

Basic Trig Identities

summarizing trigonometric identities

The **Pythagorean identities** are based on the properties of a right triangle.

$$\textcircled{2} \cos^2 \theta = 1 - \sin^2 \theta$$

$$\textcircled{1} \cos^2 \theta + \sin^2 \theta = 1$$

$$\textcircled{3} \sin^2 \theta = 1 - \cos^2 \theta$$

$$\textcircled{6} \cot^2 \theta = \csc^2 \theta - 1$$

$$\textcircled{4} 1 + \cot^2 \theta = \csc^2 \theta$$

$$\textcircled{5} \csc^2 \theta - \cot^2 \theta = 1$$

$$\textcircled{8} \tan^2 \theta = \sec^2 \theta - 1$$

$$\textcircled{7} 1 + \tan^2 \theta = \sec^2 \theta$$

$$\textcircled{9} \sec^2 \theta - \tan^2 \theta = 1$$

The **even-odd identities** relate the value of a trigonometric function at a given angle to the value of the function at the opposite angle.

$$\textcircled{10} \tan(-\theta) = -\tan \theta$$

$$\textcircled{11} \cot(-\theta) = -\cot \theta$$

$$\textcircled{12} \sin(-\theta) = -\sin \theta$$

$$\textcircled{13} \csc(-\theta) = -\csc \theta$$

$$\textcircled{14} \cos(-\theta) = \cos \theta$$

$$\textcircled{15} \sec(-\theta) = \sec \theta$$

The **reciprocal identities** define reciprocals of the trigonometric functions.

$$\textcircled{16} \sin \theta = \frac{1}{\csc \theta}$$

$$\textcircled{17} \cos \theta = \frac{1}{\sec \theta}$$

$$\textcircled{18} \tan \theta = \frac{1}{\cot \theta}$$

$$\textcircled{19} \csc \theta = \frac{1}{\sin \theta}$$

$$\textcircled{20} \sec \theta = \frac{1}{\cos \theta}$$

$$\textcircled{21} \cot \theta = \frac{1}{\tan \theta}$$

The **quotient identities** define the relationship among the trigonometric functions.

$$\textcircled{22} \tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\textcircled{23} \cot \theta = \frac{\cos \theta}{\sin \theta}$$