

1. Write $\cot x$ in terms of $\sin x$.

2. Verify that each equation is an identity.

a) $\cot^2 x (\tan^2 x + 1) = \csc^2 x$

b) $\frac{\tan^2 x}{\sec^2 x} = (1 + \cos x)(1 - \cos x)$

$$c) \frac{\sec x + \tan x}{\sin x} = \frac{\csc x}{\sec x - \tan x}$$

$$d) \frac{1 + \cos \theta}{\cos \theta} = \frac{\tan^2 \theta}{\sec \theta - 1}$$

$$e) \sec x + \tan x = \frac{\cos x}{1 - \sin x}$$

Q: A man rode his horse into town on Tuesday. Two days later he rode home on Tuesday. How is this possible?