## FREQUENTLY ASKED *Questions*

Q: **To use the cosine law, what do you need to know about a triangle?**

A: You need to know the measurements of three sides, or two sides and the contained angle in the triangle. You can calculate the length of a side if you know the measure of the angle that is opposite the side, as well as the lengths of the other two sides. You can calculate the measure of an angle if you know the lengths of all three sides.

EXAMPLE

Can you use the cosine law to determine the length of *RQ*? Explain.
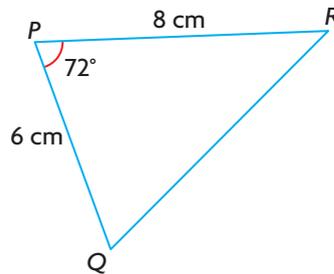
Solution
Yes. You know the lengths of two sides and the angle that is opposite the side you want to determine. Solving for *p* will give you the measure of *RQ*.

$$p^2 = 8^2 + 6^2 - 2(8)(6)\cos 72°$$

Q: **When solving a problem that can be modelled by an acute triangle, how do you decide whether to use the primary trigonometric ratios, the sine law, or the cosine law?**

A: Draw a clearly labelled diagram of the situation to see what you know.
- If the diagram involves one or more right triangles, you might be able to use a primary trigonometric ratio.
- Use the sine law if you know the lengths of two sides and the measure of one opposite angle, or the measures of two angles and the length of one opposite side.
- Use the cosine law if you know the lengths of all three sides, or two sides and the angle between them.

You may need to use more than one strategy to solve some problems.

PRACTICE Questions

Lesson 8.1

1. Jane claims that she can draw an acute triangle using the following information: $a = 6$ cm, $b = 8$ cm, $c = 10$ cm, $\angle A = 30°$, and $\angle B = 60°$. Is she correct? Explain.

2. Which of the following are not correct for acute triangle DEF?

    a) $\dfrac{d}{\sin D} = \dfrac{f}{\sin F}$ c) $f \sin E = e \sin F$

    b) $\dfrac{\sin E}{e} = \dfrac{\sin D}{d}$ d) $\dfrac{d}{\sin D} = \dfrac{\sin F}{f}$

Lesson 8.2

3. Calculate the indicated side length or angle measure in each triangle.

    a)

    b)
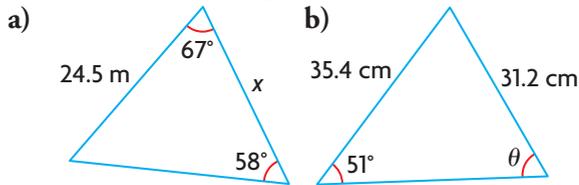
4. In $\triangle ABC$, $\angle B = 31°$, $b = 22$ cm, and $c = 12$ cm. Determine $\angle C$.

5. Solve $\triangle ABC$, if $\angle A = 75°$, $\angle B = 50°$, and the side between these angles is 8.0 cm.

6. Allison is flying a kite. She has released the entire 150 m ball of kite string. She notices that the string forms a 70° angle with the ground. Marc is on the other side of the kite and sights the kite at an angle of elevation of 30°. How far is Marc from Allison?
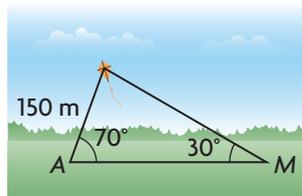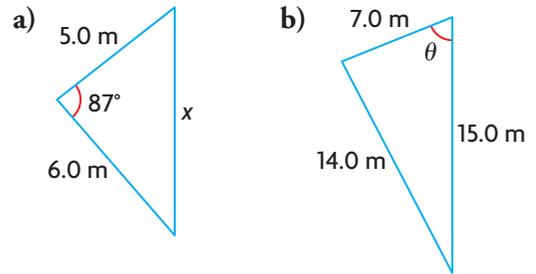
Lesson 8.3

7. Which of these is not a form of the cosine law for $\triangle ABC$? Why not?
    a) $a^2 = b^2 + c^2 - 2bc \cos B$
    b) $c^2 = a^2 + b^2 - 2ab \cos C$
   c) $b^2 = a^2 + c^2 - 2ac \cos B$

Lesson 8.4

8. Calculate the indicated side length or angle measure.

    a)

    b)

9. Solve $\triangle ABC$, if $\angle A = 58°$, $b = 10.0$ cm, and $c = 14.0$ cm.

10. Two airplanes leave an airport at the same time. One airplane travels at 355 km/h. The other airplane travels at 450 km/h. About 2 h later, they are 800 km apart. Determine the angle between their paths.

Lesson 8.5

11. From the top of an 8 m house, the angle of elevation to the top of a flagpole across the street is 9°. The angle of depression is 22° to the base of the flagpole. How tall is the flagpole?
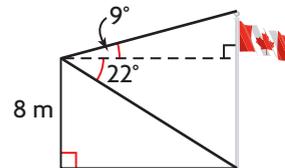
12. A bush pilot delivers supplies to a remote camp by flying 255 km in the direction N52°E. While at the camp, the pilot receives a radio message to pick up a passenger at a village. The village is 85 km S21°E from the camp. What is the total distance that the pilot will have flown by the time he returns to his starting point?

13. A canoeist starts from a dock and paddles 2.8 km N34°E. Then she paddles 5.2 km N65°W. What distance, and in which direction, should a second canoeist paddle to reach the same location directly, starting from the same dock?