Exercise 147

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

$$\frac{\tan\theta\cot\theta}{\csc\theta} = \sin\theta$$

Solution

$$\frac{\tan\theta\cot\theta}{\csc\theta} \overset{?}{=} \sin\theta$$

$$\frac{\tan\theta\left(\frac{1}{\tan\theta}\right)}{\csc\theta} \overset{?}{=} \sin\theta$$

$$\frac{1}{\csc\theta} \overset{?}{=} \sin\theta$$

$$\frac{1}{\left(\frac{1}{\sin\theta}\right)} \overset{?}{=} \sin\theta$$

$$\sin\theta = \sin\theta$$

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