

**(A) Lesson Context**

|                           |   |  |   |
|---------------------------|---|--|---|
| BIG PICTURE of this UNIT: | <ul style="list-style-type: none"> <li>How do we work through geometry based problems, wherein triangles are used to model the problem</li> <li>How do we model phenomenon that are periodic in nature</li> </ul> |  |   |
| CONTEXT of this LESSON:   | Where we've been<br><br>We have reviewed SOHCAHTOA and working through right triangles as well as the Sine Law  | Where we are<br><br>How can we work in non-right triangles wherein the information provided is in a SAS or SSS pattern | Where we are heading<br><br>How do we work in any given triangle (right, acute, obtuse) |

**(B) Lesson Objectives:**

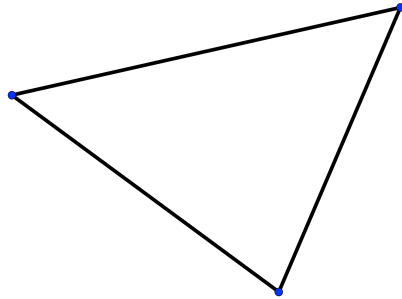
- Introduce terms and conventions used when discussing angles and triangles.
- Investigate the Cosine Law through constructions and measurements.
- Solve for unknowns in non-right triangles using the Cosine Law.
- Apply the Cosine Law to word problems.

**(C) Fast Five:** Use the sine law and/or RTT to solve the following:

- (a) Solve for side  $a$  in  $\triangle ABC$  if  $\angle A = 63^\circ$ ,  $b = 10$  cm and  $c = 12$  cm.      (b) Solve for angle A in  $\triangle ABC$  if  $a = 7$  cm,  $b = 10$  cm and  $c = 12$  cm.

**(D) Terms**

- a. **Naming Conventions for Sides and Angles:** (see diagram)

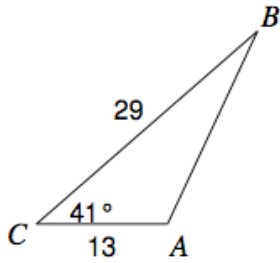


- (E) Cosine Law Development** → In the space provided below, construct an acute triangle and CAREFULLY measure the length of the sides and the corresponding angles. Record your measurements and use these measurements to determine the required ratios:

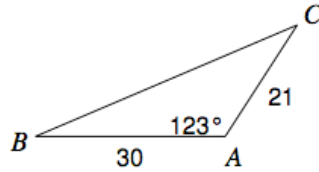
**TWO Statements of the Cosine Law**

**(F) Working with the Cosine Law – Triangles**

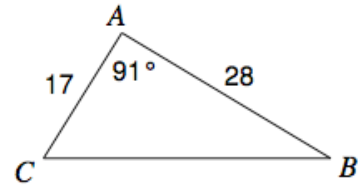
1) Find AB



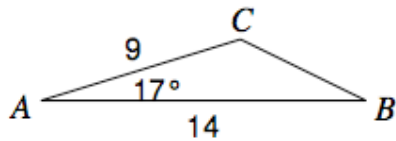
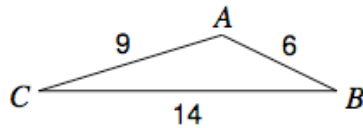
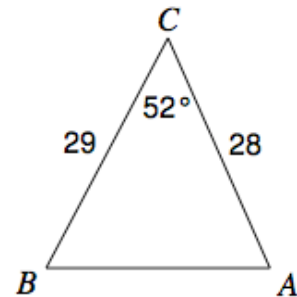
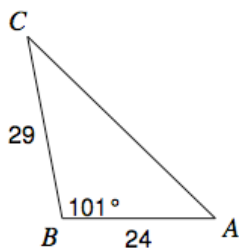
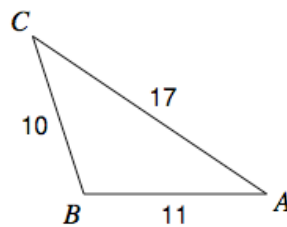
2) Find BC



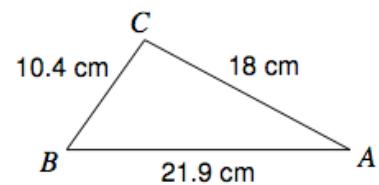
3) Find BC



4) Find BC

7) Find  $m\angle A$ 9) Find  $m\angle A$ 10) Find  $m\angle C$ 11) Find  $m\angle A$ 

16)

(a) Solve for side  $a$  in  $\triangle ABC$  if  $\angle A = 63^\circ$ ,  $b = 10$  cm and  $c = 12$  cm.(b) Solve for side  $a$  in  $\triangle ABC$  if  $a = 7$  cm,  $b = 10$  cm and  $c = 12$  cm.

**(G)Working with the Cosine Law – Word Problems**

(1) A triangular lot sits at the corner of two streets that intersect at an angle of  $58^\circ$ . One street side of the lot is 32 meters long and the other street side is 40 meters long.

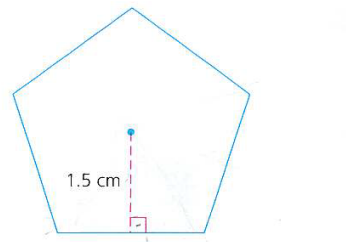
(A) This triangular field is to be fenced. Determine the total perimeter of the field.

(B) Determine the total area of the field.

(2) 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.

a. 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  $N65^\circ W$
- (a) what heading should he take to compensate for the wind?
  - (b) what is the speed of the plane relative to the ground?