

3.7 Sinusoidal Function Context and Data Modeling

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

KEY WORDS period 周期 • midline 中线 • amplitude 振幅 • sinusoidal function 正弦型函数

Objective

Build the skills to answer exam questions on **sinusoidal function context and data modeling**.

You must be able to:

- build a sinusoidal model from a maximum, minimum, and **period** 周期

1 Worked examples

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

■ **Building a sinusoid from data**

- amplitude = $\frac{\text{max} - \text{min}}{2}$;
- midline = $\frac{\text{max} + \text{min}}{2}$;
- $b = \frac{2\pi}{\text{period}}$.

■ **Example**

A tide with max 6 m, min 2 m, period 12 h: amplitude 2, midline 4, $b = \frac{2\pi}{12} = \frac{\pi}{6}$, giving $y = 2\sin\left(\frac{\pi}{6}t\right) + 4$.

2 Practice

2.1 State the formula for b given the period. [1]

2.2 A quantity has max 10 and min 4. Find the amplitude and midline. [2]

2.3 State b for a period of 24. [1]

3 Exam-style questions

3.1 Given period P , the value b equals [1]

- A

B

C

D

A $P/2\pi$

B $2\pi/P$

C πP

D $2\pi P$

3.2 The midline of a sinusoidal model equals [1]

- A

B

C

D

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

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

C max

D min

3.3 A Ferris wheel has maximum height 50 m, minimum 2 m, and period 60 s.

- (a) Find the amplitude. [1]

(b) Find the midline. [1]

(c) Find the value of b . [1]