

## 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 | B |
| C | D |
- 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 | B |
| C | D |
- 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]