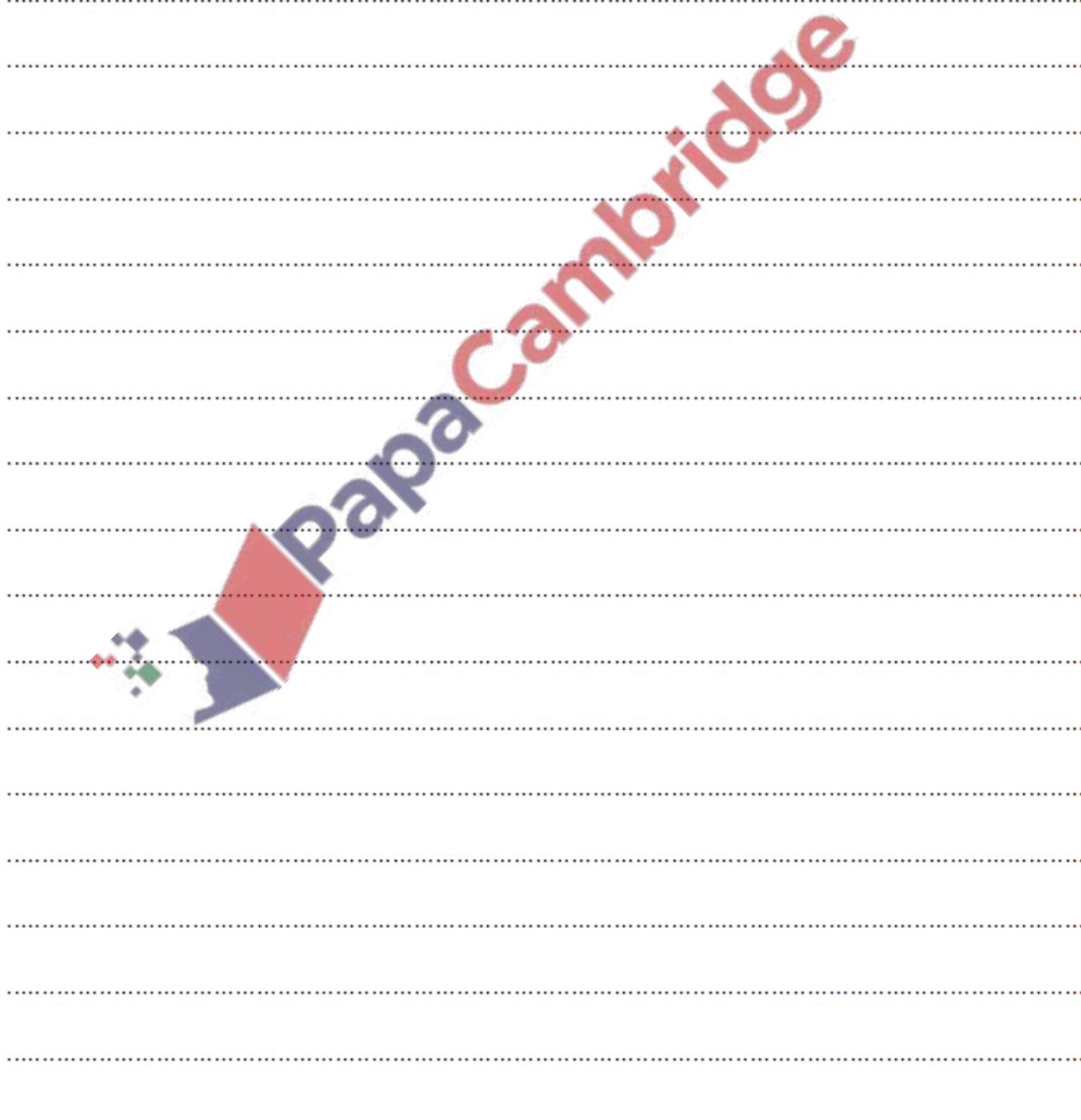


1. Nov/2022/Paper 9709 11/No.6

(a) Show that the equation

$$\frac{1}{\sin \theta + \cos \theta} + \frac{1}{\sin \theta - \cos \theta} = 1$$

