

Cambridge International AS & A Level

Mathematics 9709

Paper 1 Pure Mathematics 1

Topic 5-Trigonometry

Question No (9)

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Question No (9)

Prove the identity

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

Solution

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L.H.S

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

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

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

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

$$\sim \sin^2 x + \cos^2 x = 1$$

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

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

$$\frac{2}{\cos x}$$

proved