

2.6 Constant, Sum, Difference, and Constant Multiple Rules

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS constant multiple 常数倍 • constant multiple rule 常数倍法则 • sum/difference rule 和差法则
• derivative 导数

Objective

Build the skills to answer exam questions on **the constant, sum, difference, and constant multiple rules**.

You must be able to:

- apply the **constant multiple rule** 常数倍法则 and **sum/difference rule** 和差法则

1 Worked examples

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

■ Basic derivative rules

- **constant multiple:** $\frac{d}{dx}[c f] = c f'$;
- **sum / difference:** $\frac{d}{dx}[f \pm g] = f' \pm g'$;
- **constant:** $\frac{d}{dx}[c] = 0$.

■ Example

$$\frac{d}{dx}[4x^3 - 2x] = 12x^2 - 2.$$

2 Practice

2.1 State the sum rule. [1]

2.2 Differentiate $3x^2$. [1]

2.3 Differentiate $x^3 + x$.

[2]

3 Exam-style questions

3.1 $\frac{d}{dx}[5x^2]$ equals

[1]

- **A** $5x$
 - **B** $10x$
 - **C** $5x^2$
 - **D** $10x^2$
-

3.2 $\frac{d}{dx}[f + g]$ equals

[1]

- **A** $f' \cdot g'$
 - **B** $f' + g'$
 - **C** $f' - g'$
 - **D** fg
-

3.3 $y = 4x^3 - 2x$.

(a) Differentiate $4x^3$.

[1]

(b) Differentiate $-2x$.

[1]

(c) State y' .

[1]

Solutions

2.1 $\frac{d}{dx}[f + g] = f' + g'.$

2.2 $6x.$

2.3 $3x^2 + 1.$

3.1 B.

3.2 B.

3.3 (a) $12x^2.$ (b) $-2.$ (c) $y' = 12x^2 - 2.$