prove the algebraic identity by starting with the LHS expression and supplying a sequence of equivalent expressions that ends with the RHS expression

\[ \tan x + \cot x = \sec x \csc x \]

**General Strategies**

⭐ Begin with the more complicated expression and work toward the less complicated expression

⭐ If no other move suggests itself, convert the entire expression to one involving sines and cosines

⭐ Combine fractions by combining them over a common denominator.
Prove each identity:

\[
\frac{\sin^2 x + \cos^2 x}{\cos^2 x} = \left( \frac{1}{\cos x} \right)^2
\]

\[
\frac{1 + \cot^2 x}{\csc^2 x} = 1
\]
\[
\frac{\sec x}{\cos x} - 1 = \frac{\sin^2 x}{\cos^2 x} \\
\]

\[
\frac{\cot^2 x}{1 + \csc x} = (\cot x)(\sec x - \tan x) 
\]