



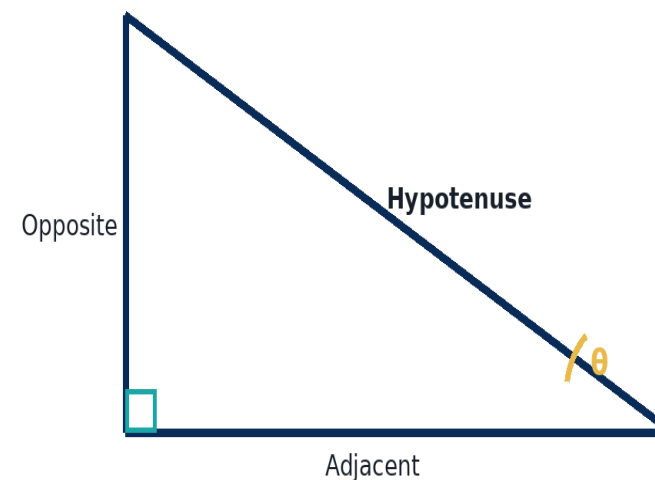
TRIGONOMETRY IN RIGHT TRIANGLES

GCSE Mathematics 1MA1 · L039 · 60 minutes

Week 13 · Reach for the Star Gold Standard

Right-triangle trigonometry: label sides relative to θ

SOH CAH TOA



Choose the ratio containing the known and required sides. Use inverse trig for an angle.

Objective and lesson route

Connect & Check

By the end you will:

- label opposite, adjacent and hypotenuse relative to θ
- select sine, cosine or tangent
- find a missing side
- use inverse trig to find an angle

Running order

- Connect & Check · 5 min
- Share · 5 min
- Present · 12 min
- Apply · 25 min
- Recall & Review · 8 min

Calculator required for trigonometric values. Check degree mode. Keep full precision until the final rounding step.

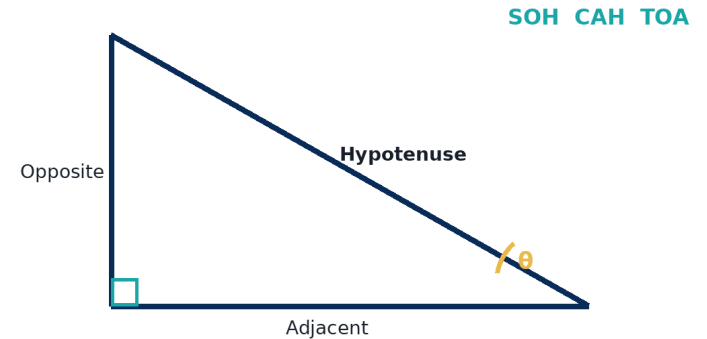
Baseline: what do you already know?

Connect & Check

Work independently · 5 minutes

- In a right triangle, which side is always the hypotenuse?
- Relative to an angle θ , explain how to identify the opposite and adjacent sides.

Right-triangle trigonometry: label sides relative to θ



Choose the ratio containing the known and required sides. Use inverse trig for an angle.

Keep this response for distance-travelled comparison.

Choose your route

[Share](#)

Same destination. Different journey.

A · Visual

Label O, A, H on the diagram and circle known/required values.

B · Method

Use SOHCAHTOA as a selection table.

C · Explain

State why one ratio contains exactly the needed sides.

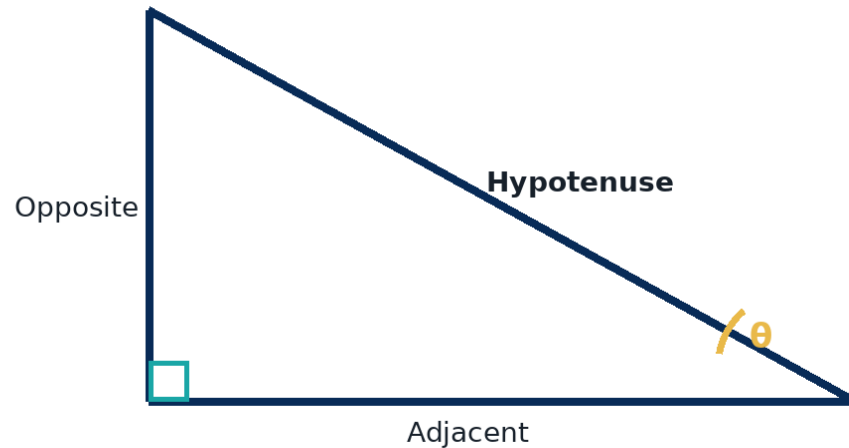
Compare evidence with a partner before you continue.

Model: label before choosing a ratio

Present

Right-triangle trigonometry: label sides relative to θ

SOH CAH TOA



Choose the ratio containing the known and required sides. Use inverse trig for an angle.

- H is opposite the right angle.
- O is opposite the chosen θ .
- A touches θ but is not H.
- Choose the ratio containing known + required values.

change θ and O/A swap; H stays the same.

