

Exercise walk-through

Sine, Cosine, and Tangent ■ 3.2

eXercise

You must be able to

- use the right-triangle ratios **SOH-CAH-TOA**
- relate $\tan \theta$ to $\sin \theta$ and $\cos \theta$

Method — Right-triangle ratios

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

$$\text{Also } \tan \theta = \frac{\sin \theta}{\cos \theta}.$$

Method — Example

A 3-4-5 right triangle (opp 3, adj 4, hyp 5): $\sin \theta = \frac{3}{5}$, $\cos \theta = \frac{4}{5}$, $\tan \theta = \frac{3}{4}$.

Practice 2.1 ■ 1 mark

State $\sin \theta$ in terms of the triangle sides.

Solution 2.1

Worked steps

$$\sin \theta = \text{opp/hyp} \quad \text{B1}.$$

Practice 2.2 ■ 1 mark

State $\tan \theta$ as a ratio of $\sin$ and $\cos$.

Solution 2.2

Worked steps

$$\tan \theta = \sin \theta / \cos \theta \quad \text{B1}.$$

Practice 2.3 ■ 2 marks

A right triangle has opp 3, adj 4, hyp 5. Find $\sin \theta$ and $\cos \theta$.

Solution 2.3

Worked steps

$$\sin \theta = \frac{3}{5}; \cos \theta = \frac{4}{5} \quad \text{B1} \quad \text{B1}.$$

Exam-style 3.1 ■ 1 mark

$\cos \theta$ equals

A opp/hyp

B adj/hyp

C opp/adj

D hyp/adj

Solution 3.1

A opp/hyp

B adj/hyp



C opp/adj

D hyp/adj

Worked steps

B.

Exam-style 3.2 ■ 1 mark

$\tan \theta$ equals

A $\sin \theta \cdot \cos \theta$

B $\sin \theta / \cos \theta$

C $\cos \theta / \sin \theta$

D $1 / \sin \theta$

Solution 3.2

A $\sin \theta \cdot \cos \theta$

B $\sin \theta / \cos \theta$ 

C $\cos \theta / \sin \theta$

D $1 / \sin \theta$

Worked steps

B.

Exam-style 3.3 ■ 1 mark

A right triangle has opp 5, adj 12, hyp 13.

- (a) Find $\sin \theta$.
- (b) Find $\cos \theta$.
- (c) Find $\tan \theta$.

Solution 3.3

Worked steps

(a) $\frac{5}{13}$ **B1**. (b) $\frac{12}{13}$ **B1**. (c) $\frac{5}{12}$ **B1**.