

4.4 Trigonometric Functions of Any Angle

Definitions of Trig Functions at Any Angle

Let θ be an angle in standard position with (x, y) being a point on the terminal side of θ , and $r = \sqrt{x^2 + y^2} \neq 0$

$$\sin \theta = \frac{y}{r}$$

$$\cos \theta = \frac{x}{r}$$

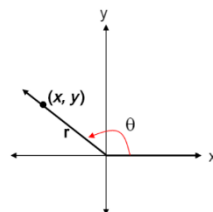
$$\tan \theta = \frac{y}{x}, \quad x \neq 0$$

$$\cot \theta = \frac{x}{y}, \quad y \neq 0$$

$$\sec \theta = \frac{r}{x}, \quad x \neq 0$$

$$\csc \theta = \frac{r}{y}, \quad y \neq 0$$

Since $r = \sqrt{x^2 + y^2}$ can't be zero,
sine and cosine are DEFINED for
any real value of θ



Reference Angles

Let θ be an angle in standard position. Its reference angle is the acute angle, denoted θ' , that's formed by the terminal side of θ and the horizontal (x) axis.

