

Practice 8.2: Verifying Trig Identities

Verify the following Trig IDs. Show your work.

1. $\sin t \csc t = 1$

2. $\tan y \cot y = 1$

$$\tan y \cdot \frac{1}{\tan y} = \frac{\tan y}{\tan y} = 1$$

3. $(1 + \sin \alpha)(1 - \sin \alpha) = \cos^2 \alpha$

Foil
 $1 - \sin \alpha + \sin \alpha - \sin^2 \alpha$
 $1 - \sin^2 \alpha = \cos^2 \alpha$

4. $\cot^2 x (\sec^2 x - 1) = 1$

$$\cot^2 x (\tan^2 x) = \frac{\cot^2 x}{\cot^2 x} = 1$$

5. $\cos^2 \beta - \sin^2 \beta = 1 - 2\sin^2 \beta$

6. $\cos^2 \beta - \sin^2 \beta = 2\cos^2 \beta - 1$

$$\cos^2 \beta - (1 - \cos^2 \beta) = \cos^2 \beta - 1 + \cos^2 \beta = 2\cos^2 \beta - 1$$

7. $\tan^2 \theta + 4 = \sec^2 \theta + 3$

8. $2 - \sec^2 z = 1 - \tan^2 z$

$$2 - (1 + \tan^2 z) = 2 - 1 - \tan^2 z = 1 - \tan^2 z$$

9. $\sin^2 \alpha - \sin^4 \alpha = \cos^2 \alpha - \cos^4 \alpha$

10. $\cos x + \sin x \tan x = \sec x$

$$\cos x + \sin x \cdot \frac{\sin x}{\cos x} = \cos x + \frac{\sin^2 x}{\cos x} = \frac{\cos^2 x}{\cos x} + \frac{\sin^2 x}{\cos x}$$

$$\sec x = \frac{1}{\cos x} = \frac{\cos^2 x + \sin^2 x}{\cos x}$$