Consider the trigonometric identity $\dfrac{\cot\theta + 1}{\cot\theta - 1} = \dfrac{1 + \tan\theta}{1 - \tan\theta}$ to answer the following questions.

a. Explain why $\theta = \dfrac{\pi}{4}$ would not be an appropriate value to use in order to numerically validate that the given equation is an identity. Show the work that validates your reasoning.

b. Based on your result from part a), what should the graph of $f(\theta) = \dfrac{1 + \tan\theta}{1 - \tan\theta}$ look like at $\theta = \dfrac{\pi}{4}$.

c. Choose and use a value for θ on the interval $0 < \theta < \dfrac{\pi}{2}$ to show that the equation is an identity. Round your answers to three decimal places.

d. Analytically show that the equation is an identity.