



Air maths tuition

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Trig. Equation | Past Paper Question | C2 OCR January 2013 Q5

(i) Show that the equation $2 \sin x = \frac{4 \cos x - 1}{\tan x}$ can be expressed in the form $6 \cos^2 x - \cos x - 2 = 0$. [3]

(ii) Hence solve the equation $2 \sin x = \frac{4 \cos x - 1}{\tan x}$, giving all values of x between 0° and 360° . [4]

$$(i) \quad 2 \sin x = \frac{4 \cos x - 1}{\tan x}$$

$$\therefore 2 \sin x \tan x = 4 \cos x - 1$$

$$\therefore 2 \sin x \frac{\sin x}{\cos x} = 4 \cos x - 1$$

$$\therefore 2(1 - \cos^2 x) = \cos x(4 \cos x - 1)$$

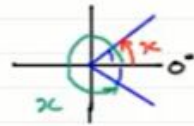
$$\therefore 2 - 2 \cos^2 x = 4 \cos^2 x - \cos x$$

$$\therefore 6 \cos^2 x - \cos x - 2 = 0$$

$$(ii) \therefore (3 \cos x - 2)(2 \cos x + 1) = 0$$

$$\therefore \cos x = \frac{2}{3} \text{ or } \cos x = -\frac{1}{2}$$

$$\therefore x = \cos^{-1} \frac{2}{3} \text{ or } x = \cos^{-1} \left(-\frac{1}{2}\right)$$



$$x = 48.189\dots^\circ, \\ 311.81\dots^\circ$$

$$x = 120^\circ, 240^\circ$$

$$\therefore x = 48.2^\circ \text{ (3sf)}, 120^\circ, 240^\circ, 312^\circ \text{ (3sf)}$$

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