

Right Triangle Trigonometry

THE BIG IDEA

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One known acute angle in a right triangle guarantees similarity to every other right triangle with that angle **(by AA)**.

In similar triangles, side lengths scale proportionally — which means **the ratios of side lengths in a right triangle are uniquely tied to one of its acute angles**.

THE THREE RATIOS

The Three Ratios — θ = one acute angle of a right triangle

$\sin \theta = \text{opposite} / \text{hypotenuse}$
SOH

$\cos \theta = \text{adjacent} / \text{hypotenuse}$
CAH

$\tan \theta = \text{opposite} / \text{adjacent}$
TOA

'Opposite' always means the side across from θ . 'Adjacent' always means the non-hypotenuse side touching θ . **These swap when you switch which angle you are referencing.**

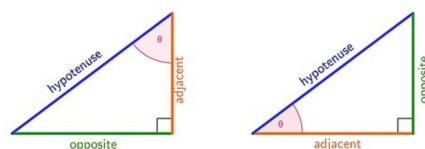
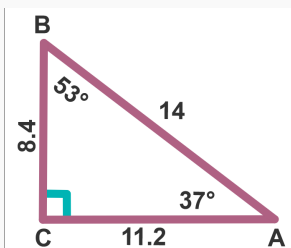


DIAGRAM AND EXAMPLE

Diagram and Example



Example:

add example here

$$\sin 37 = \underline{\hspace{1cm}} / \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

$$\cos 37 = \underline{\hspace{1cm}} / \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

$$\tan 53 = \underline{\hspace{1cm}} / \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

Pattern to notice: $\sin(\theta)$ and $\cos(90^\circ - \theta)$ What do you notice?