MATHEMATICS ADVANCED YEAR 11 - MODULE 3 - LESSON 13

Volumes of Solids of Revolution

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

Spin a curve around an axis and it traces out a three-dimensional solid — a vase, a rocket nose cone, or a wine glass. By slicing that solid into infinitely thin disks and adding up their volumes, we can find the exact volume of almost any rotational shape. This is the power of volumes of solids of revolution.

- The disk method formula for rotation about the x-axis and y-axis
- How revolving a curve generates a three-dimensional solid

2. Success Criteria

By the end, you should be able to:

- The disk method formula for rotation about the x-axis and y-axis
- The washer method for regions between two curves
- How to identify the radius function for a given solid

3. Key Terms

This
the power of volumes of solids of revolution

Each infinitesimally thin slice
a disk with volume $\pi r^2 \cdot \text{thickness}$

Point of Inflection
the reverse of differentiation, but includes an arbitrary constant (+C) for indefinite integrals

each slice
approximately a circular disk with:

the region being rotated
bounded by two curves, the cross-section is a

volume of each washer
the volume of the outer disk minus the volume of the inner disk:

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 disk method formula for rotation about the x-axis and y-axis". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "The washer method for regions between two curves". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Volumes of Solids of Revolution: "How to identify the radius function for a given solid".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Volumes of Solids of Revolution 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 Volumes of Solids of Revolution?

☐ 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 Volumes of Solids of Revolution?

☐ 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 disk method formula for rotation about the x-axis and y-axis

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: The washer method for regions between two curves

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: How to identify the radius function for a given solid

BAND 5 4 MARKS

One thing I still need help with: