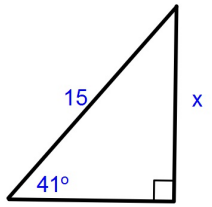
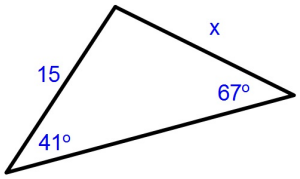
SOHCAHTOA

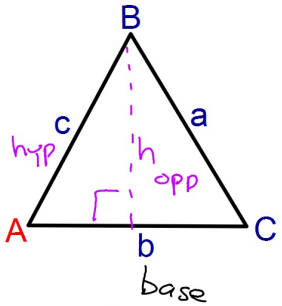
works only works for right triangles.



What if it's not a right triangle?



You must find another tool to use!

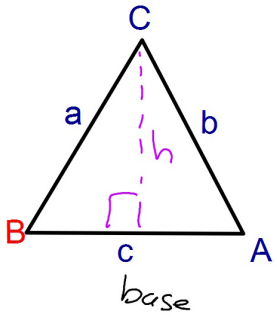


$\sin A = \frac{h}{c}$

Write an expression for the area if:

you know angle A:

Area = $\frac{1}{2}(b)(c \sin A)$

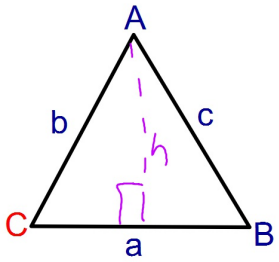


$\sin B = \frac{h}{a}$

Given the same triangle write an expression for the area if:

you know angle B:

Area = $\frac{1}{2}(c)(a \sin B)$



$\sin C = \frac{h}{b}$

Given the same triangle write an expression for the area if:

you know angle C:

Area = $\frac{1}{2}(a)(b \sin C)$

All three areas should be the same.

$$A = \frac{1}{2}bc\sin A = \frac{1}{2}ac\sin B = \frac{1}{2}ab\sin C$$

Simplify: divide by $\frac{1}{2}abc$

$$\frac{\frac{1}{2}bc\sin A}{\frac{1}{2}abc} = \frac{\frac{1}{2}ac\sin B}{\frac{1}{2}abc} = \frac{\frac{1}{2}ab\sin C}{\frac{1}{2}abc}$$

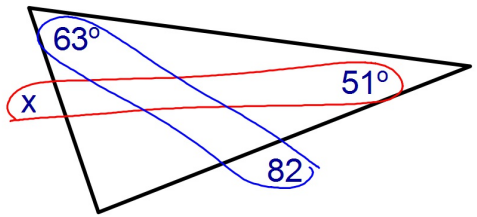
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

The Law of Sines:

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

You will only be using two of the three ratios at any given moment.
Therefore, Law of the Sines turns out to be a proportion.

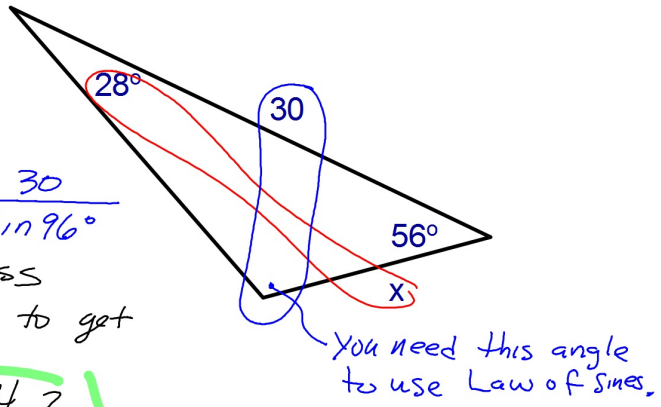
Find the value of x in this triangle to the nearest tenth.



$$\frac{\sin 51^\circ}{x} = \frac{\sin 63^\circ}{82}$$

cross multiply to get $X = 71.5$

Find the value of x in this triangle to the nearest tenth.



$$\frac{x}{\sin 28^\circ} = \frac{30}{\sin 96^\circ}$$

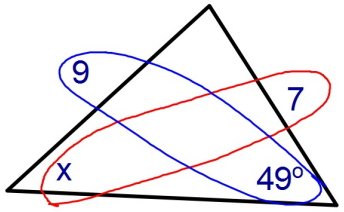
Now cross multiply to get

$X = 14.2$

You need this angle to use Law of Sines.

$180 - 56 - 28 = 96^\circ$

Find the value of x in this triangle to the nearest tenth.



$\frac{7}{\sin x} = \frac{9}{\sin 49°}$

since you are trying to find an angle you'll eventually have to use Inverse Sine.

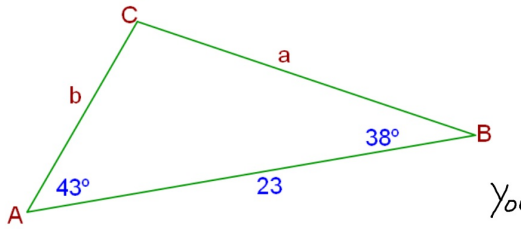
First solve for Sinx then do the inverse sine.

$\sin x = \frac{7 \cdot \sin 49°}{9}$

$X = \sin^{-1}(\ )$

$X = 35.9°$

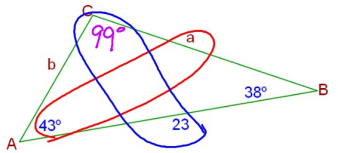
Use the Law of Sines to find the lengths of the missing sides in this triangle. Round to a tenth.



a =

b =

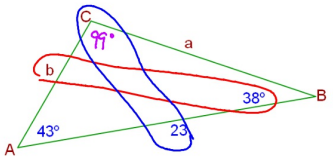
You first need to find ∠C. $\angle C = 180 - 38 - 43 = 99°$



You can choose to find either missing side first. Let's find side a.

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

$a = 15.9$

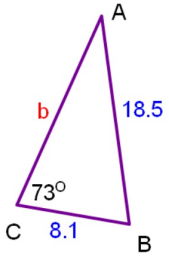


Now find side b:

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

$b = 14.3$

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



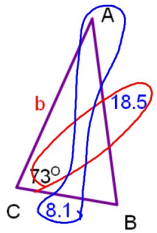
with the given information you can only find anlge A first.

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

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

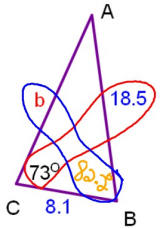
$\angle A = \sin^{-1}(\ )$

$\angle A = 24.8°$



Now find ∠B: $180 - 73 - 24.8$

$\angle B = 82.2°$



Finally, find side b:

$\frac{\sin 73}{18.5} = \frac{\sin 82.2}{b}$

Cross multiply:

$b = 19.2$

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

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

To find an angle you need to know:

One other angle and the two sides opposite those angles

SSA

To find a side you need to know:

another side and the two angles opposite those sides.

AAS

You can now finish Hwk #26
Sec 14-4

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Problems: 1, 3-5, 11, 12, 17, 18, 28