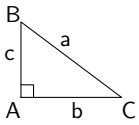
Unit: The Right Angle Triangle

In this unit, we will be studying the right angle triangle.

Solving the triangle means finding the measure of every unknown angle, and the length of every unknown side.

A right angle triangle:

- Angles are labeled using capital letters
- Sides are labeled using lower case letters
- Angles and their opposing side use the same letter.



Notes

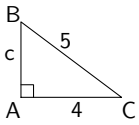
Pythagorus

Given two sides of a right angle triangle, we can find the missing side using the Pythagorean theorem $a^2 = b^2 + c^2$, where a is the longest side (or hypotenuse).

Example

Consider the following figure:

$$\begin{aligned} 5^2 &= 4^2 + c^2 \\ 25 &= 16 + c^2 \\ 9 &= c^2 \\ 3 &= c \end{aligned}$$



Notes

The Right Angle Triangle and the Trig Functions

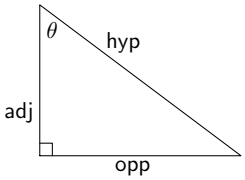
The opposite and adjacent sides are always relative to an angle.

(Standard mnemonic: SOHCAHTOA)

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

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

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



We use the sin, cos, and tan buttons on the calculator to calculate the values.

Notes

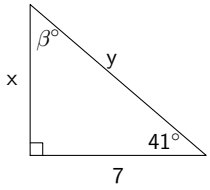
Quick Check

Using a calculator, calculate the following values:

- $\sin 45^\circ$
- $\cos 30^\circ$
- $\tan 65^\circ$
- $\sin 15^\circ$
- $\cos 20^\circ$
- $\tan 55^\circ$

Notes

Using the Trig Functions



Solve the easy one first:
$\beta = 180^\circ - 90^\circ - 41^\circ = 49^\circ$

Solving for x:

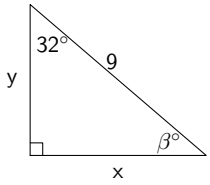
$$\begin{aligned} \tan 41^\circ &= \frac{x}{7} \\ 7 \tan 41^\circ &= x \\ 6.085 &= x \end{aligned}$$

Solving for y:

$$\begin{aligned} \cos 41^\circ &= \frac{7}{y} \\ y &= \frac{7}{\cos 41^\circ} \\ y &= 9.275 \end{aligned}$$

Notes

Using the Trig Functions



Solve the easy one first:
$\beta = 180^\circ - 90^\circ - 32^\circ = 58^\circ$

Solving for x:

$$\begin{aligned} \sin 32^\circ &= \frac{x}{9} \\ 9 \sin 32^\circ &= x \\ 4.796 &= x \end{aligned}$$

Solving for y:

$$\begin{aligned} \cos 32^\circ &= \frac{y}{9} \\ 9 \cos 32^\circ &= y \\ 7.632 &= y \end{aligned}$$

Notes