Exercise walk-through

Rates of Change in Applied Contexts Other Than Motion ▪ 4.3

eXercise

You must be able to

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

Method — 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.

Method — Example

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

Practice 2.1 ▪ 1 mark

State what marginal cost is, as a derivative.

Solution 2.1

Method: Rates in other contexts

Worked steps

the derivative of the cost function, $C'(x)$ **B1**.

Practice 2.2 ▪ 1 mark

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

Solution 2.2

Method: Example

Worked steps

dollars per item **B1**.

Practice 2.3 ▪ 2 marks

If $C'(100) = 5$, interpret this.

Solution 2.3

Worked steps

near $x = 100$ items, cost rises about $\$5$ per additional item **B1** **B1**.

Exam-style 3.1 ▪ 1 mark

Marginal cost is the derivative of

A revenue

B the cost function

C profit

D price

Solution 3.1

Method: Rates in other contexts

A revenue

B the cost function ✓

C profit

D price

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

If $A'(t) > 0$, the area A is

A shrinking

B growing

C constant

D zero

Solution 3.2

- **A** shrinking
- **B** growing ✓
- **C** constant
- **D** zero

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

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

(a) State the units.

(b) State what the sign means.

(c) Interpret $C'(50) = 8$.

Solution 3.3

Method: Example

Worked steps

(a) dollars per item **B1**. (b) cost is rising with output **B1**. (c) about $\$8$ to produce the 51st item **B1**.