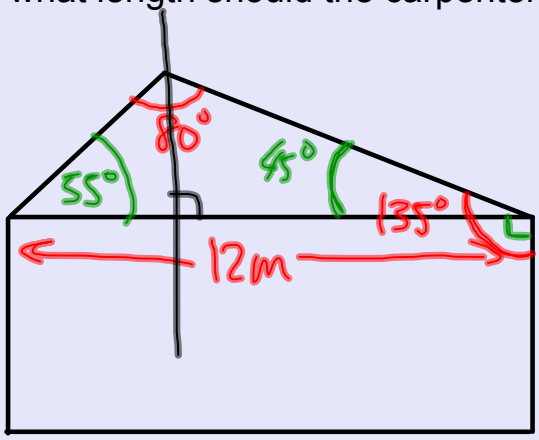
Consider the following question, but do not copy (p.545)

An architect designed a new building that is to be 12m wide. The roof consists of rafters of two different lengths that meet at the top at an 80° angle. The long rafters make a 135° angle with the exterior wall. To what length should the carpenter cut the two types of rafters?



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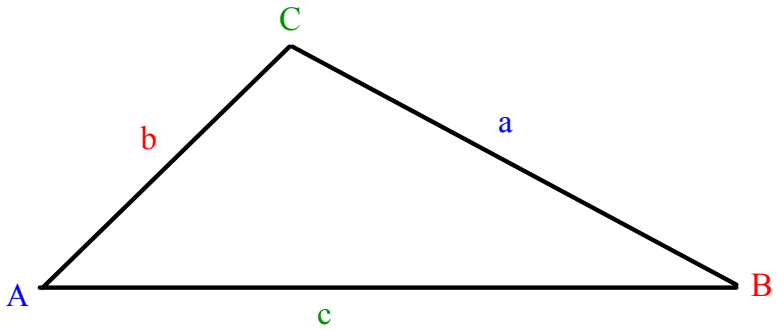
The Sine Law

Date: May 27/2010



How can we relate the sides and angles to each other in a triangle that has no right angles?

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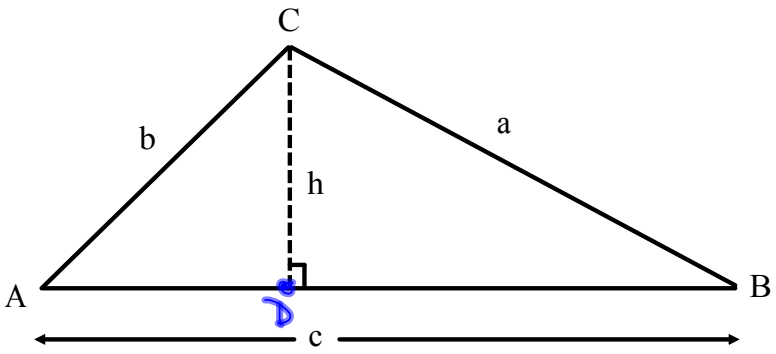

We can always create right triangles by drawing an altitude from any vertex.

Using trigonometry on each right triangle, we can relate the angles and sides of the overall triangle.

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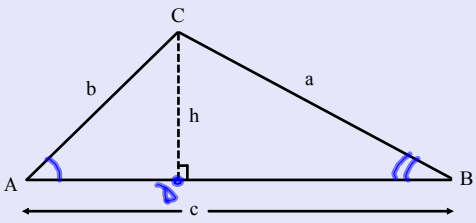

$\sin A = \frac{h}{b}$ $\sin B = \frac{h}{a}$

$b \sin A = h$ $a \sin B = h$

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

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

Repeat this for other altitudes

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

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The Sine Law (2 formats):

In ΔABC,

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

or

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

$\frac{3}{5} = \frac{6}{10}$ $\frac{5}{3} = \frac{10}{6}$

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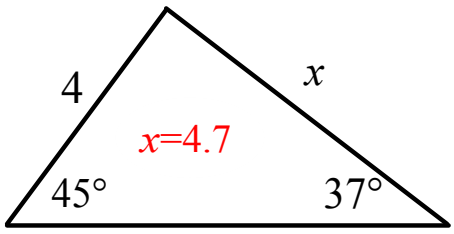
Ex1: Solve for x.



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

$\frac{x}{\sin 45^\circ} = \frac{4}{\sin 37^\circ}$

$\frac{x}{0.707} \doteq \frac{4}{0.602}$

$x \doteq \frac{4(0.707)}{0.602}$

$x \doteq 4.7$

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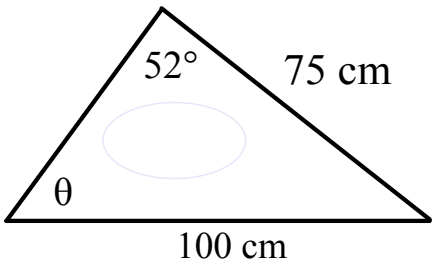
Ex 2: Solve for θ.



$\frac{\sin\theta}{75} = \frac{\sin 52^\circ}{100}$

$\sin\theta \doteq \frac{75(0.7880)}{100}$

$\sin\theta \doteq 0.591$

$\theta \doteq \sin^{-1}(0.591)$

$\theta = 36.2^\circ$

Dec 13-10:20 PM

HW: p. 549 # 1 - 4, 6 - 9, 12, 15

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