MATHEMATICS ADVANCED YEAR 11 - MODULE 1 - LESSON 14

Further Transformations & Synthesis

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

In a recording studio, audio engineers take sound waves and transform them in extreme ways — clipping off negative parts, mirroring halves, or inverting amplitudes. The mathematics behind these effects is exactly what you will master in this lesson: absolute-value transformations, reciprocal graphs, and the synthesis of every transformation technique you have learned so far.

- The effect of $y = |f(x)|$, $y = f(|x|)$, and $y = \\frac{1}{f(x)}$ on a graph
- Why $|f(x)|$ creates "cusps" at x-intercepts

2. Success Criteria

By the end, you should be able to:

- The effect of $y = |f(x)|$, $y = f(|x|)$, and $y = \\frac{1}{f(x)}$ on a graph
- How zeros, turning points, and asymptotes behave under these transformations
- The complete toolkit of graph transformations

3. Key Terms

Function
A relation where each input has exactly one output.

Domain
The set of all possible input values for a function.

Range
The set of all possible output values for a function.

Inverse Function
A function that reverses the effect of the original function.

Quadratic
A polynomial of degree 2, in the form $ax^2 + bx + c$.

Discriminant
The expression $b^2 - 4ac$ that determines the nature of quadratic roots.

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 effect of $y = |f(x)|$, $y = f(|x|)$, and $y = \\frac{1}{f(x)}$ on a graph". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "How zeros, turning points, and asymptotes behave under these transformations". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Further Transformations & Synthesis: "The complete toolkit of graph transformations".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Further Transformations & Synthesis 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 Further Transformations & Synthesis?

☐ 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 Further Transformations & Synthesis?

☐ 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 effect of $y = |f(x)|$, $y = f(|x|)$, and $y = \\frac{1}{f(x)}$ on a graph

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: How zeros, turning points, and asymptotes behave under these transformations

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: The complete toolkit of graph transformations

BAND 5 4 MARKS

One thing I still need help with: