Are there any Homework Questions you would like to see on the board?

pp. 289-290 # 6 – 11 **AND** 85
READ p. 291 **AND**
pp. 292-293 # 1 – 11

Today's Learning Goal(s):

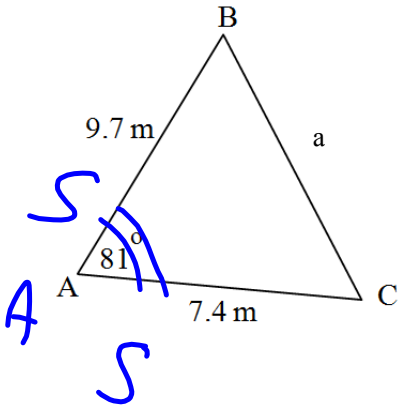
Return SWYK 5.1?

By the end of the class, I will be able to:

a) Correctly write the cosine **LAW** in one of the two forms.
b) Use the cosine law to solve a non-right triangle.

Warm-up (This will become Ex. 1)

Write the sine law for the following triangle:



S A S

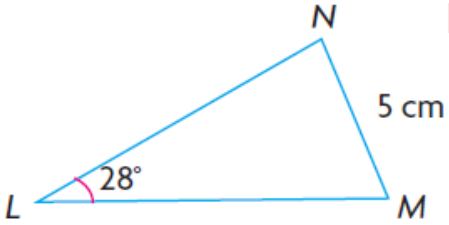
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{a}{\sin 81^\circ} = \frac{7.4}{\sin B} = \frac{9.7}{\sin C}$$

p. 289

8. Solve each triangle. Round each length to the nearest centimetre and each angle to the nearest degree.

b)



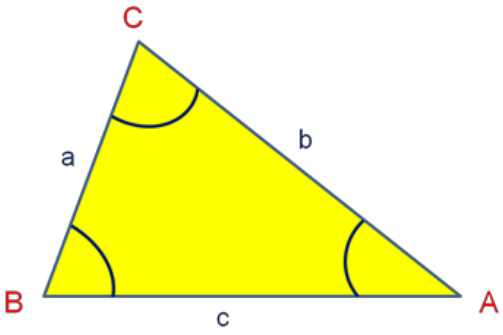
Not enough info given to solve!

MCF 3MI 5.4 Applying the Cosine **LAW** in Acute Triangles

Date: Apr. 23/18

Collect Homework 5.1 pp.271-273 #3-5, 7-11, 14

The Cosine **Law** can be used with any triangle, even if it is not a right triangle.
Given <u>any</u> triangle,



① $a^2 = b^2 + c^2 - 2bc\cos A$ (SAS)

and

② $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$ (SSS)

When the triangle we are solving involves 2 known sides and the contained angle (a.k.a. SAS), then we use the formula given in ①, because the sine law will not work.

<u>Remember</u> to take the <u>square root of the answer</u> to find *a*.

When the triangle we are solving involves 3 known sides, but no known angles (a.k.a. SSS), then we use the formula given in ②.

<u>Remember</u> to take the inverse cos, (or $\cos^{-1}$) to find the <u>measure</u> of angle A.
Note: In this case, <u>always find the largest angle first</u>, in case it is an obtuse angle.
The largest angle will be located opposite the longest side. [Think about it!]

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

$$\frac{a^2 - b^2 - c^2}{-2bc} = \frac{-2bc\cos A}{-2bc}$$

$$\frac{-a^2 + b^2 + c^2}{2bc} = \cos A$$

$$\frac{b^2 + c^2 - a^2}{2bc} = \cos A$$

Ex. 1 Solve the triangle. (Round side lengths and angles to 1 decimal place.)

