Transformed sinusoidal models including phase shift

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. State the amplitude and range of $4\sin x - 2$. [2 marks]

The midline is -2; add and subtract 4.

Answer: Amplitude 4; range $[-6, 2]$.

2. Find the period of $2\cos(\frac{x}{3})$. [2 marks]

$B = \frac{1}{3}$, so $T = \frac{2\pi}{\frac{1}{3}}$.

Answer: 6π.

3. Find the horizontal shift of $\sin(4x - \pi)$. [2 marks]

Factor the argument as $4(x - \frac{\pi}{4})$.

Answer: Right $\frac{\pi}{4}$.

4. A cosine graph has range $[-5, 3]$, period 2π and a maximum at 0. Give a rule. [2 marks]

The mean of the endpoints is -1, half their difference is 4, and $B = 1$.

Answer: $y = -1 + 4\cos x$.

5. Find the first two maxima of $2\cos(\frac{\pi x}{3})$ for $x \geq 0$. [2 marks]

Period 6; positive cosine starts at a maximum.

Answer: $x = 0, 6$.

6. Explain the difference between $\sin x + 4$ and $4\sin x$. [2 marks]

Their ranges are $[3, 5]$ and $[-4, 4]$, respectively.

Answer: The first changes the midline; the second changes amplitude.