MATHEMATICS ADVANCED YEAR 11 - MODULE 2 - LESSON 9

Domains and Ranges of Trigonometric Functions

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

Not every angle can be plugged into every trig function. Tangent blows up at 90°, cosecant is undefined at 0°, and cosine never exceeds 1. In this lesson, you will systematically determine the domain and range of all six trigonometric functions — an essential foundation for graphing, solving equations, and working with inverse trig functions.

- The domain and range of sine, cosine, and tangent
- How the unit circle determines the range of sine and cosine

2. Success Criteria

By the end, you should be able to:

- The domain and range of sine, cosine, and tangent
- The domain and range of cosecant, secant, and cotangent
- Why division by zero creates domain restrictions

3. Key Terms

Trigonometric Ratio
The ratio of sides in a right-angled triangle (sin, cos, tan).

Radian
A unit of angle measure where one radian subtends an arc equal to the radius.

Sine Rule
A formula relating sides and angles in any triangle: a/sinA = b/sinB = c/sinC.

Cosine Rule
A formula for finding sides or angles: $c^2 = a^2 + b^2 - 2ab\cos C$.

Period
The length of one complete cycle of a periodic function.

Amplitude
The maximum displacement from the centre line of a periodic function.

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 domain and range of sine, cosine, and tangent". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "The domain and range of cosecant, secant, and cotangent". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Domains and Ranges of Trigonometric Functions: "Why division by zero creates domain restrictions".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Domains and Ranges of Trigonometric Functions 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 Domains and Ranges of Trigonometric Functions?

☐ 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 Domains and Ranges of Trigonometric Functions?

☐ 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 domain and range of sine, cosine, and tangent

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: The domain and range of cosecant, secant, and cotangent

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: Why division by zero creates domain restrictions

BAND 5 4 MARKS

One thing I still need help with: