

Exercise walk-through

Selecting Procedures for Calculating Derivatives ■ 3.5

eXercise

You must be able to

- recognise the structure of an expression and pick the right rule (power, product, quotient, chain)

Method — Choosing a rule

- a power of $x \rightarrow$ **power rule**;
- a product $\rightarrow$ **product rule**;
- a quotient $\rightarrow$ **quotient rule**;
- a composite (function of a function) $\rightarrow$ **chain rule**.

Combine them when an expression mixes structures.

Practice 2.1 ■ 1 mark

State which rule to use for a composite.

Solution 2.1

Method: Choosing a rule

Worked steps

the chain rule **B1**.

Practice 2.2 ■ 1 mark

State which rule to use for a product.

Solution 2.2

Method: Choosing a rule

Worked steps

the product rule **B1**.

Practice 2.3 ■ 2 marks

For $y = x^2 \sin x$, name the rule.

Solution 2.3

Worked steps

the product rule $\boxed{B1} \boxed{B1}$.

Exam-style 3.1 ■ 1 mark

For $y = (x^2 + 1)^5$, use the

A quotient rule

B chain rule

C product rule only

D no rule

Solution 3.1

A quotient rule

B chain rule 

C product rule only

D no rule

Worked steps

B.

Exam-style 3.2 ■ 1 mark

For $y = \frac{x}{x+1}$, use the

- A** power rule
- B** quotient rule
- C** chain rule
- D** sum rule

Solution 3.2

A power rule

B quotient rule 

C chain rule

D sum rule

Worked steps

B.

Exam-style 3.3 ■ 1 mark

Name the rule for each.

(a) $y = x^3$.

(b) $y = x e^x$.

(c) $y = \sin(x^2)$.

Solution 3.3

Worked steps

(a) power rule **B1**. (b) product rule **B1**. (c) chain rule **B1**.