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 $2\cos(x/3)$. [2 marks]

$B = 1/3$, so $T = 2\pi/(1/3)$.

Answer: 6π.

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

Factor the argument as $4(x - \pi/4)$.

Answer: Right $\pi/4$.

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 $2\cos(\pi x/3)$ 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.