

# E6.2 Right-angled triangles

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Total: 14 marks

## Objective

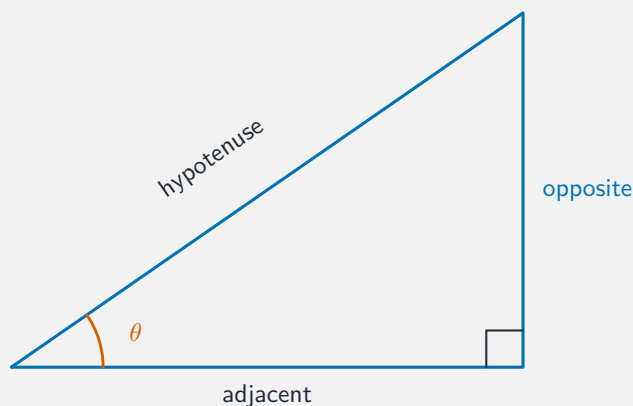
Build the skills to answer Extended exam questions on **right-angled triangles** 直角三角形—the **sine, cosine and tangent** 正弦、余弦、正切 ratios (SOH-CAH-TOA), to find a side or an angle.

**You must be able to:**

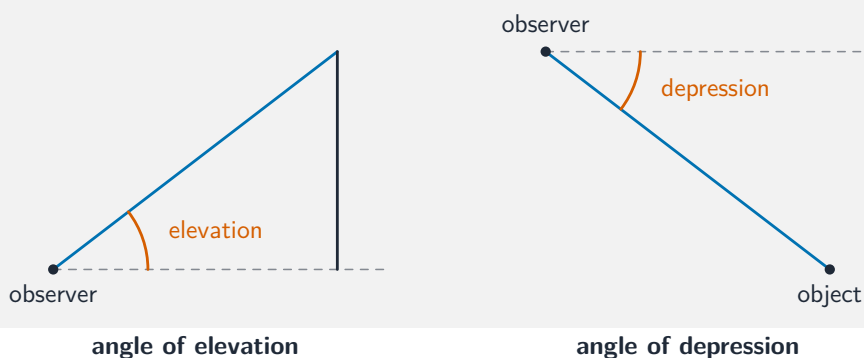
- label opposite, adjacent and hypotenuse
- use sin, cos, tan to find a missing side
- use the inverse ratios to find a missing angle

## 1 Worked examples

### ■ SOH-CAH-TOA



*Give angle answers to 1 decimal place*



angle of elevation

angle of depression

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}$$

- **Find a side:** hyp 10, angle  $30^\circ \rightarrow \text{opp} = 10 \sin 30^\circ = 5$ .
- **Find an angle:** opp 4, adj 3  $\rightarrow \tan \theta = \frac{4}{3} \rightarrow \theta = \tan^{-1} \frac{4}{3} = 53.1^\circ$ .

**Answer shapes:** **M1** a correct method, **A1** the correct answer.

## 2 Practice

**2.1** A right-angled triangle has hypotenuse 12 cm and angle  $40^\circ$ . Find the opposite side. [2]

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**2.2** A right-angled triangle has opposite 5 cm and hypotenuse 10 cm. Find the angle. [2]

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**2.3** A right-angled triangle has adjacent 8 cm and angle  $35^\circ$ . Find the opposite side. [2]

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## 3 Exam-style questions

**3.1** In a right-angled triangle, the side opposite an angle is 7 cm and the adjacent side is 10 cm. Find the angle. [2]

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**3.2** A right-angled triangle has hypotenuse 15 cm and an angle of  $52^\circ$ . Find the side adjacent to the angle. [2]

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**3.3** A ramp rises 1.2 m over a horizontal distance of 5 m. Find the angle the ramp makes with the horizontal. [2]

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## 4 Go further

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You are now ready for the real exam questions on this subtopic. Open the **E6.2 Right-angled triangles** past-paper sheet in the Library, or try this in **Practice mode**:

- 0580/21 J25 —Q20 (right-angled trigonometry)

## Solutions

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Marking: **M1** a correct method, **A1** the correct answer.

**2.1**  $\text{opp} = 12 \times \sin 40^\circ = 12 \times 0.643 = 7.71 \text{ cm}.$

**2.2**  $\sin \theta = \frac{5}{10} = 0.5 \rightarrow \theta = 30^\circ.$

**2.3**  $\text{opp} = 8 \times \tan 35^\circ = 8 \times 0.700 = 5.60 \text{ cm}.$

**3.1**  $\tan \theta = \frac{7}{10} = 0.7 \rightarrow \theta = \tan^{-1}(0.7) = 35.0^\circ.$

**3.2**  $\text{adj} = 15 \times \cos 52^\circ = 15 \times 0.616 = 9.23 \text{ cm}.$

**3.3**  $\tan \theta = \frac{1.2}{5} = 0.24 \rightarrow \theta = \tan^{-1}(0.24) = 13.5^\circ.$