

Exercise walk-through

Periodic Phenomena ■ 3.1

eXercise

You must be able to

- identify the **period** 周期, **amplitude** 振幅, and **midline** 中线 of a periodic function

Method — Periodic functions

A **periodic** function repeats every **period** P (the length of one cycle). Its:

- **amplitude** $= \frac{\max - \min}{2}$;
- **midline** $= \frac{\max + \min}{2}$ (the horizontal centre).

Method — Example

Max 8, min 2: amplitude = 3, midline = 5.

Practice 2.1 ■ 1 mark

Define the period of a periodic function.

Solution 2.1

Method: Periodic functions

Worked steps

the length of one complete cycle **B1**.

Practice 2.2 ■ 1 mark

State how the amplitude relates to the max and min.

Solution 2.2

Worked steps

$$\text{amplitude} = \frac{\text{max} - \text{min}}{2} \quad \text{B1}.$$

Practice 2.3 ■ 2 marks

A wave has max 8 and min 2. Find the amplitude and midline.

Solution 2.3

Worked steps

$$\text{amplitude} = \frac{8 - 2}{2} = 3; \text{midline} = \frac{8 + 2}{2} = 5 \quad \text{M1 A1}.$$

Exam-style 3.1 ■ 1 mark

The period of a periodic function is

- A** its height
- B** the length of one cycle
- C** its maximum
- D** its slope

Solution 3.1

Method: Periodic functions

- A its height
- B the length of one cycle**
- C its maximum
- D its slope



Worked steps

B.

Exam-style 3.2 ■ 1 mark

The amplitude equals

A $\text{max} - \text{min}$

B $\frac{\text{max} - \text{min}}{2}$

C $\frac{\text{max} + \text{min}}{2}$

D max

Solution 3.2

A $\max - \min$

B $\frac{\max - \min}{2}$



C $\frac{\max + \min}{2}$

D $\max$

Worked steps

B.

Exam-style 3.3 ■ 1 mark

A tide has maximum height 6 m and minimum 0 m, repeating every 12 h.

- (a) Find the amplitude.
- (b) Find the midline.
- (c) State the period.

Solution 3.3

Method: Periodic functions

Worked steps

$$(a) \frac{6 - 0}{2} = 3 \text{ m } \text{B1}. \quad (b) \frac{6 + 0}{2} = 3 \text{ m } \text{B1}. \quad (c) 12 \text{ h } \text{B1}.$$