Chapter 8 Problem Wrap-Up

Student Text Pages
431

Suggested Timing
15–20 min

Tools
- protractor
- ruler

Technology Tools
- computer
- *The Geometer's Sketchpad*®
- Internet access

Related Resources
- G–4 Protractor
- T–4 *The Geometer's Sketchpad*® 3
- T–5 *The Geometer's Sketchpad*® 4
- BLM 8–12 Chapter 8 Problem Wrap Up Rubric

Using the Chapter Problem

- Encourage students to draw from what they learned in the chapter to create their trigonometry problems. Have students prepare for this task by looking at one of the four Chapter Problem questions in pairs or small groups. In addition, students can look at other questions that have an aeronautical context (e.g., Section 8.1, question 10; Section 8.2, questions 8 and 13; Section 8.4, question 4).
- Suggest that their question may contain several parts, some simple and others more challenging. If desired, require that a solution use only the sine law or only the cosine law. (Note: Multiple solutions using both laws and a diagram may be required for level 3 and 4 performances.)
- Suggest that some students use *The Geometer's Sketchpad*® (GSP) as a tool to provide a scale model of the problem situation. However, since the chapter expectations are on the ability to use trigonometry to solve problems, these students should share/compare their solution with a trigonometric solution for the same or a similar problem.
- Motivate students to prepare good quality, interesting, and fair problems by offering to use some of the student-generated questions as part of the Chapter Test. One possibility is to assign different sections of the chapter to different groups of students in order to ensure a broad base of questions to draw from.
- Use **T–4 *The Geometer's Sketchpad*® 3** or **T–5 *The Geometer's Sketchpad*® 4** to support this activity.

Summative Assessment

- Use **BLM 8–12 Chapter 8 Problem Wrap-Up Rubric** to assess student achievement.

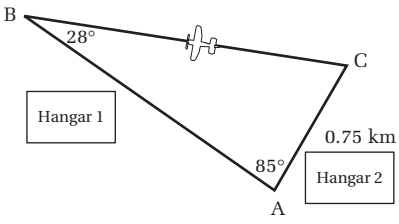
Level 3 Sample Response

Problem:

Vicki is learning to fly at a small airfield north of the city. She needs to know the length of the runway. Vicki's flight instructor has given her a drawing of the airfield in which the runway, BC, is part of △ABC and the other sides, AB and AC, are taxiways to the hangars.

a) How long is the runway, BC?

b) How long is the other taxiway, AB?



Solution:

a) Use the sine law.

$$\frac{0.75}{\sin 28°} = \frac{BC}{\sin 85°}$$

$$\sin 85° \left(\frac{0.75}{\sin 28°}\right) = BC$$

$$1.59 \doteq BC$$

The runway is about 1.59 km long.

b) $\angle C = 180° - 85° - 28°$
$= 67°$

Use the sine law.

$$\frac{AB}{\sin 67°} = \frac{0.75}{\sin 28°}$$

$$AB = \sin 67° \left(\frac{0.75}{\sin 28°}\right)$$

$$AB \doteq 1.47$$

The taxiway is about 1.47 km long.

Alternatively, use the cosine law.

$$AB^2 = BC^2 + AC^2 - 2(BC)(AC)(\cos C)$$
$$AB^2 = 1.59^2 + 0.75^2 - 2(1.59)(0.75)(\cos 67°)$$
$$AB^2 = 2.1587\ldots$$
$$AB^2 = \sqrt{2.1587\ldots}$$
$$AB \doteq 1.47$$

The taxiway is about 1.47 km long.

Level 3 Notes

Look for the following:

- Clear understanding of trigonometric concepts
- Correct use of the sine law and cosine law
- Mostly accurate calculations to a specified degree of accuracy
- Planning and thinking in developing strategies and trigonometric applications in posing and solving the problem
- Inclusion of a reasonably accurate and appropriate diagram with or without GSP
- Well-constructed mathematical arguments
- Use of good form and correct mathematical notation

What Distinguishes Level 2

At this level, look for the following:

- Some understanding of trigonometric concepts
- Somewhat correct use of the sine law and cosine law
- Some accurate calculations to a specified degree of accuracy
- Some planning and thinking in developing strategies and trigonometric applications in posing and solving the problem
- Lack of a diagram or inclusion of an inappropriate diagram
- Some well-constructed mathematical arguments
- Some use of good form and correct mathematical notation

What Distinguishes Level 4

At this level, look for the following:

- Very clear understanding of trigonometric concepts
- Detailed use of the sine law and cosine law
- Accurate calculations to a specified degree of accuracy
- Detailed planning and thinking in developing strategies and trigonometric applications in posing and solving the problem
- Inclusion of an accurate and appropriate diagram with or without GSP
- Detailed, well-constructed mathematical arguments
- Use of very good form and correct mathematical notation