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Trigonometry

IGCSE Mathematics

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Quality Mathematics Education for Students

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1 Introduction to Trigonometry

Note

Trigonometry is the branch of mathematics that studies the relationships between the angles and sides of triangles. In IGCSE Mathematics, we focus on trigonometry in right-angled triangles, which gives us three powerful ratios — sine, cosine, and tangent — that allow us to find unknown sides and angles.
In this chapter, we will explore:

- Labelling sides relative to an angle (Opposite, Adjacent, Hypotenuse)
- The three trigonometric ratios: SOH CAH TOA
- Finding missing sides using trigonometry
- Finding missing angles using inverse trigonometric functions
- Exact trigonometric values
- Angles of elevation and depression
- Bearings problems
- Applications of trigonometry in 2D shapes
- Trigonometry in 3D problems

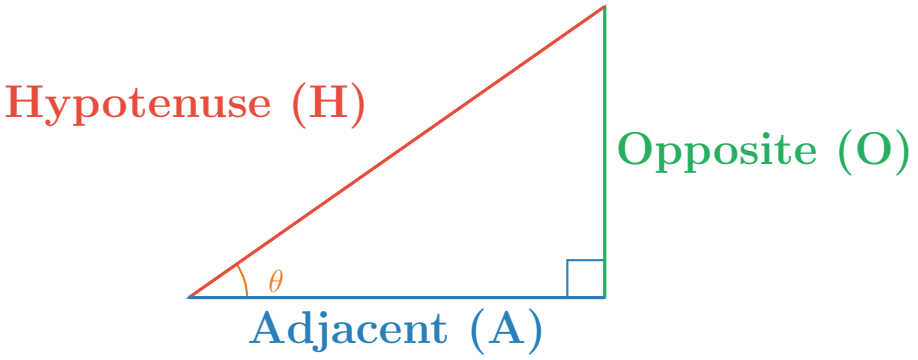
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2 Labelling the Sides of a Right-Angled Triangle

Definition

In a right-angled triangle, the sides are named **relative to a chosen angle** θ (not the right angle):

- The **Hypotenuse (H)** is the longest side, always opposite the right angle.
- The **Opposite (O)** is the side directly opposite the chosen angle θ.
- The **Adjacent (A)** is the side next to (adjacent to) the chosen angle θ that is not the hypotenuse.

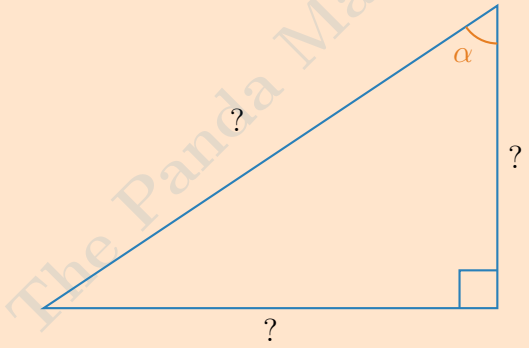


Warning

The labels **Opposite** and **Adjacent** change depending on which angle you are working with. The **Hypotenuse** is always the same — it is always opposite the right angle, regardless of which angle you choose.

Example

Label the sides of the triangle below relative to angle α.



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Solution:
Relative to angle α at the top-right vertex:

- The side **opposite** α is the **bottom horizontal** side.
- The side **adjacent** to α is the **right vertical** side (next to α, not the hypotenuse).
- The **hypotenuse** is the **slanted** side (longest, opposite the right angle).

Preview ends here

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