

# No Joking Around Trigonometric Identities Double- and Half-Angle Formulas

Prove each identity.

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

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

3.  $\cos^4\theta - \sin^4\theta = \cos 2\theta$

4.  $\cot\theta + \tan\theta = 2\csc 2\theta$

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Prove each identity.

1.  $\cot\theta = \frac{\sin 2\theta}{2\sin^2\theta}$

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

3.  $1 + \sin\theta = \left(\sin\frac{\theta}{2} + \cos\frac{\theta}{2}\right)^2$

4.  $\sin^2\theta - 2\sin\theta\cos\theta + \cos^2\theta = 1 - \sin 2\theta$

5.  $\frac{\sec^2\theta}{2} + \tan\theta = \frac{1 + \sin 2\theta}{1 + \cos 2\theta}$