Reciprocal trig functions and their graphs

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. Find $\sec(\pi/3)$. [2 marks]

Take the reciprocal of $\cos(\pi/3) = 1/2$.

Answer: 2.

2. Find $\csc(7\pi/6)$. [2 marks]

The sine is $-1/2$; its reciprocal is -2.

Answer: -2.

3. State the excluded values for $\csc(2x)$. [2 marks]

Exclude $\sin(2x) = 0$, giving $2x = k\pi$.

Answer: $x = k\pi/2$, $k \in \mathbb{Z}$.

4. Solve $\sec x = -2$ on $[0, 2\pi)$. [2 marks]

Take reciprocals to solve $\cos x = -1/2$.

Answer: $x = 2\pi/3, 4\pi/3$.

5. State the range of $2\sec x + 1$. [2 marks]

Scale secant by 2 and shift both branches up 1.

Answer: $(-\infty, -1] \cup [3, \infty)$.

6. Find the period and zeros of $\cot(2x)$. [2 marks]

Cotangent repeats when its argument increases by π; its zeros occur at argument $\pi/2 + k\pi$.

Answer: Period $\pi/2$; zeros $x = \pi/4 + k\pi/2$.