

(A) Lesson Objectives

- a. Demonstrate a derivation of the Cosine Law
- b. Work with the Cosine Law in triangles
- c. Apply the Cosine Law to Word Problems

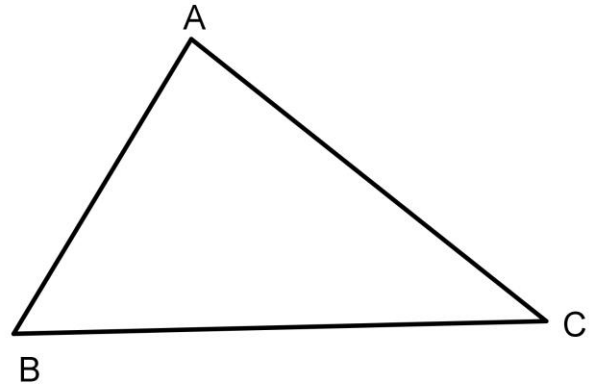
(B) Opening Example – Solving a SAS triangle

Solve for side a in $\triangle ABC$ if $\angle A = 63^\circ$, $b = 10$ cm and $c = 12$ cm.

(C) The Cosine Law

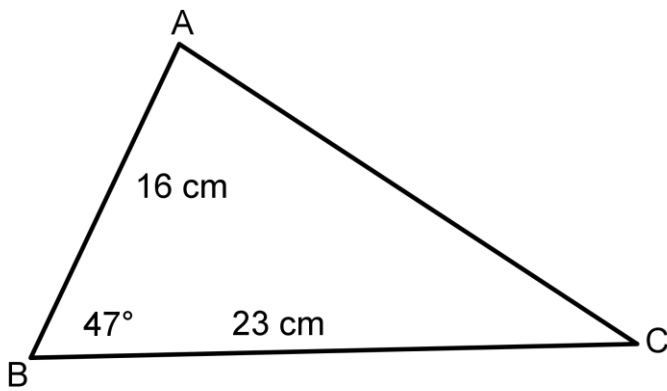
The cosine law can be written as

$a^2 = b^2 + c^2 - 2bc \cos A$ which can be rearranged or rewritten as is necessary (when solving for another side or even when solving for an angle).

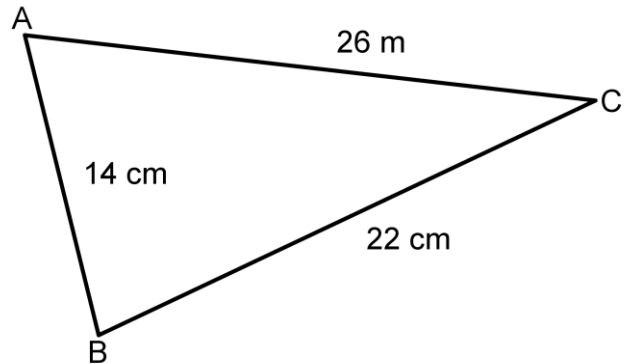


(D) Working with the Cosine Law

EXAMPLE #1: Solve for side AC and then determine the measure of angle A



EXAMPLE #2: Solve for angle C and then determine the measure of angle A



(E) Applications of the Cosine Law

A triangular lot sits at the corner of two streets that intersect at an angle of 58° . One street side of the lot is 32 meters long and the other street side is 40 meters long.

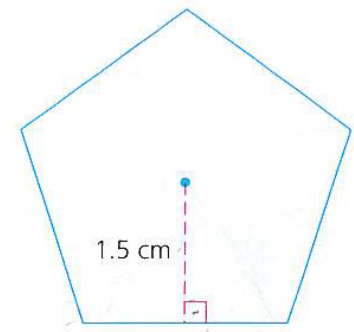
- i. This triangular field is to be fenced. Determine the total perimeter of the field.
- ii. Determine the total area of the field.

(F) Applications of the Cosine Law

- a. A bicycle race follows a triangular course. The three legs of the race are, in order, 23 km, 59 km and 62 km. Find the angle between the starting leg and finishing leg to the nearest degree.

b. CHALLENGE QUESTIONS:

26. **Thinking, Inquiring, Problem Solving:** Find the perimeter and area of this regular pentagon.



27. An airplane is flying from Montreal to Vancouver. The wind is blowing from the west at 60 km/h. The plane flies at 750 km/h relative to the air. If the pilot wishes to fly at a heading of $N65^\circ W$
- what heading should he take to compensate for the wind?
 - what is the speed of the plane relative to the ground?