Precalculus with Trigonometry
Lesson: April 8, 2020

Learning Target:
Students will find missing sides of a triangle using Law of Cosines

Let's Get Started:
Watch Video: Law of Cosines

Law of Cosines Formulas

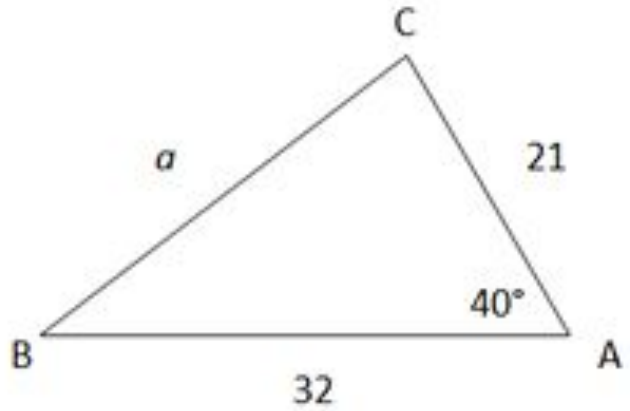
$$c^2 = a^2 + b^2 - 2ab \cdot cosC$$

$$b^2 = a^2 + c^2 - 2ac \cdot cosB$$

$$a^2 = b^2 + c^2 - 2bc \cdot cosA$$

Example Problem

Find the length of a.



Write down known. $b = 21, c = 32, \text{m}\angle A = 40°$

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

Substitute. $a^2 = (21)^2 + (32)^2 - 2(21)(32)\cos 40°$

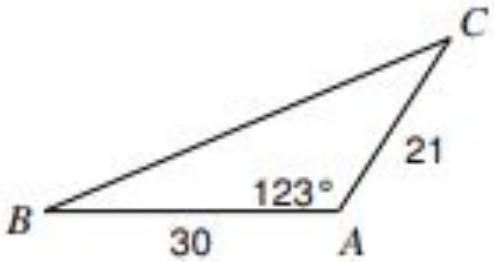
Simplify. $a^2 = 441 + 1024 - 1344\cos 40°$

$\sqrt{a^2} = \sqrt{441 + 1024 - 1344\cos 40°}$

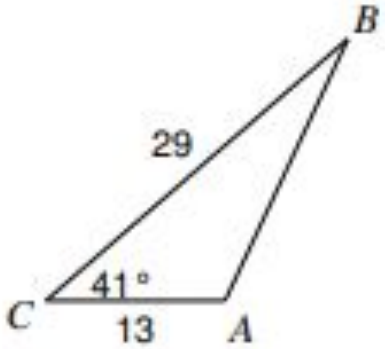
Round to the nearest hundredth. $a \approx 20.87$

Practice problems

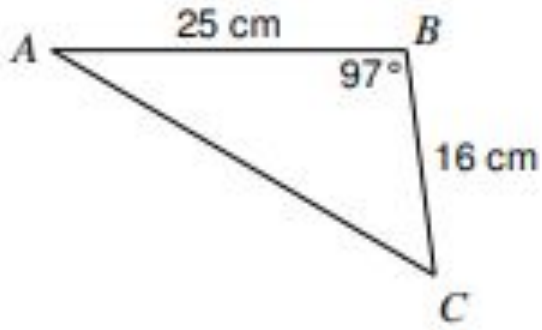
1. Find side a



2. Find side c



3. Find side b



Answer key

1. a = 45

2. c = 21

3. b = 31.3cm

Additional Practice and Resources

Click on the links below to get additional practice and to see the proof of the Law of Cosines

Try problems #1-4 on the following: Law of Cosines

How is the Law of Cosines derived? Watch the video below.

Proof of Law of Cosines