Reciprocal trig functions and their graphs

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. Find $\sec(\frac{\pi}{3})$. [2 marks]

Take the reciprocal of $\cos(\frac{\pi}{3}) = \frac{1}{2}$.

Answer: 2.

2. Find $\csc(\frac{7\pi}{6})$. [2 marks]

The sine is $-\frac{1}{2}$; 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: $x = \frac{k\pi}{2}$, $k \in \mathbb{Z}$.

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

Take reciprocals to solve $\cos x = -\frac{1}{2}$.

Answer: $x = \frac{2\pi}{3}, \frac{4\pi}{3}$.

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 $\frac{\pi}{2} + k\pi$.

Answer: Period $\frac{\pi}{2}$; zeros $x = \frac{\pi}{4} + \frac{k\pi}{2}$.