

## Exercise 153

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

$$\frac{1}{1 - \sin \alpha} + \frac{1}{1 + \sin \alpha} = 2 \sec^2 \alpha$$

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### Solution

$$\begin{aligned} \frac{1}{1 - \sin \alpha} + \frac{1}{1 + \sin \alpha} &\stackrel{?}{=} 2 \sec^2 \alpha \\ \frac{(1 + \sin \alpha) + (1 - \sin \alpha)}{(1 - \sin \alpha)(1 + \sin \alpha)} &\stackrel{?}{=} 2 \sec^2 \alpha \\ \frac{2}{1 - \sin^2 \alpha} &\stackrel{?}{=} 2 \sec^2 \alpha \\ \frac{2}{\cos^2 \alpha} &\stackrel{?}{=} 2 \sec^2 \alpha \\ 2 \sec^2 \alpha &= 2 \sec^2 \alpha \end{aligned}$$

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