

3.2 Sine, Cosine, and Tangent

Name: _____ Class: _____ Date: _____

Total: 9 marks

Objective

Build the skills to answer exam questions on **sine, cosine, and tangent**.

You must be able to:

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

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Right-triangle ratios

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

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

■ Example

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

2 Practice

2.1 State $\sin \theta$ in terms of the triangle sides. [1]

2.2 State $\tan \theta$ as a ratio of sin and cos. [1]

2.3 A right triangle has opp 3, adj 4, hyp 5. Find $\sin \theta$ and $\cos \theta$. [2]

3 Exam-style questions

3.1 $\cos \theta$ equals [1]

- **A** opp/hyp
 - **B** adj/hyp
 - **C** opp/adj
 - **D** hyp/adj
-

3.2 $\tan \theta$ equals [1]

- **A** $\sin \theta \cdot \cos \theta$
 - **B** $\sin \theta / \cos \theta$
 - **C** $\cos \theta / \sin \theta$
 - **D** $1 / \sin \theta$
-

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

(a) Find $\sin \theta$. [1]

(b) Find $\cos \theta$. [1]

(c) Find $\tan \theta$. [1]

4 Go further

- work through the **3.2 Sine, Cosine, and Tangent** lesson on the **Learn** page;
- read the **Trigonometric and Polar Functions** section of the AP Precalculus hand-out on the **Know** page.

Solutions

2.1 $\sin \theta = \text{opp/hyp}.$

2.2 $\tan \theta = \sin \theta / \cos \theta.$

2.3 $\sin \theta = \frac{3}{5}; \cos \theta = \frac{4}{5}.$

3.1 B.

3.2 B.

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