

4.2 Definitions and Graphs of Trigonometric Functions

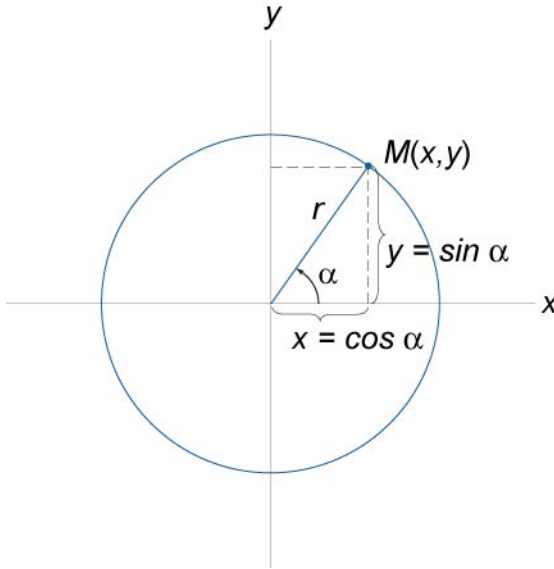


Figure 58.

367. $\sin \alpha = \frac{y}{r}$

368. $\cos \alpha = \frac{x}{r}$

369. $\tan \alpha = \frac{y}{x}$

370. $\cot \alpha = \frac{x}{y}$

371. $\sec \alpha = \frac{r}{x}$

372. $\operatorname{cosec} \alpha = \frac{r}{y}$

373. Sine Function
 $y = \sin x$, $-1 \leq \sin x \leq 1$.

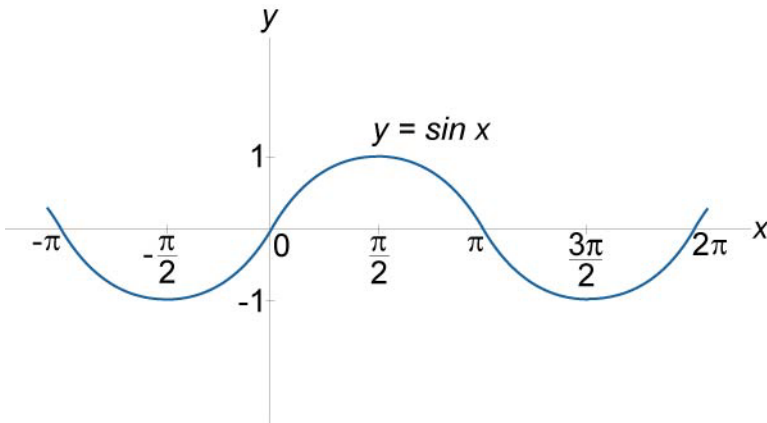


Figure 59.

374. Cosine Function
 $y = \cos x$, $-1 \leq \cos x \leq 1$.

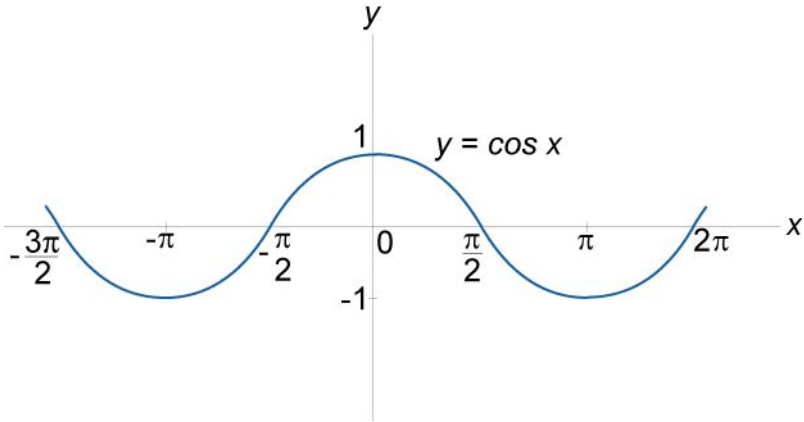


Figure 60.

375. Tangent Function

$$y = \tan x, \quad x \neq (2k+1)\frac{\pi}{2}, \quad -\infty \leq \tan x \leq \infty.$$

