

5.2 Graphs of Reciprocal Trigonometric Functions

BLM 5-6

1. **a) Use Technology** Use graphing technology to graph $y = \tan x$.
b) Determine all values of x in the interval $x \in [0, 2\pi]$ such that $\tan x = 6$. Round your answers to two decimal places.
2. **Use Technology** Use graphing technology to determine all values of x in the interval $x \in [0, 2\pi]$ such that $\cos x = -0.8$. Round your answers to two decimal places.
3. **Use Technology** Use graphing technology to determine all values of x in the interval $x \in [0, 2\pi]$ such that $\csc x = -3$. Round your answers to two decimal places.
4. **a)** Describe the graph of $y = \csc x$ in terms of a transformation of the graph of $y = \sec x$.
b) Is there more than one transformation that will accomplish what is required in part a)?
5. **a)** Explain the difference between $\cot \frac{1}{\sqrt{3}}$ and $\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$.
b) Determine a value for each expression in part a).
6. **Use Technology**
a) Use graphing technology to show that there is at least one value of x such that $\sec x = \cos^{-1} x$.
b) Determine a value of x , to three decimal places, that makes the equation in part a) true.
c) Verify your answer found in part b).
7. A boat is in the water 150 m from a straight shoreline. There is a rotating beam on the boat.
a) Determine a reciprocal trigonometric relation for the distance, d , from the boat to where the light hits the shoreline in terms of the angle of rotation, x .
b) Determine an exact expression for the distance in part a) when $x = \frac{\pi}{6}$.
c) Determine an approximate value, to the nearest tenth of a metre, for the distance from part b).
d) Sketch a graph of the relation in part a) in the interval $x \in \left[0, \frac{\pi}{2}\right]$.
8. **Use Technology** Use graphing technology to determine whether it is reasonable to conjecture that $\sec^2 x = \csc^2 x$. If so, justify your conclusion. If not, use the graphs to determine a similar equation that is an identity.
9. **a)** Sketch the graph of $y = \sec x$.
b) Predict the shape of each function, and then check your answer by graphing.
 - i) $y = \frac{1}{2} \sec x$
 - ii) $y = \sec x - 4$
 - iii) $y = \sec(x + 2)$
 - iv) $y = \sec 3x$