

4.3 Rates of Change Beyond Motion

Name: _____ Class: _____ Date: _____ Total: 9 marks

KEY WORDS marginal cost 边际成本

Objective

Build the skills to answer exam questions on **rates of change in applied contexts other than motion**.

You must be able to:

- interpret a derivative as a rate in any context (e.g. **marginal cost** 边际成本)

1 Worked examples

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

■ Rates in other contexts

A derivative measures the rate of change of **any** quantity: marginal cost $C'(x)$, a flow rate, a reaction rate. Interpret its sign and units just as for motion.

■ Example

If $C(x)$ is cost in dollars for x items, $C'(100) = 5$ means about \$5 to produce the 101st item.

2 Practice

2.1 State what marginal cost is, as a derivative. [1]

2.2 State the units of $C'(x)$ if C is in dollars and x in items. [1]

2.3 If $C'(100) = 5$, interpret this. [2]

3 Exam-style questions

3.1 Marginal cost is the derivative of [1]

- | | |
|---|---|
| A | B |
| C | D |
- A revenue
B the cost function
C profit
D price

3.2 If $A'(t) > 0$, the area A is [1]

- | | |
|---|---|
| A | B |
| C | D |
- A shrinking
B growing
C constant
D zero

3.3 $C(x)$ is cost in dollars for x items, and $C'(50) = 8$.

(a) State the units. [1]

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

(c) Interpret $C'(50) = 8$. [1]