

5.2 Homework

Prove that each of the following equations is an identity.

1.  $\sin x \cot x = \cos x$

2.  $1 - \sec(-x)\cos^3 x = \sin^2(-x)$

3.  $\frac{\cos x \sin^2 x + \cos^3 x}{\sin x} = \cot x$

4.  $\frac{\sin x}{\csc x} + \frac{\cos x}{\sec x} = 1$

5.  $\csc x \sin^2 x - \tan(-x)\cos(-x) = 2 \sin x$

$$6. (1 + \sin \alpha)^2 + \cos^2 \alpha = 2 + 2 \sin \alpha$$

$$7. (1 + \cot \alpha)^2 - 2 \cot \alpha = \frac{1}{(1 - \cos \alpha)(1 + \cos \alpha)}$$

$$8. (1 - \sin^2 \beta)(1 + \sin^2 \beta) = 2 \cos^2 \beta - \cos^4 \beta$$

$$9. \tan x + \cot x = \sec x \csc x$$

$$10. \frac{\sec x}{\tan x} - \frac{\tan x}{\sec x} = \cos x \cot x$$

$$11. \sec^2 x = \frac{\csc x}{\csc x - \sin x}$$

$$12. \frac{\sin x}{\sin x + 1} = \frac{\csc x - 1}{\cot^2 x}$$

$$13. \frac{\csc y + 1}{\csc y - 1} = \frac{1 + \sin y}{1 - \sin y}$$