

Section 4.2

Definition of Trigonometric Functions

Let t be a real number and let (x, y) be the point on the unit circle corresponding to t .

$$\begin{aligned} \sin t &= y & \cos t &= x & \tan t &= \frac{y}{x}, x \neq 0 \\ \csc t &= \frac{1}{y}, y \neq 0, & \sec t &= \frac{1}{x}, x \neq 0, & \cot t &= \frac{x}{y}, y \neq 0 \end{aligned}$$

Periodic Function

A function t is periodic if there exists a positive real number c such that $f(t + c) = f(t)$ for all t in the domain of f . The smallest number c for which f is periodic is called the period of f .

Even and Odd Trigonometric Functions

The cosine and secant functions are even.

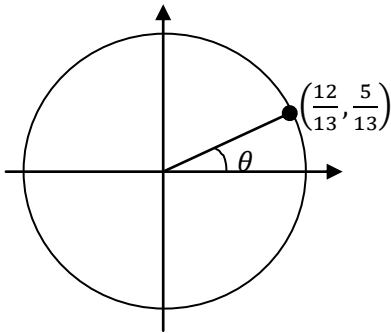
$$\cos(-t) = \cos t, \quad \sec(-t) = \sec t.$$

The sine, cosecant, tangent, and cotangent functions are odd.

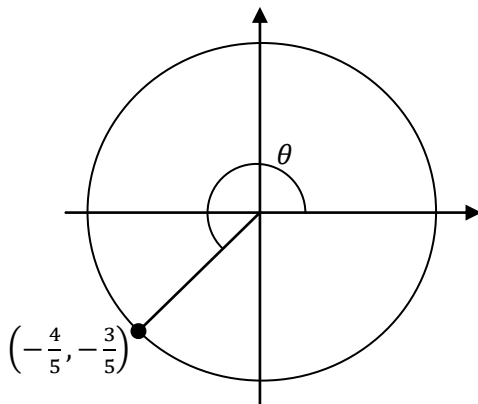
$$\sin(-t) = -\sin t, \quad \tan(-t) = -\tan t, \quad \csc(-t) = -\csc t, \quad \cot(-t) = -\cot t$$

Problem 1. Determine the exact values of the six trigonometric functions of the angle θ .

a) C_1



b) C_2



Problem 2. Evaluate the six trigonometric functions of the real number.

a) $t = \frac{\pi}{4}$

b) $t = -\frac{\pi}{6}$

c) $t = -\frac{3\pi}{4}$

d) $t = \frac{7\pi}{6}$

Problem 3. Evaluate the trigonometric function using its period as an aid.

a) $\cos 7\pi$

b) $\sin \frac{15\pi}{6}$

c) $\cos\left(-\frac{13\pi}{4}\right)$

Problem 4. Use the value of the trigonometric function to evaluate the indicated functions.

a) $\cos(t) = \frac{2}{3}, \cos(-t), \sec(-t)$

b) $\sin(-t) = \frac{2}{5}, \sin t, \csc t$