

Trigonometric Identities and Equation FAQ 1.

Prove that

$$\frac{1}{1 - \frac{1}{1 - \sec^2 x}} = \sec^2 x$$

$$\text{LHS } \frac{1}{1 - \frac{1}{1 - \sec^2 x}}$$

$$= \frac{1}{1 - \frac{1}{1 - \sec^2 x - 1}}$$

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

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

$$= \frac{1}{\cancel{\sec^2 x} + 1 - \cancel{\sec^2 x}}$$

$$= \frac{1}{1}$$

$$= \sec^2 x = \text{RHS } \textcircled{\text{!}}$$