## PLOTTING THE COURSE

### OBJECTIVE

Build on prior lessons by finding the true course between two airports and then determining the magnetic course.

### MATERIALS (Per Group)

- VFR sectional chart
- Aeronautical chart plotter with rotating azimuth wheel

### PROCEDURE

1. Divide students into groups of three or four. They will need to select one airport as their starting point, and three additional airports that will represent destinations for three flights from the starting airport. When complete, they should have three plotted true courses in three different directions (for example, routes toward the south, east, and west). Students may then follow the directions below.
   a. Determine the true course between your starting airport and the first additional airport.
   b. Using the same starting airport, determine the true course to a second airport of your choosing.
   c. Again, using the same starting airport, determine the true course to the third airport of your choosing.
2. Recalling what they learned last semester, have the students find the dashed magenta isogonic lines on the sectional chart that show the magnetic variation near their chosen airports. Have the students try to figure out what the magnetic course would be between those airports using only the information on the charts. Once they've determined an answer, have the students check their work using SkyVector.
3. As a reminder: To check your work using SkyVector, right-click on the first airport and choose "PLAN" next to the airport name in the pop-up menu. Do the same thing on the destination airport, and SkyVector will display the magnetic course line between the two airports, labeled with the distance and direction in degrees.

### QUESTIONS

*Students may choose any airports, so responses will vary. After the students draw a line between the airports, the true course can be read directly off the VFR sectional chart using a plotter as the students learned in the previous lesson. The magnetic variation can be read directly off the sectional chart. Students may figure out that they need to subtract the magnetic variation (MV) from the true course if the MV is easterly, or add it if it is westerly. If they don't figure this out on their own, the course given by SkyVector should help them figure this out. This guided "discovery" should be the focus of the class discussion at the end of the activity.*

1. Starting Airport: Destination Airport 1:

   a. True Course:

   b. Magnetic Variation:

c. Magnetic Course (calculated):

d. Magnetic Course (SkyVector):

2. Starting Airport: Destination Airport 2:

a. True Course:

b. Magnetic Variation:

c. Magnetic Course (calculated):

d. Magnetic Course (SkyVector):

3. Starting Airport: Destination Airport 3:

a. True Course:

b. Magnetic Variation:

c. Magnetic Course (calculated):

d. Magnetic Course (SkyVector):

4. What did you find out about the effect of the magnetic variation on the true course?

*Responses may vary, but students should have discovered that the magnetic variation needed to be added to the true course if westerly, or subtracted from the true course if easterly.*

5. Which course do you think a pilot references and flies in the airplane?

*A pilot references a magnetic compass or heading indicator while flying, so they rely on magnetic courses.*

6. What would happen if a pilot flew a true course when they meant to fly a magnetic course?

*In most areas, the magnetic variation is at least a few degrees, meaning that if a pilot flew one course instead of the other, they would be several degrees off of their intended course. Over the length of a flight, this could cause the pilot to be many miles away from their intended destination, potentially missing the destination altogether.*