

# 2.9 The Quotient Rule

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_ Total: 9 marks

KEY WORDS quotient rule 商法则

## Objective

Build the skills to answer exam questions on **the quotient rule**.

You must be able to:

- differentiate a quotient with the **quotient rule** 商法则  $\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$

## 1 Worked examples

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

### ■ The quotient rule

$$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}.$$

### ■ Example

$$\frac{d}{dx} \left[ \frac{x}{x+1} \right] = \frac{(1)(x+1) - x(1)}{(x+1)^2} = \frac{1}{(x+1)^2}.$$

## 2 Practice

2.1 State the quotient rule. [1]

2.2 Differentiate  $\frac{1}{x}$  using the quotient rule. [2]

2.3 State the denominator of the quotient-rule result. [1]

## 3 Exam-style questions

3.1  $\left(\frac{f}{g}\right)'$  equals [1]

- |   |                         |
|---|-------------------------|
| A | $\frac{f'g - fg'}{g^2}$ |
| B | $\frac{f'g + fg'}{g^2}$ |
| C | $\frac{f'}{g'}$         |
| D | $\frac{fg' - f'g}{g^2}$ |

3.2 In the quotient rule, the denominator is [1]

- |   |       |
|---|-------|
| A | $g$   |
| B | $g^2$ |
| C | $f^2$ |
| D | $fg$  |

3.3  $y = \frac{x}{x+2}$ .

(a) Identify  $f$  and  $g$ . [1]

(b) Apply the rule. [1]

(c) Simplify. [1]