

3.3 Sine and Cosine Function Values

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

KEY WORDS unit circle • radians

Objective

Build the skills to answer exam questions on **sine and cosine function values**.

You must be able to:

- use the **unit circle** : the point at angle θ is $(\cos \theta, \sin \theta)$
- convert between degrees and **radians**

1 Key knowledge and worked examples

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

■ The unit circle

On the unit circle, the point at angle θ is $(\cos \theta, \sin \theta)$.

Radians: $\pi = 180^\circ$.

Key values: $\cos 0 = 1$, $\sin 0 = 0$; $\cos \frac{\pi}{2} = 0$, $\sin \frac{\pi}{2} = 1$.

■ Using the unit circle

Find $\cos \frac{\pi}{3}$ and $\sin \frac{\pi}{3}$. The angle $\frac{\pi}{3} = 60^\circ$ gives the point $(\frac{1}{2}, \frac{\sqrt{3}}{2})$, so $\cos \frac{\pi}{3} = \frac{1}{2}$ and $\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$. The x -coordinate is the cosine; the y -coordinate is the sine.

2 Practice

2.1 State the coordinates of the unit-circle point at angle θ . [1]

2.2 Convert 180° to radians. [1]

2.3 State $\sin \frac{\pi}{2}$ and $\cos \frac{\pi}{2}$. [2]

3 Exam-style questions

3.1 On the unit circle, the point at angle θ is [1]

- ☐
- A** $(\sin \theta, \cos \theta)$

B $(\cos \theta, \sin \theta)$

C $(\tan \theta, 1)$

D $(1, \theta)$

3.2 π radians equals [1]

- ☐
- A** 90°

B 180°

C 270°

D 360°

3.3 Evaluate each.

(a) $\cos 0$. [1]

(b) $\sin 0$. [1]

(c) $\sin \frac{\pi}{2}$. [1]

Solutions

Each answer shows the steps, then the **result**.

2.1

- $(\cos \theta, \sin \theta)$

2.2

- π radians

2.3

- $\sin \frac{\pi}{2} = 1; \cos \frac{\pi}{2} = 0$

3.1 B

- $(\cos \theta, \sin \theta)$.

3.2 B

- 180° .

3.3

(a)

- 1

(b)

- 0

(c)

- 1