AP CALCULUS BC • EXERCISE SHEET

3.5 Selecting Procedures for Calculating Derivatives

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

Objective

Build the skills to answer exam questions on **selecting procedures for calculating derivatives**.

You must be able to:

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

1 Worked examples

Study these first. Each one shows the method for a question type used later.

> ■ **Choosing a rule**
> - a power of $x \to$ **power rule**;
> - a product $\to$ **product rule**;
> - a quotient $\to$ **quotient rule**;
> - a composite (function of a function) $\to$ **chain rule**.
>
> Combine them when an expression mixes structures.

2 Practice

2.1 State which rule to use for a composite. [1]

2.2 State which rule to use for a product. [1]

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

3 Exam-style questions

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

- **A** quotient rule
- **B** chain rule
- **C** product rule only
- **D** no rule

3.2 For $y = \dfrac{x}{x + 1}$, use the [1]

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

3.3 Name the rule for each.

(a) $y = x^3$. [1]

(b) $y = x\,e^x$. [1]

(c) $y = \sin(x^2)$. [1]

4 Go further

- work through the **3.5 Selecting Procedures for Calculating Derivatives** lesson on the **Learn** page;
- read the **Differentiation: Composite, Implicit, and Inverse Functions** section of the AP Calculus BC handout on the **Know** page.

Solutions

2.1 the chain rule.

2.2 the product rule.

2.3 the product rule.

3.1 B.

3.2 B.

3.3 (a) power rule. (b) product rule. (c) chain rule.