

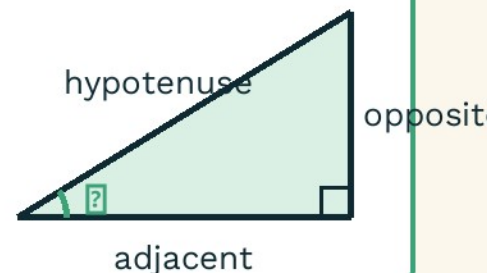
Trigonometry

Angles and triangles, measured with ratios

WHAT IS IT?

Trigonometry links the angles of a right triangle to the lengths of its sides. Three ratios, sine, cosine and tangent, let you find heights and distances you cannot measure directly.

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



THE BIG IDEAS

- 1 In a right triangle the side ratios depend only on the size of the angle, not the size of the triangle.
- 2 SOH CAH TOA: $\sin = \text{opposite/hypotenuse}$, $\cos = \text{adjacent/hypotenuse}$, $\tan = \text{opposite/adjacent}$.
- 3 The unit circle extends these ideas to every angle.
- 4 Sine and cosine make smooth, repeating waves.

YOU SEE IT WHEN ...

Finding a tree's height from its shadow

Sound, light and radio waves

Games and animation that rotate things

WORDS YOU WILL MEET

Hypotenuse

the longest side of a right triangle, opposite the right angle

Opposite / adjacent

the side across from the angle / the side next to it (not the hypotenuse)

Sine, cosine, tangent

the three main ratios

Radian

angle measure from the circle: $180^\circ = \pi$ radians

Unit circle

a circle of radius 1 used to define the ratios

Identity

an equation that is true for every value

GOOD TO KNOW FIRST

Right triangles, the Pythagorean theorem and basic algebra.

IN YOUR COURSE YOU WILL ...

- Solve right triangles
- Use degrees and radians
- Graph sine and cosine waves
- Prove and use trig identities

Start tip: Label opposite, adjacent and hypotenuse from the angle you are using.