1.5 Make Decisions Using Trigonometry

Student Text Pages
42–51

Suggested Timing
140 min

Tools
- calculators

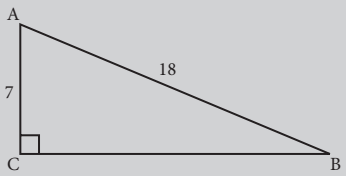
Related Resources
BLM 1-10 Section 1.5 Match Me Up Cards
BLM 1-11 Section 1.5 Make Decisions Using Trigonometry
BLM 1-12 Section 1.5 Achievement Check Rubric
BLM 1-13 Section 1.5 Literacy Connect
BLM A-18 Opinion Piece Checklist

Link to Prerequisite Skills

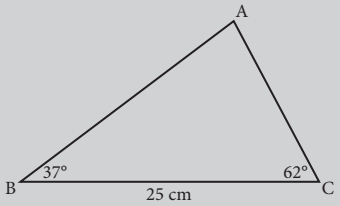
Students should complete Prerequisite Skills questions 1 to 3, 6, and 8 to 10 before proceeding with this section.

Warm-Up

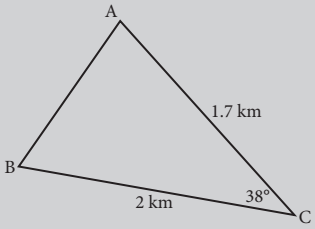
1. Use the primary trigonometric ratios to solve the triangle.



2. Use the sine law to solve the triangle.



3. Use the cosine law to solve the triangle.



Warm-Up Answers

1. $a = 16.6$, $\angle A = 67°$, $\angle B = 23°$
2. $\angle A = 81°$, $c = 22.3$ cm, $b = 15.2$ cm
3. $c = 1.2$ km, $\angle B = 58°$, $\angle A = 84°$

Teaching Suggestions

Warm-Up

- Write the Warm-Up questions on the board or on an overhead. Have students complete the questions independently. Then, discuss the solutions as a class.

Section Opener

- Discuss the section opener. Have students suggest other situations where unknown measures are calculated.

Investigate

- Have students work in pairs to complete the Investigates and then discuss their results.
- Supply students with **BLM 1-10 Section 1.5 Match Me Up Cards** for Investigate 1.

- You can use these questions for additional practice.
  1. Luigi is flying his kite, which is attached to a 32-m long string. The angle of elevation of the kite is 20°. What is the height of the kite? Include a diagram. (10.9 m)
  2. Flying squirrels are known for their ability to glide from one tree to another. Three trees (oak, elm, and maple) near a flying squirrel's home form a triangle. The angle from the oak to the maple to the elm is 48°. The angle from the maple to the oak to the elm is 67°. The distance between the oak and the maple is 10 m. How far does the flying squirrel have to jump to get from the oak to the elm? Include a diagram. (10.2 m)
  3. Roma's soccer player Totti takes a shot towards the goal, which is 7.32 m wide. The ball is 36 m from the left goal post and 34 m from the right goal post. Within what angle must he shoot to get the ball into net? (18°)

Investigate Answers (pages 42–43)

Investigate 2

1. $40 \times \sin 26° = 17.53$ m
2. Let A be the first light, B be the second light, and C be the third light. Use the cosine law: $\cos A = 0.3$, $\angle A = 72.54°$. Use the sine law: $\angle B = 64.90°$, $\angle C = 57.27°$.
3. Let DS represents the distance between Stockholm and Doria. Use the cosine law: $DS^2 = 20^2 + 24^2 + 2(20)(24)(\cos 32°)$, DS = 42.31 knots.

Examples

- Have students work through the Examples as a class before proceeding to the Discuss the Concepts.

Key Concepts

- Make memory aid diagrams associating the triangle and the tool or formula to be used. Include the necessary information. Encourage students to use short forms to remember: right triangle, use SOH-CAH-TOA; AAS or SSA, use sine law; SAS or SSS, use cosine law

Discuss the Concepts

- Give students time to formulate their answers before discussing the questions as a class.

Discuss the Concepts Suggested Answers (page 48)

D1. No. Need to know the measures of at least two sides, or of one side and one acute angle.

D2. No. Many possible triangles can be formed given one side and one angle measure. Need one more side or one more angle measure before the triangle can be solved for an unknown angle.

Practise (A)

- Encourage students to refer to the Investigates and the Examples before asking for assistance.

Apply (B)

- For **questions 3** to **5**, you may want to explain some golf terms to your class, such as hazard, eagle, lay up, irons, etc.
- **Question 5** is a Literacy Connect. You may wish to assign this question as a journal entry or to discuss the question as a class.

Common Errors

- Some students may use the sine law to find the second angle of a triangle, such as in Example 3.

R_x Have students find the smallest angle in the triangle first.

Accommodations

Visual—encourage the use of technology to draw diagrams needed for problems

Spatial—provide additional scaffolding for problems in paragraph form

Perceptual—provide diagrams for the problems

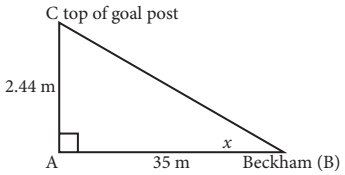
Gifted and Enrichment—have students prepare a poster showing the application of trigonometry in a favourite sport

Language—allow a reading partner to assist with the interpretation of the problems

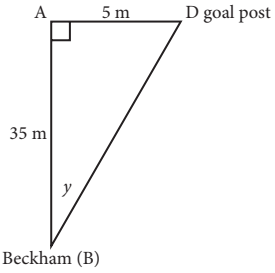
- **Question 11** is an Achievement Check question. You may wish to use **BLM 1-12 Section 1.5 Achievement Check Rubric** to assist you in assessing your students.

Extend (C)

- Assign the Extend questions to students who are not being challenged by the questions in Apply.
- For **question 11**, tell students they need to find the vertical angle (from the goalie to Beckham to the top of the right post) and the horizontal angle (from the goalie to Beckham to the goal post) within which Beckham can score. Supply student with these diagrams if they need assistance.



Side View



Top View

Achievement Check Answers (page 50)

11. a) 3.86 km
b) 226.26 km
c) Assume that athletes will swim in a straight line from S to F.

Literacy Connect

- Distribute copies of **BLM 1-13 Section 1.5 Literacy Connect**. Have students work in pairs to complete this read and understand opinion piece. You may wish to use **BLM A-18 Opinion Piece Checklist** to assess students' responses.
- This literacy activity may be assigned at any convenient time while students are working on Chapter 1.
- Please refer to page xv of the Overview in this Teacher's Resource for further information about these special literacy BLMs.

Mathematical Process Expectations

Process Expectation	Questions
Problem Solving	1, 3, 4, 6, 7, 11–13
Reasoning and Proving	1, 3–5, 9, 12, 14
Reflecting	5
Selecting Tools and Computational Strategies	2–4, 6–8, 10–14
Connecting	3, 4, 12
Representing	5, 9, 14
Communicating	3–5, 9, 11, 12

Extra Practice

- You may wish to use **BLM 1-11 Section 1.5 Make Decisions Using Trigonometry** for remediation or extra practice.