

## Past-paper walk-through

Estimating Derivatives of a Function at a Point ■ 2.3

eXercise

## Questions in this set

- 2026 Q1
- 2025 Q3
- 2021 Q1
- 2019 Q6
- 2016 Q1
- 2015 Q3

## Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

# Question 1

2026 ■ Q1

Male birds of a certain species arrive at a nesting area over a thirty-day period. The rate at which the male birds arrive at the nesting area at time  $t$  days is modeled by a differentiable function  $M$ , where  $M(t)$  is measured in number of birds per day. Selected values of  $M(t)$  are shown in the table.

| $t$ (days)             | 0 | 5 | 10 | 15 | 20 | 25 | 30 |
|------------------------|---|---|----|----|----|----|----|
| $M(t)$ (birds per day) | 2 | 7 | 16 | 6  | 5  | 2  | 0  |

## Question 1

(Note: Your calculator should be in radian mode.)

**(a)** Approximate  $M'(7.5)$  using the average rate of change of  $M$  over the interval  $5 \leq t \leq 10$ . Show the work that leads to your answer, and indicate units of measure.

## Question 1

|                        |   |   |    |    |    |    |    |
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