

Prove the following trigonometric identities by showing that the left side is equal to the right side.

1. $\sin \theta = \cos \theta \tan \theta$

2. $\frac{1}{\cos \theta} = \frac{\tan \theta}{\sin \theta}$

3. $\sin^2 \theta - \cos^2 \theta = 1 - 2\cos^2 \theta$

4. $\tan^2 \theta + 1 = \frac{1}{\cos^2 \theta}$

5. $1 - \cos^2 \theta = \sin \theta \cos \theta \tan \theta$

6. $\cos^2 \theta \tan^2 \theta = \sin^2 \theta$

7. $\sin \theta \tan \theta + \cos \theta = \frac{1}{\cos \theta}$

8. $\frac{\tan^2 \theta}{\sin^2 \theta} - 1 = \tan^2 \theta$

9. $\cos^2 \theta(1 + \tan^2 \theta) = 1$

10. $\frac{1}{\cos^2 \theta} = \tan^2 \theta + 1$

11. $\sin^2 \theta - \cos^2 \theta = 2\sin^2 \theta - 1$

12. $1 + \cos^2 \theta = 2\cos^2 \theta + \sin^2 \theta$

13. $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$

14. $\sin \theta(1 + \tan \theta) = \tan \theta(\sin \theta + \cos \theta)$