Right Triangle Trigonometry

Opener

***Mathematics 10*, pages 98–99**

Suggested Timing

30–40 min

Blackline Masters

BLM 3–2 Chapter 3 Prerequisite Skills
BLM 3–4 Chapter 3 Unit 1 Project
BLM U1–1 Unit 1 Project
BLM U1–2 Unit 1 Project Checklist

Key Terms

opposite side
adjacent side
cosine ratio
primary trigonometric ratios
hypotenuse
tangent ratio
sine ratio

What's Ahead

In this chapter, students learn about the primary trigonometric ratios: tangent, sine, and cosine. These ratios can be used to find missing sides or missing angles. The chapter ends by combining all methods to solve triangles (find all the missing sides and angles).

Planning Notes

Explain that the chapter is about using the relationships among the sides and angles of a right triangle to find unknown measurements. Tell students that they will rely on their existing knowledge and skills of solving one-step equations and proportions. Direct students to the information about some of the different areas that trigonometry is used. Have students discuss what they know about the work in these areas and how trigonometry might be related to the work.

Unit Project

You might take the opportunity to discuss the Unit 1 project described in the Unit 1 opener on TR page 2. Throughout the chapter, there are individual questions for the Unit Project. These questions are not mandatory but are recommended because they provide some of the research needed for the final report for the Unit 1 project assignment.

You will find questions related to the project in the Check Your Understanding in sections 3.1 and 3.3.

Foldables™ Study Tool

Discuss with students the benefits of keeping a summary of what they are learning in the chapter. If they have used Foldables before, you may wish to have them report on how useful they found various designs.

- What designs have they used?
- Which designs were the most useful?
- Which, if any, designs were hard to use?
- What disadvantages do Foldables have?
- What other method(s) could they use to summarize their learning?

Discuss the Foldable design on page 99 and how it might be used to summarize Chapter 3. Encourage students to suggest revisions for this Foldable, or to replace this Foldable with another design of their choice. Allowing personal choice in this way will increase student ownership in their work.

Give students time to develop the summary method they have chosen. Discuss with them the advantage of keeping track of what they need to work on, and ask them to include a method for doing so.

As students progress through the chapter, provide time for them to keep track of what they need to work on. This will assist them in identifying and solving any difficulties with concepts, skills, and processes. Have them check off each item as they deal with it.

Meeting Student Needs

- Consider having students complete the questions on **BLM 3–2 Chapter 3 Prerequisite Skills** to activate the prerequisite skills for this chapter.
- Consider having students staple a copy of **BLM U1–2 Unit 1 Project Checklist** to the back of the Foldable. They can check off items as they complete them. Students may also wish to start a formula section in their Foldable for trigonometric relationships.

- You may wish to post the student learning outcomes for the entire chapter in the classroom. You could color-code the outcomes by section in the chapter. Ensure that students understand the outcomes as written. This will help them to self-assess their progress and to identify areas of weakness.
- Make a bulletin board display or a large chart showing a large right triangle labelled with all the related definitions students have written.
- To reinforce the Key Terms, post seven sheets of paper around the room, each labelled with one Key Term. Have student pairs respond to the following prompts for each term:
  – definition in their own words
  – example in daily life
  – facts

  Have student pairs move around the room and use diagrams and words to contribute to each Key Term. Once each pair has contributed, have students review all the entries to see what others have written. As a class, debrief each sheet to conclude the activity. Leave the sheets on display throughout the chapter.
- Some students may find it useful to keep a taped or oral summary of what they are learning. Others may work best with a keyboarded version in a software application of their choice.
- Invite a carpenter or architect to talk to the class about design and how math skills related to trigonometry are used in their profession.
- If you have student do the Unit 1 project questions, consider offering them the opportunity to work on these alone or with a partner.
- Some students may benefit from completing all unit project questions.
- **BLM 3–4 Chapter 3 Unit 1 Project** includes all of the unit project questions for this chapter. These questions provide a beginning for the Unit 1 project.

ELL

- For each section of the textbook, you may want to consider the following approach as a way to assist students:
  – Read the opening paragraphs as a class, and discuss any definitions given in the paragraph. Identify any words with which students are unfamiliar. Suggest that students restate the meaning of the material in their own words. You may even consider having students restate the meaning in their own language first, and then restate it again in English.
  – Discuss and identify examples of any definitions. Provide the class with any necessary materials. Work through the investigation as a class exercise. It may assist students to work in pairs to respond to the Reflect and Respond question. You may even have the class share their findings, and then construct a class response.
  – Work through each Example and Solution as a class, demonstrating the process of solving each problem. Ask the students to work in pairs to solve the Your Turn questions.

Enrichment

- Consider the following triangles, with the given side lengths:
  – Triangle A: 3, 4, 5
  – Triangle B: 1, 1, $\sqrt{2}$
  – Triangle C: 1, 2, $\sqrt{3}$

  As students learn right-triangle facts and processes, encourage them to find why these three triangles have special mathematical significance.

Gifted

- After reading the chapter opener, have students speculate about how finding distances in space terms might be particularly challenging.

Career Connection

You might want to discuss what it means to be an astronomer: what do they do? what kinds of questions do they attempt to answer? what are some of the emerging topics in this field? Many students may not recognize how integral (and complex) the mathematics of astronomy is. Invite them to research the training and qualifications, and employment opportunities in this field. Have them locate where astronomers work in Canada, in their province, and possibly even in their community (they might also look at some of the interesting locations astronomers work around the world). What role could they see trigonometry playing in this career? Have them visit the web link below as a starting point for their research.

Web Link

Students could visit www.mhrmath10.ca and follow the links to learn more about astronomers and astronomy.