

# WBP 371 14-1 IDENTITIES

$$\begin{aligned}
 2. \quad \csc \theta &= \cot \theta \sec \theta \\
 &= \frac{\cancel{\cos \theta}}{\sin \theta} \frac{1}{\cancel{\cos \theta}} \\
 &= \frac{1}{\sin \theta} \\
 &= \csc \theta \quad \checkmark
 \end{aligned}$$

$$4. \quad \cancel{\cos \theta} \csc \theta \tan \theta = 1$$

$$\begin{aligned}
 \frac{\cancel{\cos \theta}}{\cancel{\sin \theta}} \frac{1}{\cancel{\cos \theta}} \frac{\cancel{\sin \theta}}{\cancel{\cos \theta}} &= 1 \\
 &\checkmark
 \end{aligned}$$

$$6. \quad \frac{\csc \theta}{\cot \theta} = \sec \theta$$

$$\begin{aligned}
 \frac{\frac{1}{\sin \theta}}{\frac{\cos \theta}{\sin \theta}} &= \frac{1}{\sin \theta} \cdot \frac{\sin \theta}{\cos \theta} \\
 &= \frac{1}{\cos \theta} \\
 &= \sec \theta \quad \checkmark
 \end{aligned}$$

$$8. \quad \tan \theta + \cot \theta = \sec \theta \csc \theta$$

$$\begin{aligned}
 \frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta} &= \frac{\sin \theta}{\sin \theta} \frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta} \frac{\cos \theta}{\cos \theta} \\
 &= \frac{\sin^2 \theta}{\sin \theta \cos \theta} + \frac{\cos^2 \theta}{\sin \theta \cos \theta} = \frac{\cos^2 \theta + \sin^2 \theta}{\sin \theta \cos \theta} \\
 &= \frac{1}{\sin \theta \cos \theta} = \frac{1}{\sin \theta} \frac{1}{\cos \theta} = \sec \theta \csc \theta
 \end{aligned}$$

$$10 \quad \cos \theta \cot \theta + \sin \theta = \csc \theta$$

$$\cos \theta \frac{\cos \theta}{\sin \theta} + \sin \theta$$

$$\frac{\cos^2 \theta}{\sin \theta} + \sin \theta$$

$$\frac{\cos^2 \theta}{\sin \theta} + \sin \theta \left( \frac{\sin \theta}{\sin \theta} \right)$$

$$\frac{\cos^2 \theta}{\sin \theta} + \frac{\sin^2 \theta}{\sin \theta}$$

$$\frac{\cos^2 \theta + \sin^2 \theta}{\sin \theta}$$

$$\frac{1}{\sin \theta} = \csc \theta \checkmark$$

$$12 \quad \sec \theta \cot \theta = \csc \theta$$

$$\frac{1}{\cos \theta} \frac{\cos \theta}{\sin \theta}$$

$$\frac{1}{\sin \theta} = \csc \theta \checkmark$$

$$14 \quad \sec \theta = \csc \theta \tan \theta$$

$$\frac{1}{\cancel{\sin \theta}} \frac{\cancel{\sin \theta}}{\cos \theta}$$

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

$$16 \quad \cos \theta (\sec \theta - \cos \theta) = \sin^2 \theta$$

$$\cos \theta \sec \theta - \cos^2 \theta$$

$$\cos \theta \frac{1}{\cos \theta} - \cos^2 \theta$$

$$1 - \cos^2 \theta$$

$$\sin^2 \theta + \cancel{\cos^2 \theta} - \cancel{\cos^2 \theta} = \sin^2 \theta \checkmark$$



$$18 \ (1 - \sin \theta)(1 + \sin \theta) = \cos^2 \theta$$

$$\begin{aligned} & 1 + \sin \theta - \sin \theta - \sin^2 \theta \\ & 1 - \sin^2 \theta \\ & \cos^2 \theta + \sin^2 \theta - \sin^2 \theta \\ & \cos^2 \theta \end{aligned}$$

$$20 \ \frac{\sec \theta}{\tan \theta} \rightarrow \frac{1}{\cos \theta} \cdot \frac{\sin \theta}{\cos \theta} = \frac{1}{\sin \theta} = \csc \theta$$

$$22 \ \sec \theta \cos^2 \theta = \frac{1}{\cos \theta} \cdot \cos^2 \theta = \cos \theta$$

$$24 \ 1 - \sin^2 \theta = \cos^2 \theta + \sin^2 \theta - \sin^2 \theta = \cos^2 \theta$$

$$26 \ \cos \theta \cot \theta + \sin \theta = \cos \theta \frac{\cos \theta}{\sin \theta} + \sin \theta$$

$$= \frac{\cos^2 \theta}{\sin \theta} + \sin \theta \left( \frac{\sin \theta}{\sin \theta} \right)$$

$$= \frac{\cos^2 \theta}{\sin \theta} + \frac{\sin^2 \theta}{\sin \theta}$$

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

$$28 \frac{\sin \theta \cot \theta}{\cos \theta} = \frac{\sin \theta \cdot \frac{\cos \theta}{\sin \theta}}{\cos \theta} = \frac{\cancel{\sin \theta} \cos \theta}{\cancel{\sin \theta} \cos \theta}$$

$$= \frac{\cos \theta}{\cos \theta} = 1$$

$$30 \frac{\sec \theta \cot \theta}{\sec \theta} = \frac{1}{\cos \theta} \cdot \frac{\cos \theta}{\sin \theta} = \frac{1}{\sin \theta} = \csc \theta$$

$$32 \frac{\tan \theta \csc \theta}{\sec \theta} = \frac{\frac{\sin \theta}{\cos \theta} \cdot \frac{1}{\sin \theta}}{\frac{1}{\cos \theta}} = \frac{\frac{1}{\cancel{\cos \theta}}}{\frac{1}{\cancel{\cos \theta}}} = 1$$

$$34 \frac{\cot \theta}{\csc \theta} = \frac{\frac{\cos \theta}{\sin \theta}}{\frac{1}{\sin \theta}} = \frac{\cos \theta}{\cancel{\sin \theta}} \cdot \frac{\cancel{\sin \theta}}{1} = \cos \theta$$

$$36 \cot \theta \tan \theta \quad \cot \theta = \frac{1}{\tan \theta}$$

$$38 \cos \theta, \sin \theta \quad c$$

$$\cos^2 \theta + \sin^2 \theta = 1$$

$$\cos^2 \theta = 1 - \sin^2 \theta$$

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