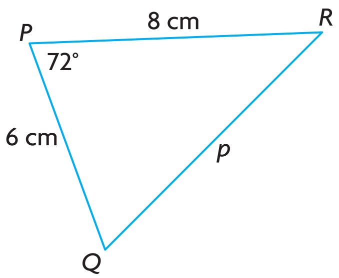
FREQUENTLY ASKED Questions

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

A: You need to know two sides and the contained angle, or three sides in the triangle.

For example, you can use the cosine law to determine the length of p.



You know:

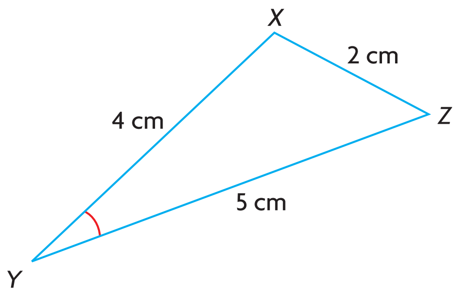
- the lengths of two sides.
- the measure of the contained angle.

You can use the cosine law to determine the length of the side opposite the contained angle, p.

$p^2 = 8^2 + 6^2 - 2(8)(6)\cos 72°$

Solving for p will determine the length.

You can also use the cosine law to determine the measure of $\angle Y$.



You know:

- the lengths of all three sides.

You can use the cosine law to determine the measure of $\angle Y$.

$2^2 = 4^2 + 5^2 - 2(4)(5)\cos Y$

$$\frac{2^2 - 4^2 - 5^2}{-2(4)(5)} = \cos Y$$

Solving for Y will determine the measure of $\angle Y$.

Study Aid

- See Lesson 3.3, Examples 1 to 3.
- Try Chapter Review Questions 6 to 9.

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 record what you know.

- You may be able to use a primary trigonometric ratio if the diagram involves a right triangle.
- Use the sine law if you know two sides and one opposite angle, or two angles and one opposite side.
- Use the cosine law if you know all three sides, or two sides and the angle between them.

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

Study Aid

- See Lesson 3.4, Examples 1 to 3.
- Try Chapter Review Questions 10 to 12.

PRACTISING

Lesson 3.1

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

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

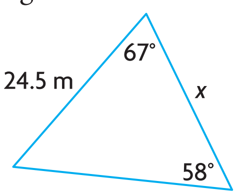
   c) $f \sin E = e \sin F$

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

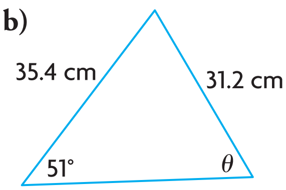
Lesson 3.2

3. Determine the indicated side or angle in each triangle to the nearest tenth of a unit.

   a)

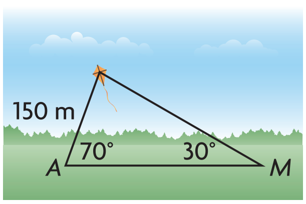


   b)



4. Solve $\triangle ABC$, if $\angle A = 75°$, $\angle B = 50°$, and the side between these angles is 8.0 cm. Round answers to the nearest tenth of a unit.

5. 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 sees the kite at an angle of elevation of 30°. How far is Marc from Allison, to the nearest tenth of a metre?



Lesson 3.3

6. Which of these is not a form of the cosine law for $\triangle ABC$? Explain.

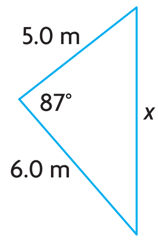
   a) $a^2 = b^2 + c^2 - 2bc \cos B$

   b) $c^2 = a^2 + b^2 - 2ab \cos C$

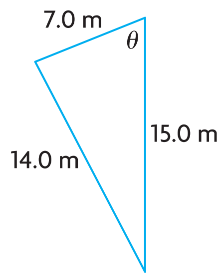
   c) $b^2 = a^2 + c^2 - 2ac \cos B$

7. Determine the indicated side or angle. Round answers to the nearest tenth of a unit.

   a)



   b)

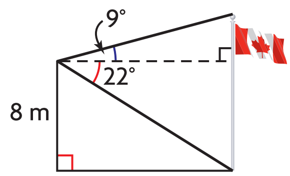


8. Solve $\triangle ABC$, if $\angle A = 58°$, $b = 10.0$ cm, and $c = 14.0$ cm. Round answers to the nearest tenth of a unit.

9. Two airplanes leave the Hay River airport in the Northwest Territories 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, to the nearest degree.

Lesson 3.4

10. From a window in an apartment building, 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, to the nearest tenth of a metre?



11. 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, to the nearest kilometre, that the pilot will have flown by the time he returns to his starting point?

12. 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? Round all answers to the nearest tenth of a unit.