MATHEMATICS ADVANCED YEAR 11 - MODULE 2 - LESSON 3

# The Unit Circle

Use this worksheet after reading the lesson to practise the key ideas and prove you can meet the success criteria.

Name _____

Date _____

Class _____

## 1. Key Ideas

The unit circle is the map that connects angles to coordinates, and coordinates to the trigonometric functions. Once you understand it, you can find the sine, cosine, and tangent of any angle — positive, negative, or larger than $360^\circ$ — without a calculator. In this lesson, you will learn to navigate this map like a pro.

- The definition of the unit circle
- Why the unit circle extends trig ratios to any angle

## 2. Success Criteria

By the end, you should be able to:

- The definition of the unit circle
- How sine, cosine, and tangent are defined from the unit circle
- The ASTC rule for quadrant signs

## 3. Key Terms

**unit circle**
a circle with radius $1$ centred at the origin $(0, 0)$ of the coordinate plane

**The unit circle**
the map that connects angles to coordinates, and coordinates to the trigonometric functions

**what**
your $x$- and $y$-coordinates? How do these coordinates relate to $\sin 45^\circ$ and $\cos 45^\circ$?

**you which trig ratios**
positive in each quadrant: All (I), Sin (II), Tan (III), Cos (IV)

**and tangent**
defined from the unit circle

**you which trigonometric ratios**
positive in each quadrant:

## 4. Activity: Build the Lesson Map

Use the lesson to complete the table. Keep answers brief but specific.

| Prompt | Your answer |
| --- | --- |
| Main concept | |
| Important example | |
| Common mistake to avoid | |
| How this links to the next lesson | |

## 5. Short Answer Questions

**1. Explain this lesson goal in your own words: "The definition of the unit circle". Use one specific example from the lesson.**

BAND 3 2 MARKS

**2. Apply this idea to a new example: "How sine, cosine, and tangent are defined from the unit circle". Show your reasoning clearly.**

BAND 4 3 MARKS

**3. Analyse why this idea matters for understanding The Unit Circle: "The ASTC rule for quadrant signs".**

BAND 5 4 MARKS

## 6. Extend: Apply the Idea

BAND 5/6 5 MARKS

**A student gives a memorised answer about The Unit Circle but does not use evidence or reasoning.**

Improve the answer by writing a stronger response that uses accurate terminology, a relevant example and a clear explanation.

## 7. Multiple Choice

**1.** What is the best first step when answering a question about The Unit Circle?

☐ A. Identify the key concept being tested

☐ B. Write every fact from memory

☐ C. Ignore the command word

☐ D. Skip examples and evidence

**2.** Which answer would show stronger understanding of The Unit Circle?

☐ A. An answer with accurate terms and reasoning

☐ B. A copied definition only

☐ C. A single-word response

☐ D. An answer with no example

**3.** What should you do if a question asks you to explain?

☐ A. Link the idea to a reason or cause

☐ B. List unrelated facts

☐ C. Only draw a diagram

☐ D. Write the shortest possible answer

## 8. Success Criteria Proof

Finish with evidence that you can do each success criterion.

**SUCCESS CRITERION 1**

**Prove that you can: The definition of the unit circle**

BAND 3 2 MARKS

**SUCCESS CRITERION 2**

**Prove that you can: How sine, cosine, and tangent are defined from the unit circle**

BAND 4 3 MARKS

**SUCCESS CRITERION 3**

**Prove that you can: The ASTC rule for quadrant signs**

BAND 5 4 MARKS

**One thing I still need help with:**