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Prove Trig Identity | Past Paper Question | C3 Edexcel June 2014 Q7(a)

(a) Show that

$$\operatorname{cosec} 2x + \cot 2x = \cot x, \quad x \neq 90n^\circ, \quad n \in \mathbb{Z} \quad (5)$$

Proof:

$$\operatorname{cosec} 2x + \cot 2x \equiv \frac{1}{\sin 2x} + \frac{\cos 2x}{\sin 2x}$$

$$\equiv \frac{1 + \cos 2x}{\sin 2x}$$

$$\equiv \frac{1 + (2\cos^2 x - 1)}{2\sin x \cos x}$$

$$\equiv \frac{2\cos^2 x}{2\sin x \cos x}$$

$$\equiv \cot x$$

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