Prize Problem

Students of calculus will recall that

\[ \int \sec(x) \, dx = \ln |\sec(x) + \tan(x)| + C, \]

which is obtained by multiplying the integrand by the artificial 1:

\[ \frac{\sec(x) + \tan(x)}{\sec(x) + \tan(x)}, \]

then recognizing a (back) substitution \( u = \sec(x) + \tan(x) \). Ever wonder if there is a different way to do this which may be more natural? Now is your chance to prove that there is a more methodical way to do it. Your task is to show that

\[ \int \sec(x) \, dx = \ln |\sec(x) + \tan(x)| + C \]

by using a trigonometric substitution.

Return solutions to Harris 4158 by 30 October 2015 to be eligible for prize, or submit electronic solutions to jpledford@vcu.edu.