A#15 DOUBLE-HALF ANGLE FORMULAE

AEM questions are taken from past exam papers - they have been carefully chosen to represent a typical exam question at each level of difficulty. If you can do these questions, you’re ready to move onto past papers for this topic.

**APPRENTICE**

By forming and solving a suitable equation, find the solutions of the equation \(3 \cos 2\theta - 5 \cos \theta + 2 = 0\) in the interval \(0^\circ < \theta < 360^\circ\), giving your answers to the nearest \(0.1^\circ\).

**EXPERT**

a. Prove that \(2 \cot 2x + \tan x \equiv \cot x \quad x \neq \frac{n\pi}{2}, \; n \in \mathbb{Z}\)

b. Hence, or otherwise, solve, for \(-\pi \leq x < \pi\), \(6 \cot 2x + 3 \tan x = \cosec^2 x - 2\). Give answers to 3 dp.

**MASTER**

a. Prove that \(\sec 2A + \tan 2A \equiv \frac{\cos A + \sin A}{\cos A - \sin A}, \quad A \neq \frac{(2n+1)\pi}{4}, \; n \in \mathbb{Z}\)

b. Hence solve, for \(0 \leq \theta < 2\pi\), \(\sec 2\theta + \tan 2\theta = \frac{1}{2}\), giving your answers to 3 dp.