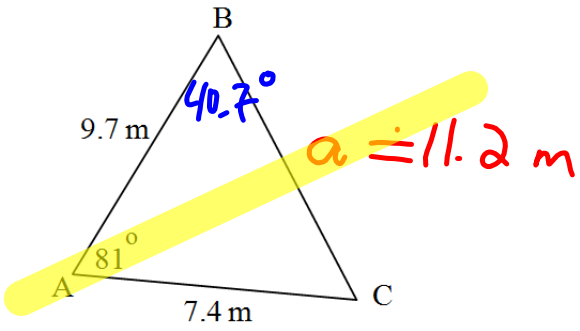


Diagram is not drawn to scale.

a	$\angle B$	$\angle C$
Since we have SAS, use ①	Now use the sine law (it's easier)	Now use the triangle sum
$a^2 = b^2 + c^2 - 2bc\cos A$	$\frac{\sin B}{b} = \frac{\sin A}{a}$	$\angle C \doteq 180^o - 81^o - 40.7^o$
✓ $a^2 = 7.4^2 + 9.7^2 - 2(7.4)(9.7)\cos 81°$	✓ $\frac{\sin B}{7.4} = \frac{\sin 81°}{11.2}$	$\doteq 58.3^o$
$a^2 = 7.4^2 + 9.7^2 - 2\times 7.4\times 9.7\times \cos 81°$	$11.2\sin B \doteq 7.4\sin 81°$	
$\doteq 126.392$ this value is a^2	$\sin B \doteq \frac{7.4\sin 81°}{11.2}$	
$a \doteq \sqrt{126.392}$	✓ $B \doteq \sin^{-1}\left(\frac{7.4\sin 81°}{11.2}\right)$	
$\doteq 11.24$	$\doteq 40.73$	
$a \doteq 11.2$ m	✓ $\doteq 40.7°$	

$\sin B = 7.4 \times \frac{\sin 81°}{11.2}$

Ex. 2 Solve the triangle. (Round side lengths and angles to the nearest **tenth**)

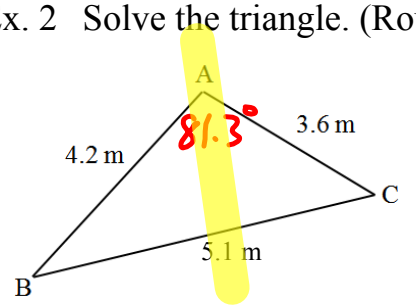


Diagram is not drawn to scale.

(Tenth means 1 decimal place).

$\angle A$	$\angle C$	$\angle B$
Since we have SSS, use②	Now use the sine law (it's easier)	Now use the triangle sum
$\cos A = \dfrac{3.6^2 + 4.2^2 - 5.1^2}{2(3.6)(4.2)}$	$\dfrac{\sin C}{4.2} \doteq \dfrac{\sin 81.3°}{5.1}$	$\angle B \doteq 180^o - 81.3^o - 54.5^o$
$A = \cos^{-1}\left(\dfrac{3.6^2 + 4.2^2 - 5.1^2}{2\times 3.6\times 4.2}\right)$	$5.1\sin C \doteq 4.2\sin 81.3°$	$\doteq 44.2^o$
$\doteq \cos^{-1}\left(\dfrac{4.59}{30.24}\right)$	$\sin C \doteq \dfrac{4.2\sin 81.3°}{5.1}$	
$\doteq 81.26$	$C \doteq \sin^{-1}\left(\dfrac{4.2\sin 81.3°}{5.1}\right)$	
$\doteq 81.3^o$	$\doteq 54.49$	
	$\doteq 54.5^o$	

Review the learning goals on the next page.

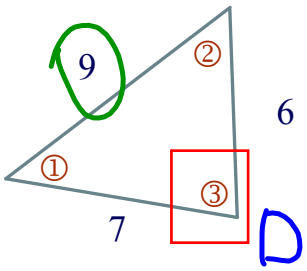
Review the learning goals. Were we successful today?

a) Correctly write the cosine **LAW** in one of the two forms.
b) Use the cosine law to solve a non-right triangle.

Today's Homework:

pp. 299-301 # 2 – 5, 7, 9

Quick Practice Question:



Label the angle you should find first as "D".
Write the formula for cosD.

$$\cos D = \frac{6^2 + 7^2 - 9^2}{2(6)(7)}$$

Remember: For Good Form

degree symbol on all angles
always round correctly at the END
approximately equal sign when necessary
add length units and end ONLY