Simple transformations and periodicity

6 questions | 18 marks

Equivalent correct methods earn the corresponding marks.

1. State amplitude and range of $y = 5 + 3\sin x$. [3 marks]

Use midline 5 and vertical distance 3.

Answer: Amplitude 3; range[2,8].

2. Find the period of $y = \cos(x/2)$. [3 marks]

$2\pi/(1/2) = 4\pi$.

Answer: 4π

3. Describe the shift in $y = \sin(x - \pi/3)$. [3 marks]

The argument becomes 0 at x=π/3.

Answer: π/3 to the right.

4. For $y = \tan(2x)$, find its period and closest asymptotes to 0. [3 marks]

The period isπ/2; solve $2x = \pm\pi/2$ for the boundaries.

Answer: Period π/2; asymptotes x=±π/4.

5. A cosine model has maximum 7, minimum−1, period 6 and starts at its maximum. Give a rule. [3 marks]

Midline 3 and amplitude 4.

$B = 2\pi/6 = \pi/3$.

Answer: $y = 3 + 4\cos(\pi x/3)$

6. Find the first maximum for x≥0 of $y = 2\sin(x - \pi/4)$. [3 marks]

The argument isπ/2 at a maximum: $x - \pi/4 = \pi/2$.

Answer: x=3π/4, value 2.