

Exercise walk-through

Sinusoidal Functions ■ 3.5

eXercise

You must be able to

- read the amplitude, period, phase shift, and midline from $y = a \sin(b(x - h)) + k$

Method — The general sinusoid

$$y = a \sin(b(x - h)) + k.$$

- $|a|$ = **amplitude** 振幅;
- period = $\frac{2\pi}{b}$;
- h = horizontal (**phase**) shift 相移;
- k = **midline** 中线 (vertical shift).

Method — Example

$y = 3 \sin(2x) + 1$: amplitude 3, period $\frac{2\pi}{2} = \pi$, midline $y = 1$.

Practice 2.1 ■ 1 mark

In $y = a \sin(bx)$, state the amplitude.

Solution 2.1

Worked steps

 $|a|$ **B1**.

Practice 2.2 ■ 2 marks

State the period of $y = \sin(2x)$.

Solution 2.2

Worked steps

$$\text{period} = \frac{2\pi}{2} = \pi \quad \text{M1} \quad \text{A1}.$$

Practice 2.3 ■ 1 mark

In $y = \sin x + 3$, state the midline.

Solution 2.3

Worked steps

$$y = 3 \text{ (B1).}$$

Exam-style 3.1 ■ 1 mark

In $y = a \sin(b(x - h)) + k$, the amplitude is

A b

B $|a|$

C k

D h

Solution 3.1

A b

B $|a|$



C k

D h

Worked steps

B.

Exam-style 3.2 ■ 1 mark

The period of $y = a \sin(bx)$ is

A 2π

B $\frac{2\pi}{b}$

C $\frac{b}{2\pi}$

D πb

Solution 3.2

A 2π

B $\frac{2\pi}{b}$



C $\frac{b}{2\pi}$

D πb

Worked steps

B.

Exam-style 3.3 ■ 1 mark

$$y = 3 \sin(2x) + 1.$$

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

Solution 3.3

Worked steps

(a) 3 **B1**. (b) π **B1**. (c) $y = 1$ **B1**.