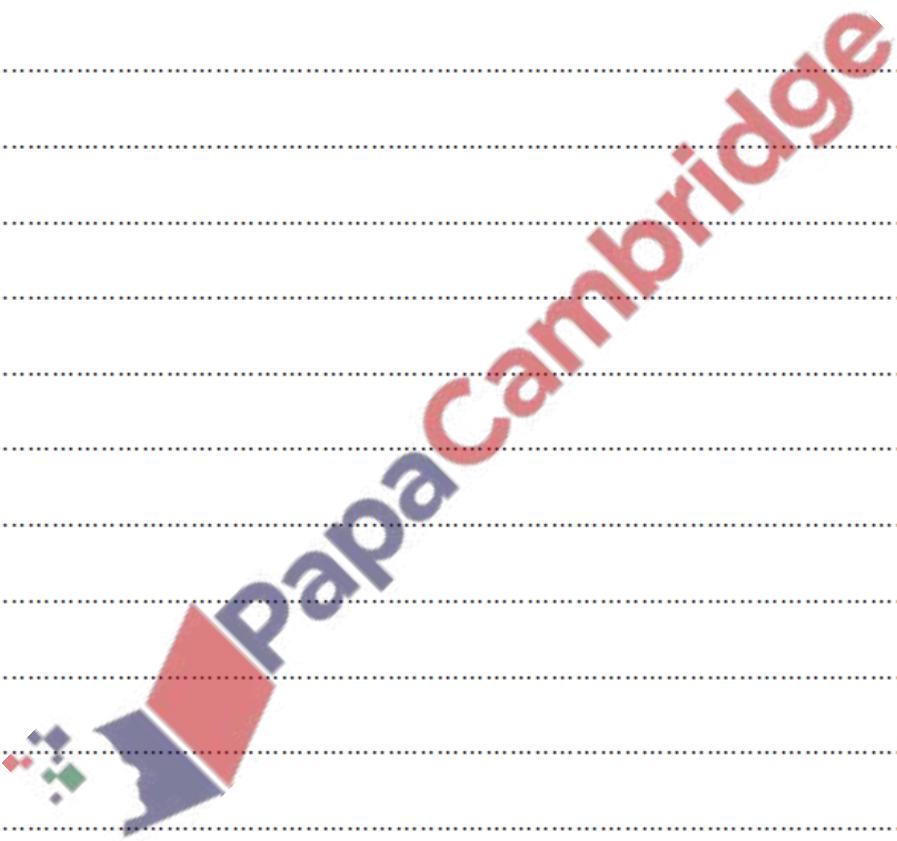
may be expressed in the form $a \sin^2 \theta + b \sin \theta + c = 0$, where a , b and c are constants to be found. [3]



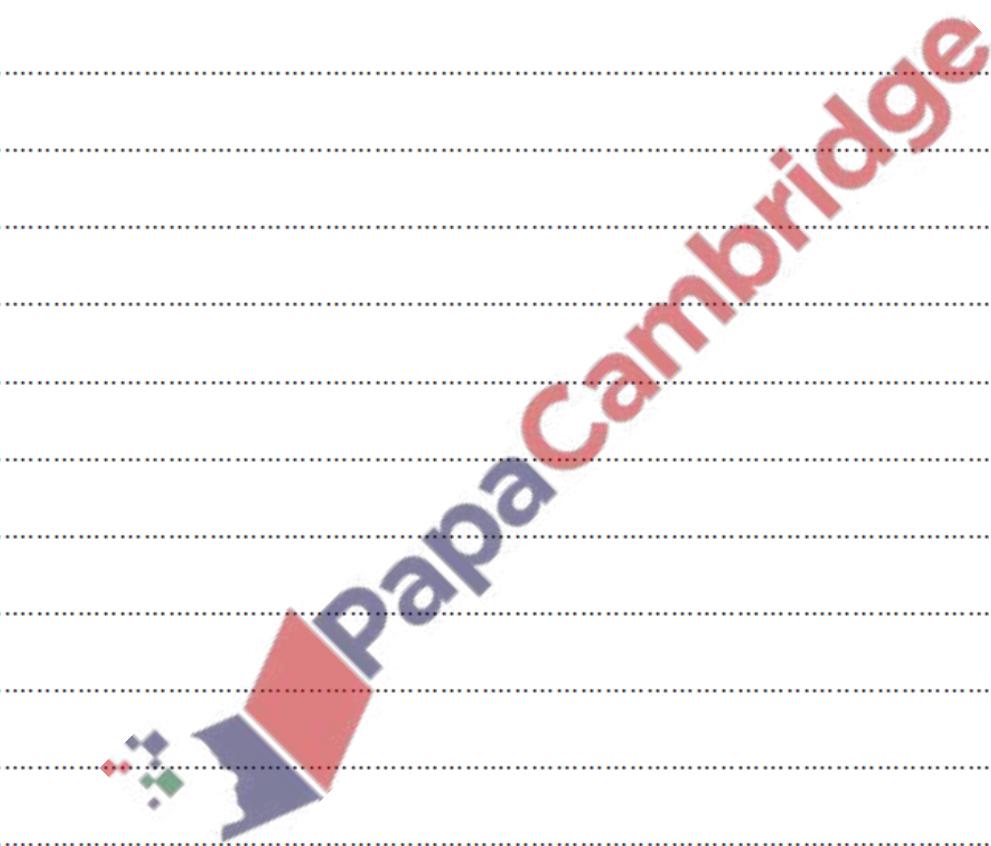
- (b) Hence solve the equation $\frac{1}{\sin \theta + \cos \theta} + \frac{1}{\sin \theta - \cos \theta} = 1$ for $0^\circ \leq \theta \leq 360^\circ$. [3]

