnetic (compass) azimuths, remember the saying “EAST IS LEAST, WEST IS BEST”.

a) If the Magnetic Variation is East, *subtract* the Magnetic Variation from the True azimuth.

b) If the Magnetic Variation is West, *add* the Magnetic Variation from the True azimuth.

4) To convert Magnetic (compass) azimuths to True (map) azimuths, do the opposite of above.

a) If the Magnetic Variation is East, *add* the Magnetic Variation from the True azimuth.

b) If the Magnetic Variation is West, *subtract* the Magnetic Variation from the True azimuth.

b. To convert between Magnetic North and Grid North on a Grid North Map:

1) Find the Magnetic Variation (sometimes called declination on non-aviation maps or the G-M Angle (Grid-Magnetic) on military maps. This should be in the legend, or in a small box near the legend.

2) Note the number of degrees and whether it labeled East or West

3) To convert Grid (map) azimuths to Magnetic (compass) azimuths:

a) If the Magnetic Variation is East, *subtract* the Magnetic Variation from the True azimuth.

b) If the Magnetic Variation is West, *add* the Magnetic Variation from the True azimuth.

4) To convert Magnetic (compass) azimuths to True (map) azimuths, do the opposite of above.

a) If the Magnetic Variation is East, *add* the Magnetic Variation from the True azimuth.

b) If the Magnetic Variation is West, *subtract* the Magnetic Variation from the True azimuth.

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: Provide the student with a gridded topographical map and an aviation map. Ensure each map contains magnetic variation information. Mark a spot on each map. Provide the student with paper and a pencil or pen.

Brief Student: Tell the student that he will have one minute for each of four conversions, and may use paper and pencil for the math. Show the student the marked spot on each map. Tell him that the first two conversions are on the gridded topographical map. Then give the student a magnetic azimuth and ask him to tell you the grid azimuth. Then give him a grid azimuth and ask him to tell you the magnetic azimuth. Now tell him to use the aviation chart. Give him a magnetic azimuth and ask him to tell you the true azimuth. Finally, give him a true azimuth and ask him to tell you the magnetic azimuth.

Evaluation

<u>Performance measures</u>	<u>Results</u>	
1. Correctly converts a magnetic to a grid azimuth within 1 minute.	P	F
2. Correctly converts a grid to a magnetic azimuth within 1 minute.	P	F
3. Correctly converts a magnetic to a true azimuth within 1 minute.	P	F
4. Correctly converts a true to a magnetic azimuth within 1 minute.	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.