

Cambridge International AS & A Level

Mathematics 9709

Paper 1 Pure Mathematics 1

Topic 5-Trigonometry

Question No (1)

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Question No (1)

Solve the equation

$$\sin 2x + 3 \cos 2x = 0,$$

for $0^\circ \leq x \leq 180^\circ$.

Solution

On Next page

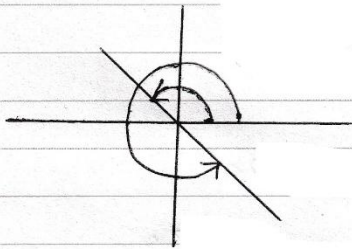
$$\sin 2x + 3 \cos 2x = 0 \quad 0 \leq x \leq 180^\circ$$

$$\sin 2x = -3 \cos 2x$$

$$\frac{\sin 2x}{\cos 2x} = -3$$

$$\tan 2x = -3$$

$\tan$ is $-ve$ in II and IV quadrant



Basic angle

$$\tan \alpha = 3$$

$$\alpha = \tan^{-1}(3)$$

$$\alpha = 71.6^\circ$$

$$\Rightarrow 2x = 180 - \alpha, \quad 360 - \alpha$$

$$= 180 - 71.6^\circ, \quad 360 - 71.6^\circ$$

$$2x = 108.4, \quad 288.4$$

$$x = \frac{108.4}{2}, \quad \frac{288.4}{2}$$

$$x = 54.2^\circ, \quad 144.2^\circ \quad \underline{\underline{Ans}}$$

