

The Chain Rule

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

What do a clock pendulum, a satellite orbiting Earth, and a sound wave all have in common? Their behaviour is described by functions inside functions. The chain rule is the key to differentiating these composite functions — and it is one of the most important tools in all of calculus.

- The chain rule formula in both function and Leibniz notation
- Why the derivative of a composite function involves multiplication of derivatives

2. Success Criteria

By the end, you should be able to:

- The chain rule formula in both function and Leibniz notation
- How to identify the "outer" and "inner" functions
- That composite functions require the chain rule

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:
 $dy/dx = dy/du \times du/dx$.

Product Rule

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

Chain Rule

For composite functions: $dy/dx = dy/du * du/dx$.

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 chain rule formula in both function and Leibniz notation". Use one specific example from the lesson.

BAND 3 **2 MARKS**

2. Apply this idea to a new example: "How to identify the "outer" and "inner" functions". Show your reasoning clearly.

BAND 4 **3 MARKS**

3. Analyse why this idea matters for understanding The Chain Rule: "That composite functions require the chain rule".

BAND 5 **4 MARKS**

6. Extend: Apply the Idea

BAND 5/6

5 MARKS

A student gives a memorised answer about The Chain Rule 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 Chain Rule?

- 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 Chain Rule?

- 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 chain rule formula in both function and Leibniz notation

BAND 3 **2 MARKS**

SUCCESS CRITERION 2

Prove that you can: How to identify the "outer" and "inner" functions

BAND 4 **3 MARKS**

SUCCESS CRITERION 3

Prove that you can: That composite functions require the chain rule

BAND 5 **4 MARKS**

One thing I still need help with:
