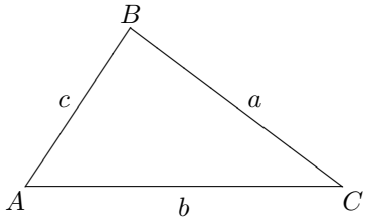
MATH 11022: Law of Sines

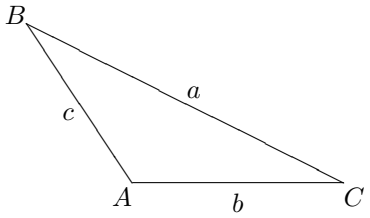
Definitions:

- A **right triangle** is a triangle that contains a right angle. A triangle that is not a right triangle is an **oblique triangle**.
- An **acute triangle** is a triangle whose angles are all acute.
- An **obtuse triangle** is a triangle that has an obtuse angle. (Note that a triangle can have at most one obtuse angle.)

Notation. When working with oblique triangles, we will identify the angles as A, B, and C, and the sides opposite these angles as a, b, and c.



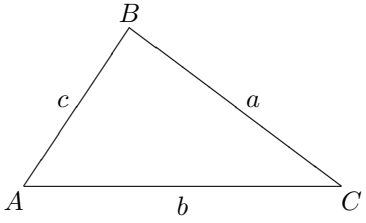
Acute triangle $\triangle ABC$



Obtuse triangle $\triangle ABC$

The Law of Sines

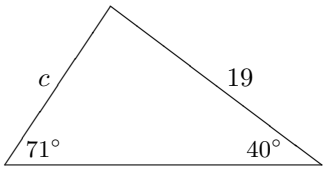
For *any* triangle,



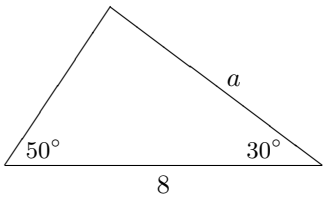
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Example 1: Solve for the variable. Give answer to two decimal places. Note that all figures are not drawn to scale.

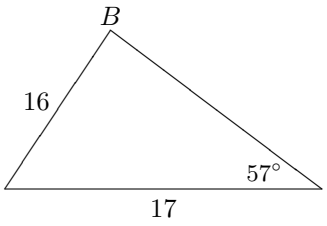
(a)



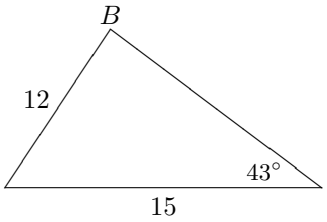
(b)



(c) Consider B to be an acute angle.



(d) Consider B to be an obtuse angle.



IMPORTANT When using inverse sine ($\sin^{-1}$) to find an angle, remember that there are two possible values: one acute and one obtuse. If you are unable to determine whether the desired angle is acute or obtuse, then you **must** consider both answers.

Example 2: