

Lesson 49: Right Triangle Trig

By the end of the lesson, we will be able to:

- ~ Use the Pythagorean Theorem to find missing sides of a triangle.*
- ~ Use SINE, COSINE, and TANGENT ratios.*
- ~ Use INVERSES of sine, cosine, and tangent.*

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In Geometry, you learned about three trigonometric ratios (functions): **sine**, **cosine**, and **tangent**.

SOH

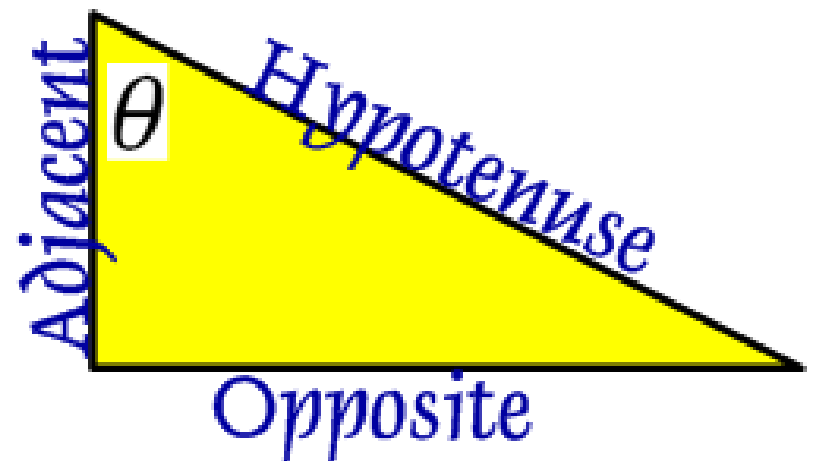
CAH

TOA

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

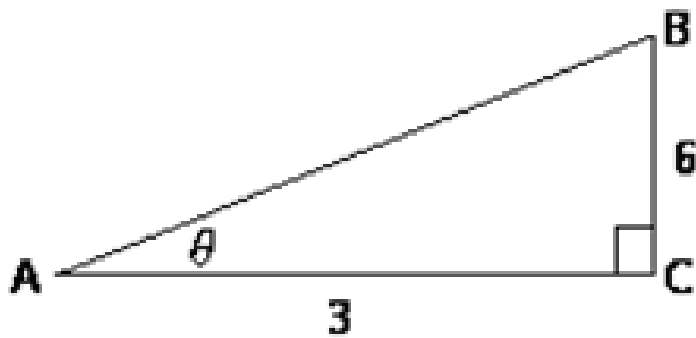
$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$



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Example 1: Find the values of the three trig functions for angle θ . Write in fraction form and in decimal form (round to 4 decimal places.)



$$\sin \theta =$$

$$\cos \theta =$$

$$\tan \theta =$$

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Example 2: Find $\tan A$ when $\cos A = \frac{2}{3}$.

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You can use a calculator to find the value of an angle using inverse trig functions :

\sin^{-1} **\cos^{-1}** **\tan^{-1}**

Example 3: Find x when $\cos(x) = 0.9659$

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You can use trigonometry to solve real-world problems involving right triangles.

When looking for a side,
use regular trig functions.

When looking for an angle,
use inverse trig functions.

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Example 4: A 150-foot rope is tied from the top of a 100-foot pole to a stake in the ground. What is the angle of elevation between the rope and the ground?

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To solve a right triangle means to find the values of all the sides and angles. To do this, you can use the Pythagorean theorem and trig ratios, and the fact that the two acute angles in a right triangle sum to 90° . It is helpful to draw a diagram.

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Unless otherwise given:

- ~ Assume that angle C is the right angle. This means that angles A and B are the acute angles.
- ~ The side - a , b , & c - are across from their respective angles:
 - * a is the side across from angle A
 - * b is the side across from angle B
 - * c is the side across from angle C
- ~ Capital letters are ANGLES, and Lower Case letters are SIDE MEASURES.

Round side lengths to the nearest tenth and angles to the nearest degree.

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Example 5:

Solve the right triangle if $a = 5$ and $b = 4$.

$a =$ _____ $A =$ _____

$b =$ _____ $B =$ _____

$c =$ _____ $C =$ _____

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Example 6:

Solve the right triangle if $A = 60$ degrees and $b = 8$.

$a =$ _____ $A =$ _____

$b =$ _____ $B =$ _____

$c =$ _____ $C =$ _____

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- ~ Use INVERSES of sine, cosine, and tangent.*

Can you?

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Homework:

Assignment 49