(A) Lesson Context

BIG PICTURE of this UNIT:	• How do work through geometry based problems, wherein triangles are used to model the problem • How do we model phenomenon that are periodic in nature		
CONTEXT of this LESSON:	Where we've been We have reviewed SOHCAHTOA and working through right triangles as well as the Sine Law	Where we are How can we work in non-right triangles wherein the information provided is in a SAS or SSS pattern	Where we are heading How do we work in any given triangle (right, acute, obtuse)

(B) Lesson Objectives:

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

(C) Opening Exercises: Solve the following triangles:

In ΔABC, $\angle$B = 79° and $\angle$C = 66° and a = 36 cm
In ΔABC, $\angle$A = 56° and a = 6.7 cm and b = 7.2 cm
In ΔDEF, $\angle$F = 63° and f = 9.0 cm and d = 9.5 cm
In ΔDEF, $\angle$D = 51° and $\angle$E = 42° and d = 6 cm

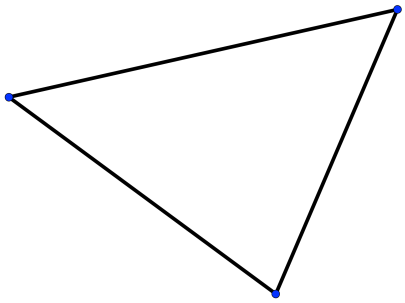
(D) Exercise #2: Solve the following:

(a) Solve for side ***a*** in ΔABC if $\angle A = 63°$, ***b*** = 10 cm and ***c*** = 12 cm.

(b) Solve for angle A in ΔABC if ***a*** = 7 cm, ***b*** = 10 cm and ***c*** = 12 cm.

(E) Terms

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



(F) Cosine Law Development ➔

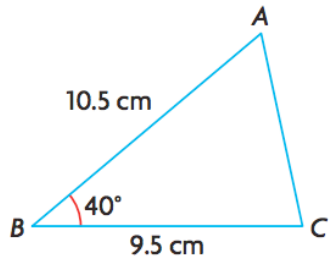
In the space provided below, construct an acute triangle and CAREFULLY measure the length of the sides and the corresponding angles. Record your measurements and use these measurements to determine the required ratios:

TWO Statements of the Cosine Law

(G) Working with the Cosine Law – Triangles

3. Determine each unknown side length.

a)



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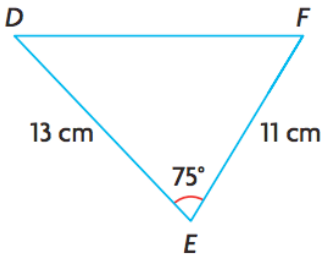

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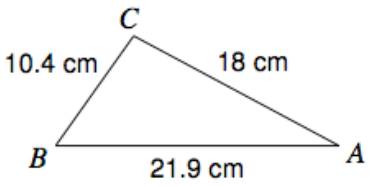
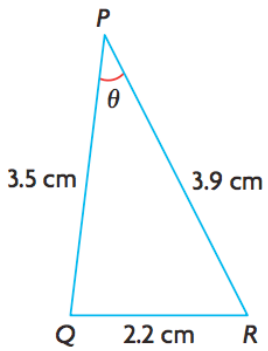


4. Determine the measure of each indicated angle to the nearest degree.

a)



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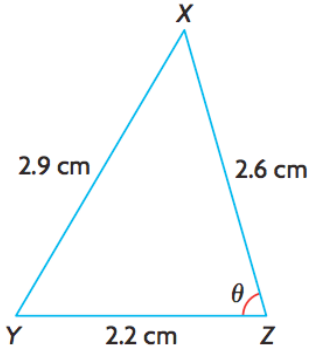
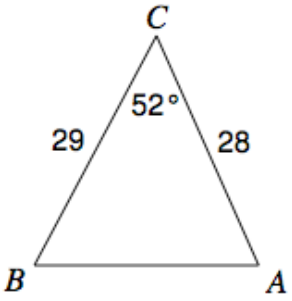


9) Find $m\angle A$



5. Solve each triangle.

K **a)** In $\triangle DEF$, $d = 5.0$ cm, $e = 6.5$ cm, and $\angle F = 65°$.

b) In $\triangle PQR$, $p = 6.4$ m, $q = 9.0$ m, and $\angle R = 80°$.

c) In $\triangle LMN$, $l = 5.5$ cm, $m = 4.6$ cm, and $n = 3.3$ cm.

d) In $\triangle XYZ$, $x = 5.2$ mm, $y = 4.0$ mm, and $z = 4.5$ cm.

6. Determine the perimeter of $\triangle SRT$, if $\angle S = 60°$, $r = 15$ cm, and $t = 20$ cm.

(a) Solve for side ***a*** in ΔABC if $\angle A = 63°$, ***b*** = 10 cm and ***c*** = 12 cm.

(b) Solve for side ***a*** in ΔABC if ***a*** = 7 cm, ***b*** = 10 cm and ***c*** = 12 cm.

(H)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°. One street side of the lot is 32 meters long and the other street side is 40 meters long.

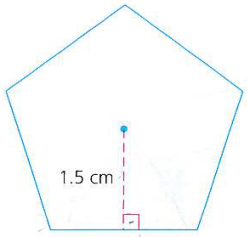
(A) This triangular field is to be fenced. Determine the total perimeter of the field.

(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°W

(a) what heading should he take to compensate for the wind?

(b) what is the speed of the plane relative to the ground?