

Exercise 152

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

$$\sin^2 \beta + \tan^2 \beta + \cos^2 \beta = \sec^2 \beta$$

Solution

$$\sin^2 \beta + \tan^2 \beta + \cos^2 \beta \stackrel{?}{=} \sec^2 \beta$$

$$(\sin^2 \beta + \cos^2 \beta) + \tan^2 \beta \stackrel{?}{=} \sec^2 \beta$$

$$(1) + \tan^2 \beta \stackrel{?}{=} \sec^2 \beta$$

$$(1 + \tan^2 \beta) \stackrel{?}{=} \sec^2 \beta$$

$$\sec^2 \beta = \sec^2 \beta$$

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