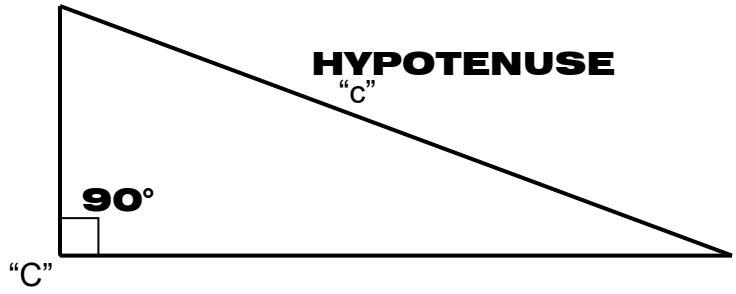


Angle "C" is always the 90º, or right angle. In a true right triangle, angle "C" never changes. The side opposite the 90º angle is always the hypotenuse, and is always the longest side of the triangle.

If two or more right triangles have equal angles and equal sides they are congruent.

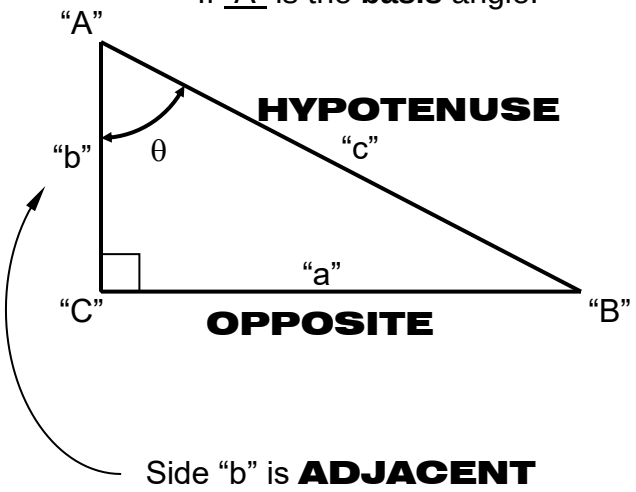
If two or more right triangles have equal angles, but sides of different lengths, said sides will be related proportionately to each other, and said triangles are similar.

1) Label the angles and sides.

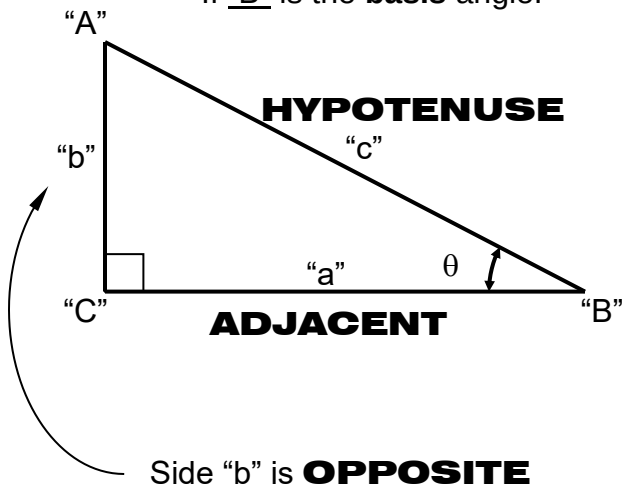
Same letters are opposite each other.
Angles are labeled with upper-case or capital letters.
Sides are labeled with lower-case or small letters.

2) Label the basis angle – determine opposite and adjacent sides.

If "A" is the **basis** angle:



If "B" is the **basis** angle:



You are working with a right triangle – a triangle with one angle equal to 90°. You have chosen an angle other than the 90° angle as a "basis angle". From this "basis angle" you have assigned the terms "opposite" and "adjacent" to the proper sides. This "basis angle" will be referred to as theta (θ).

The following are the main trig formulas we as surveyors need to know:

SIN	=	Sine	HYP	=	Hypotenuse
COS	=	Cosine	OPP	=	Opposite
TAN	=	Tangent	ADJ	=	Adjacent

$$SIN(\theta) = \frac{OPP}{HYP} \qquad HYP = \frac{OPP}{SIN(\theta)} \qquad OPP = HYP \cdot SIN(\theta)$$

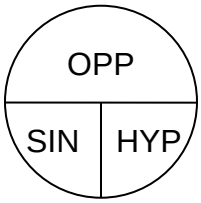
$$COS(\theta) = \frac{ADJ}{HYP} \qquad HYP = \frac{ADJ}{COS(\theta)} \qquad ADJ = HYP \cdot COS(\theta)$$

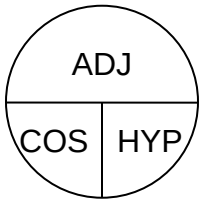
$$TAN(\theta) = \frac{OPP}{ADJ} \qquad ADJ = \frac{OPP}{TAN(\theta)} \qquad OPP = ADJ \cdot TAN(\theta)$$

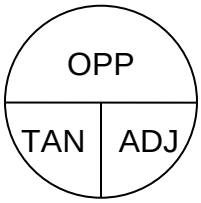
You do not have to memorize all nine formulas! The three trigonometric functions are in the same order on your calculator. Use a phrase to help memorize the order the sides such as …

"SOH–CAH–TOA"
or
"Some old hen, caught another hen, taking oats away."
or
"Ozzie had a hunk of apple."

Set up the following diagrams. An element at the top of the circle is the product of the two elements at the bottom. An element at the bottom of a circle is the division of the other two elements in the circle.







The other three trigonometric functions will be discussed at a later time but are shown on the accompanying Unit Circle diagram:

COT = Cotangent
SEC = Secant
CSC = Cosecant

$$COT(\theta) = \frac{ADJ}{OPP}$$

$$SEC(\theta) = \frac{HYP}{ADJ}$$

$$CSC(\theta) = \frac{HYP}{OPP}$$