

SOHCAHTOA

This only work for right triangles!

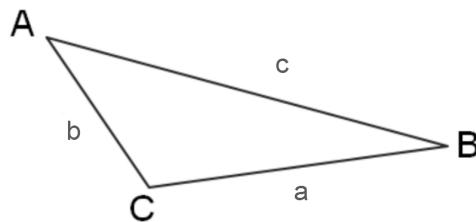
What if you are working with something other than a right triangle?

When working with NON-Right Triangles
there are two other tools you may be able to use:

1. Law of Sines
2. Law of Cosines

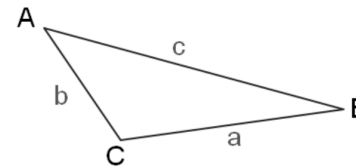
Angles are labeled with Capital Letters

Sides are labeled with Lower Case Letters



Side a is opposite Angle A
Side b is opposite Angle B
Side c is opposite Angle C

Sec 14-4 The Law of Sines: The following ratio is equal in every triangle regardless of which angle you use.



$$\frac{\sin(\text{any angle})}{\text{Length of its opposite side}}$$

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

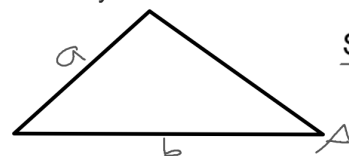
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

This relationship can also be written as:

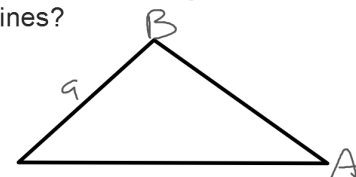
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

At any given moment you will be using only two of these ratios.

What is the least amount of information about a triangle that you need in order to use the Law of Sines?



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



1. One angle and two sides.

How must these sides and angle be positioned on the triangle?

SSA

The angle must be opposite of one of the sides.

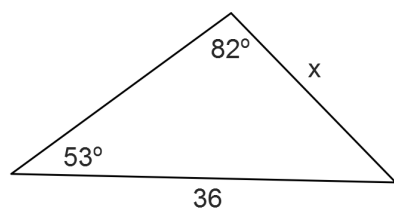
2. One side and two angles.

How must these angles and side be positioned on the triangle?

AAS

The side must be opposite of one of the angles.

Use the Law of Sines to find the value of the variable to the nearest hundredth.



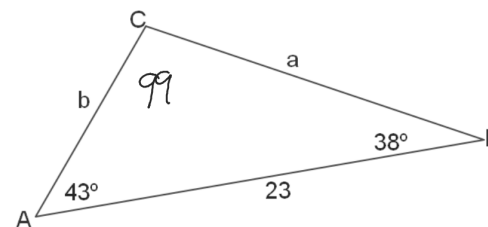
$$\frac{\sin 53}{x} = \frac{\sin 82}{36}$$

or

$$\frac{x}{\sin 53} = \frac{36}{\sin 82}$$

$$x = 29.03$$

Use the Law of Sines to find value of the missing parts of this triangle to the nearest hundredth.



Need to find angle C first
 $\angle C = 180 - 38 - 43 = 99^\circ$

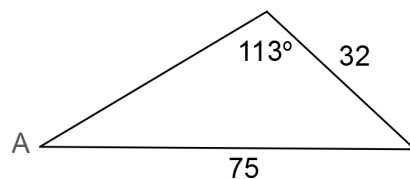
$$a = 15.88$$

$$b = 14.34$$

$$\frac{23}{\sin 99} = \frac{a}{\sin 43}$$

$$\frac{23}{\sin 99} = \frac{b}{\sin 38}$$

Use the Law of Sines to find the value of A to the nearest hundredth.



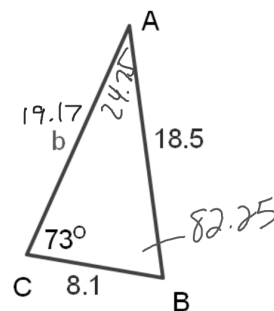
$$\frac{\sin 113}{75} = \frac{\sin A}{32}$$

$$\sin A = .3927$$

$$\angle A = \sin^{-1}(.3927)$$

$$\angle A = 23.13^\circ$$

Use the Law of Sines to find remaining sides and angles in this triangle. Round to the nearest hundredth.



$$\angle A = 24.75$$

$$\angle B = 180^\circ - 73^\circ - 24.75^\circ = 82.25^\circ$$

$$b = 19.17$$

$$\frac{\sin A}{8.1} = \frac{\sin 73}{18.5}$$

$$\frac{\sin 73}{18.5} = \frac{\sin 82.25}{b}$$

Hwk # 38

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