MATHEMATICS ADVANCED YEAR 11 - MODULE 3 - LESSON 6

The Product and Quotient Rules

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 function is a simple power or a composition inside brackets. Some functions are products of two simpler functions. Others are quotients — one function divided by another. To differentiate these, we need two more powerful tools: the product rule and the quotient rule .

- The product rule formula: $(uv)' = u'v + uv'$
- Why the derivative of a product requires both $u'v$ and uv'

2. Success Criteria

By the end, you should be able to:

- The product rule formula: $(uv)' = u'v + uv'$
- The quotient rule formula: $\left(\frac{u}{v}\right)' = \frac{u'v - uv'}{v^2}$
- When each rule is needed

3. Key Terms

Derivative
The rate of change of a function at a point; the gradient of the tangent.

Differentiation
The process of finding the derivative of a function.

Stationary Point
A point where the derivative equals zero.

Chain Rule
A rule for differentiating composite functions: dy/dx = dy/du × du/dx.

Product Rule
A rule for differentiating products: d(uv)/dx = u(dv/dx) + v(du/dx).

Quotient Rule
For y = u/v: dy/dx = (u'v - uv') / v^2.

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 product rule formula: $(uv)' = u'v + uv'$". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "The quotient rule formula: $\left(\frac{u}{v}\right)' = \frac{u'v - uv'}{v^2}$". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding The Product and Quotient Rules: "When each rule is needed".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about The Product and Quotient Rules 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 Product and Quotient Rules?

☐ 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 Product and Quotient Rules?

☐ 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 product rule formula: $(uv)' = u'v + uv'$

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: The quotient rule formula: $\left(\frac{u}{v}\right)' = \frac{u'v - uv'}{v^2}$

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: When each rule is needed

BAND 5 4 MARKS

One thing I still need help with: