

Exercise 151

For the following exercises, verify that each equation is an identity.

$$\cot \gamma + \tan \gamma = \sec \gamma \csc \gamma$$

Solution

$$\cot \gamma + \tan \gamma \stackrel{?}{=} \sec \gamma \csc \gamma$$

$$\left(\frac{\cos \gamma}{\sin \gamma}\right) + \left(\frac{\sin \gamma}{\cos \gamma}\right) \stackrel{?}{=} \sec \gamma \csc \gamma$$

$$\frac{\cos \gamma(\cos \gamma) + \sin \gamma(\sin \gamma)}{\sin \gamma \cos \gamma} \stackrel{?}{=} \sec \gamma \csc \gamma$$

$$\frac{\cos^2 \gamma + \sin^2 \gamma}{\sin \gamma \cos \gamma} \stackrel{?}{=} \sec \gamma \csc \gamma$$

$$\frac{1}{\sin \gamma \cos \gamma} \stackrel{?}{=} \sec \gamma \csc \gamma$$

$$\left(\frac{1}{\cos \gamma}\right) \left(\frac{1}{\sin \gamma}\right) \stackrel{?}{=} \sec \gamma \csc \gamma$$

$$\sec \gamma \csc \gamma = \sec \gamma \csc \gamma$$

This is a true statement, so the identity is verified.