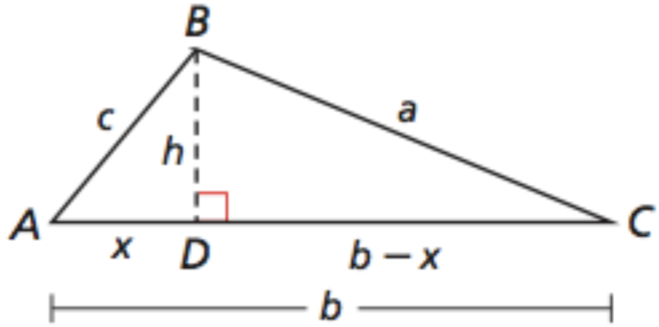
The Law of Cosines
13.6

How to derive it.



$a^2 = (b - x)^2 + h^2$	*Pythagorean Theorem*
$a^2 = b^2 - 2bx + x^2 + h^2$	*Expand $(b - x)^2$.*
$a^2 = b^2 - 2bx + c^2$	*In $\triangle ABD$, $c^2 = x^2 + h^2$. Substitute c^2 for $x^2 + h^2$.*
$a^2 = b^2 - 2b(c\cos A) + c^2$	*In $\triangle ABD$, $\cos A = \frac{x}{c}$, or $x = c\cos A$. Substitute $c\cos A$ for x.*
$a^2 = b^2 + c^2 - 2bc\cos A$	

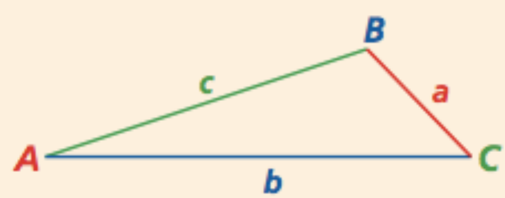
Law of Cosines

For $\triangle ABC$, the Law of Cosines states that

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

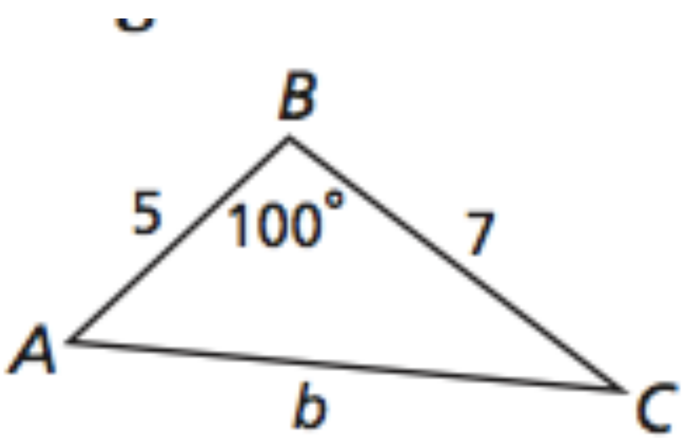
$$b^2 = a^2 + c^2 - 2ac\cos B.$$

$$c^2 = a^2 + b^2 - 2ab\cos C.$$



I do

Use the given measurements to solve for the triangle.

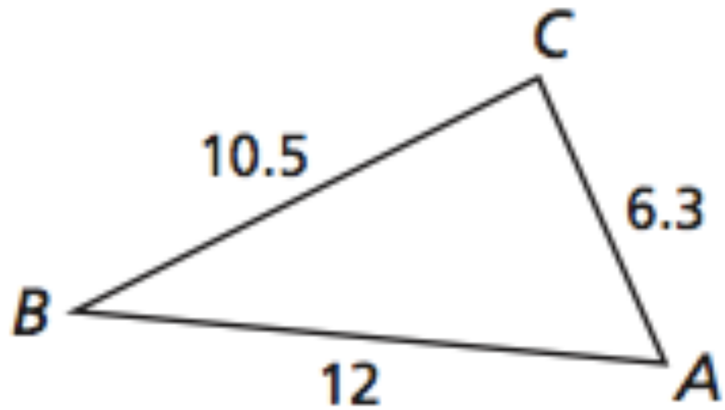


Identify the givens	B=100° $a = 7, c = 5$
Solve for a missing part using Law of Cosine	$b^2 = a^2 + c^2 - 2(a)(c)cosB$ $b^2 = 7^2 + 5^2 - 2(7)(5)cos100°$ $b^2 = 86.2$ $b = 9.3$
Solve for the other angles.	$\frac{SinA}{a} = \frac{SinB}{b}$

	$\frac{SinA}{7} = \frac{Sin100°}{9.3}$ sinA=7($\frac{sin100}{9.3}$) $A = 47.8°$ $C = 180° - 47.8° - 100°$ C=32.2°

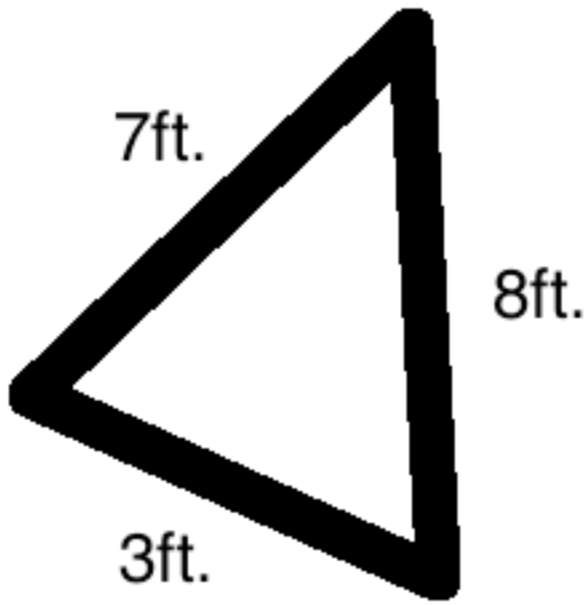
We Try:

Use the given measurements to solve for the triangle.



Identify the Givens	$a = 10.5, b = 6.3, c = 12$
Solve for a missing part using the Law of Cosine.	
Solve for the other angles.	

You Try with your partner:
Solve for the angles.



Identify the Givens	
Solve for a missing part using the Law of Cosine.	
Solve for the other angles.	

You Try with your partner:

Solve the triangle.

$a = 24, b = 40, c = 18$

Identify the Givens	
Solve for a missing part using the Law of Cosine.	
Solve for the other angles.	

You Try solo:

$A = 120°, b = 9, c = 5$