

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]