



Air maths tuition

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## Trig Identities to Prove - Double Angles (2)

$$\begin{aligned} \text{Prove: } \tan \theta + \cot \theta &\equiv 2 \operatorname{cosec} 2\theta \\ \text{Proof: } \tan \theta + \cot \theta &\equiv \frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta} \\ &\equiv \frac{\sin^2 \theta + \cos^2 \theta}{\cos \theta \sin \theta} \\ &\equiv \frac{1}{\cos \theta \sin \theta} \times \frac{2}{2} \\ &\equiv \frac{2}{2 \cos \theta \sin \theta} \\ &\equiv \frac{2}{\sin 2\theta} \\ &\equiv 2 \operatorname{cosec} 2\theta \end{aligned}$$

$2 \operatorname{cosec} 2\theta \equiv \frac{2}{\sin 2\theta}$   
 $\equiv \frac{2}{2 \sin \theta \cos \theta}$   
 $\equiv \frac{1}{\sin \theta \cos \theta}$

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