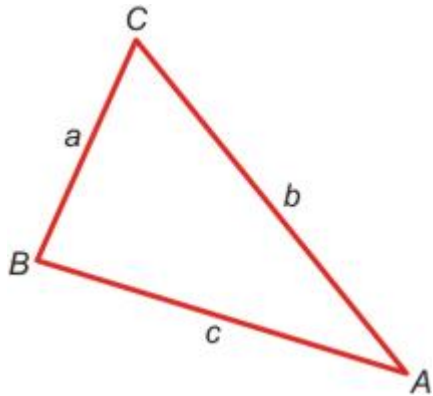
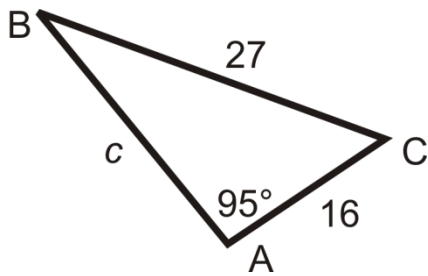


The Sine Law

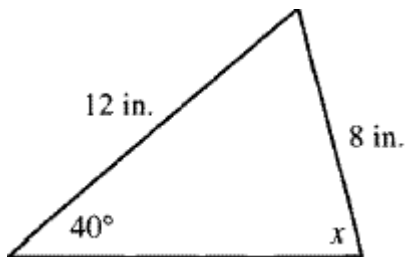


The Law of Sines	
$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
Use to find ANGLES	Use to find sides

Example 1 Solve the following triangle.



Example 2 Find the measure of angle x.



The Sine Law and the Ambiguous Case

Suppose you were asked to solve $\triangle ABC$, where $\angle A = 36^\circ$, $a = 5.9$ cm, and $b = 7.8$ cm. A good starting point would be to draw the triangle but when doing so, we need to be careful because sometimes there are 2 triangles with the given properties.

We must provide both solutions:

This is called the **ambiguous case**. Given $\angle A$, a and b , if $a < b$ there are 3 possibilities:

$a < b \sin A$ means **no triangle** possible (no solution)

$a = b \sin A$ means **1 right angle triangle** is possible (1 solution)

$a > b \sin A$ means **2 triangles** are possible (2 solutions)

Example 3 Determine the number of solutions. Then, determine the length of the third side.

a) In $\triangle ABC$ where $\angle A = 30^\circ$, $a = 3$ cm and $c = 5$ cm.

b) In $\triangle PQR$, $\angle P = 49^\circ$, $p = 12.2$ cm, and $q = 18$ cm.

c) In $\triangle KLM$, $\angle K = 36^\circ$, $k = 5.0$ m, and $l = 8.5$ m.