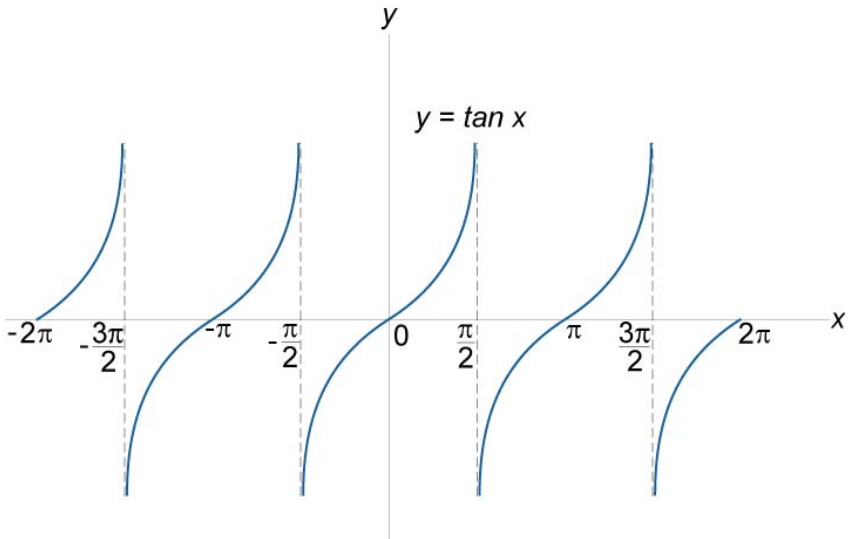
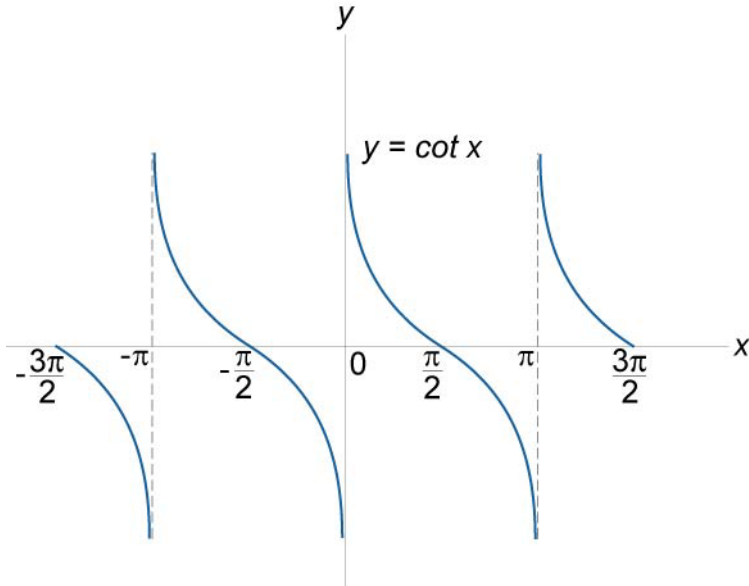


Figure 61.

376. Cotangent Function

$$y = \cot x, \quad x \neq k\pi, \quad -\infty \leq \cot x \leq \infty.$$

**Figure 62.****377. Secant Function**

$$y = \sec x, \quad x \neq (2k+1)\frac{\pi}{2}.$$

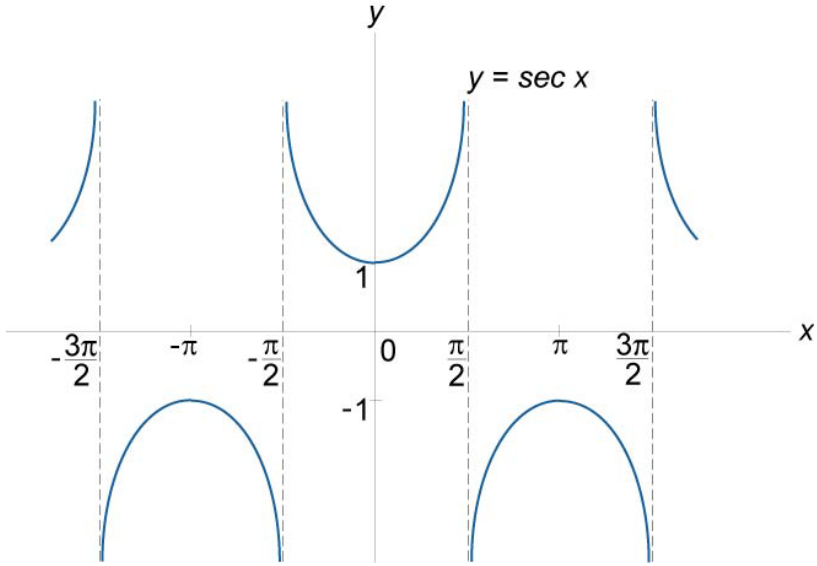


Figure 63.

378. Cosecant Function
 $y = \operatorname{cosec} x, x \neq k\pi.$

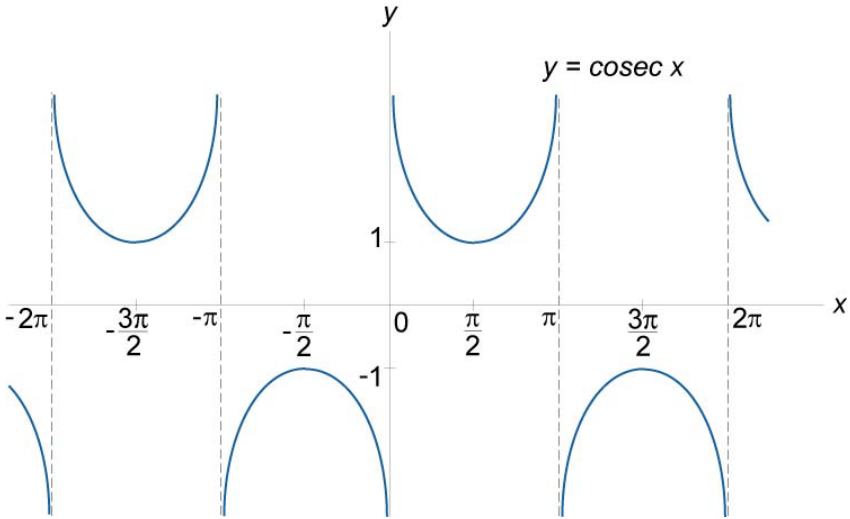


Figure 64.