2. Nov/2022/Paper_9709_12/No.7

- (a) Prove the identity $\frac{\sin \theta}{\sin \theta + \cos \theta} + \frac{\cos \theta}{\sin \theta - \cos \theta} \equiv \frac{\tan^2 \theta + 1}{\tan^2 \theta - 1}$. [3]



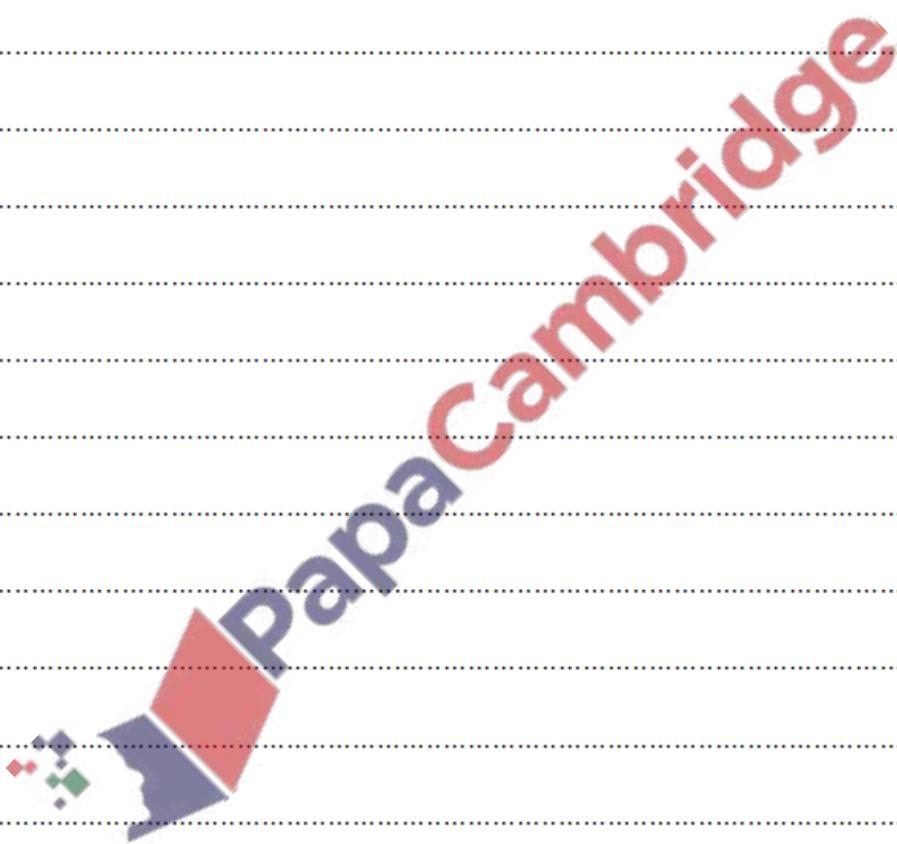
- (b) Hence find the exact solutions of the equation $\frac{\sin \theta}{\sin \theta + \cos \theta} + \frac{\cos \theta}{\sin \theta - \cos \theta} = 2$ for $0 \leq \theta \leq \pi$. [4]



3. Nov/2022/Paper_9709_13/No.1

Solve the equation $8 \sin^2 \theta + 6 \cos \theta + 1 = 0$ for $0^\circ < \theta < 180^\circ$.

[3]



4. Nov/2022/Paper_9709_13/No.6

It is given that $\alpha = \cos^{-1}\left(\frac{8}{17}\right)$.

Find, without using the trigonometric functions on your calculator, the exact value of $\frac{1}{\sin \alpha} + \frac{1}{\tan \alpha}$. [5]