Worked example

Present

Adjacent = 8 cm and $\theta = 35^\circ$. Find the opposite side.

- Relative to θ : $A=8$, $O=x$.
- $\tan 35 = x/8$.
- $x = 8 \tan 35 \approx 5.60$ cm.

Check: positive length; opposite is smaller than adjacent for 35° , which is plausible.

Misconception check

Present

A learner uses sine when the known sides are opposite and adjacent.

- Which ratio contains O and A?
- What does sine require?
- Write the ratio before substituting.

Repair: use tangent because $\tan\theta = O/A$.

Supported practice

Apply

Angle $\theta=30^\circ$, hypotenuse=10 cm. Find the opposite side.

Scaffold: label H/O/A, circle known + required, choose SOH/CAH/TOA, then rearrange.

Opposite=7 cm, hypotenuse=10 cm. Find θ to 1 d.p.

Remove the scaffold before the next slide.

Independent practice: scaffold removed

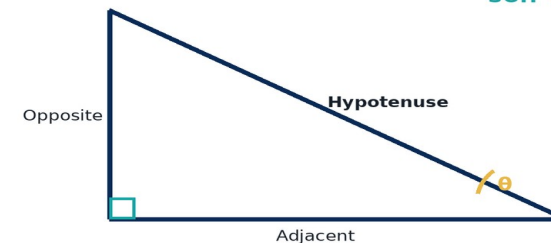
Apply

- Adjacent=12 cm, $\theta=28^\circ$. Find the hypotenuse to 1 d.p.
- Opposite=9 cm, adjacent=14 cm. Find θ to 1 d.p.

Show a separate check or justification.

Right-triangle trigonometry: label sides relative to θ

SOH CAH TOA



Choose the ratio containing the known and required sides. Use inverse trig for an angle.

Exam-style practice

Apply

A ladder 5.5 m long makes an angle of 68° with the ground. How high up the wall does it reach? Give 2 d.p.

From a point 20 m from the base of a vertical tower, the angle of elevation to the top is 32° . Find the tower height to 1 d.p.

Exam tip: a written trig equation protects method marks even if the calculator step goes wrong.

Stretch and deep challenge

Apply

Stretch

Two right triangles both have angle 30° but hypotenuses 10 cm and 25 cm. Compare their opposite sides.

Deep challenge

A right triangle has area 30 cm^2 and one acute angle 40° . Find one possible pair of perpendicular side lengths.

Similar right triangles with the same acute angle preserve side ratios.

Self-mark and repair

Apply

Identify the first decision that went wrong.

- Is the calculator in degree mode?
- Did you label sides relative to the stated angle?
- Does the chosen ratio contain the known and required sides?
- Did you rearrange before typing?
- Did you round only at the end?

Repair one answer, then solve a fresh matched question without prompts.

Independent exit evidence

Without notes · 5 minutes

A right triangle has opposite side 6 cm and adjacent side 11 cm relative to θ . Find θ to 1 d.p. and state the ratio used.

- Label O/A/H.
- State the ratio.
- Use inverse trig.
- Round to 1 d.p.

Fresh evidence against the objective.

Distance travelled

Compare your baseline with the exit evidence.

WWW What is now more accurate, complete or clearly explained?

EBI What one action will improve your next answer?

Record the next-practice target in the workbook.

Core answers

Teacher check

- P1 5.60 cm
- A1 5 cm
- A2 44.4°
- A3 13.6 cm
- A4 32.7°
- E1 5.10 m
- E2 12.5 m
- X1 5 cm and 12.5 cm
- Exit 28.6°



L039 teacher notes

- Check degree mode before any calculation.
- O/A are angle-relative; H is fixed.
- Equation before calculator input.
- Inverse trig finds angles; it is not reciprocal trig.

Next: L040 Cumulative checkpoint 2 and feedback

L039 Recall & Review

Trigonometry in right triangles



Fresh evidence: prove the objective

Solve a new question without prompts. Explain one check, then correct one error in your working.

Objective: Select sine, cosine or tangent to find a right-triangle side or angle.

Write the next practice step before you leave. It must test the method again, not simply copy today's example.

Feedback language

Use the full phrases before the abbreviations.

What Went Well (WWW)

I selected the correct geometric fact, theorem, formula or transformation and used a clear diagram with appropriate labels and units.

Identify the mathematical method, representation, reasoning or check that improved.

Even Better If (EBI)

I will name the fact or theorem, show the substitution or construction step and check whether the size, direction and units of the result are reasonable.

Set one precise next-step action and test it on a fresh question.

Extension route

Choose this route only after the core evidence is secure.

Stretch

A right triangle has adjacent side 8 cm and an angle of 35° . Find the opposite side to 2 d.p.

Deep challenge

Two right triangles share angle 30° but have hypotenuses 10 cm and 25 cm. Compare their opposite sides.

Explain your reasoning clearly enough that another learner could check it.