

# 4.1 Interpreting the Derivative in Context

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

KEY WORDS units 单位

## Objective

Build the skills to answer exam questions on **interpreting the meaning of the derivative in context**.

You must be able to:

- give the **units** 单位 of a derivative
- interpret its sign and value in a real context

## 1 Worked examples

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

### ■ The derivative in context

A derivative is a **rate of change** with units: if  $V(t)$  is a volume in  $\text{cm}^3$  at time  $t$  (s), then  $V'(t)$  is in  $\text{cm}^3/\text{s}$ .

- $f'(t) > 0$ : the quantity is increasing;
- $f'(t) < 0$ : it is decreasing.

## 2 Practice

2.1 State the units of  $f'(t)$  if  $f$  is in metres and  $t$  in seconds. [1]

2.2 State what a positive derivative means. [1]

2.3 If  $P(t)$  is a population and  $P'(5) = 200$ , interpret this. [2]

## 3 Exam-style questions

3.1 If  $h(t)$  is a height in m and  $t$  in s, then  $h'(t)$  has units [1]

- |   |   |
|---|---|
| A | B |
| C | D |
- A m  
B m/s  
C s/m  
D m · s

3.2 A positive  $f'(t)$  means the quantity is [1]

- |   |   |
|---|---|
| A | B |
| C | D |
- A decreasing  
B increasing  
C constant  
D zero

3.3  $W(t)$  is water in litres at time  $t$  (min), and  $W'(3) = -4$ .

(a) State the units. [1]

(b) State what the sign means. [1]

(c) Interpret  $W'(3) = -4$ . [1]