Exercise 320

Simplify the following trigonometric expressions.

$$\frac{\tan^2 x}{\sec^2 x} + \cos^2 x$$

Solution

Simplify the expression.

$$\begin{aligned}\frac{\tan^2 x}{\sec^2 x} + \cos^2 x &= \tan^2 x \left(\frac{1}{\sec^2 x}\right) + \cos^2 x \\ &= \tan^2 x(\cos^2 x) + \cos^2 x \\ &= \left(\frac{\sin^2 x}{\cos^2 x}\right)(\cos^2 x) + \cos^2 x \\ &= \sin^2 x + \cos^2 x \\ &= 1\end{aligned}$$