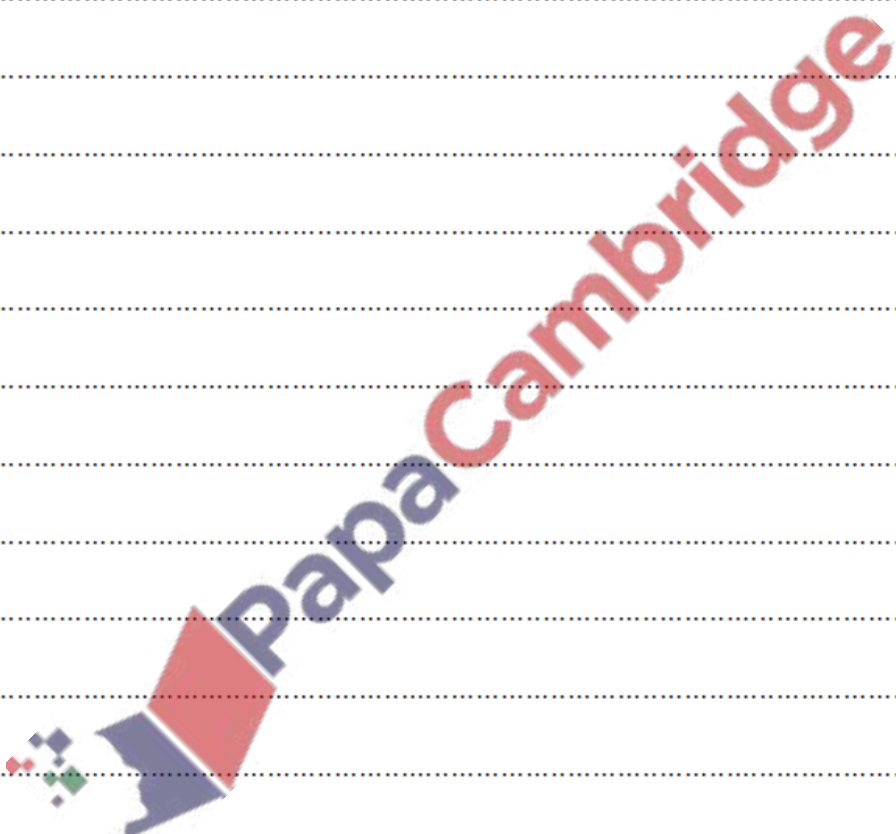


1. March/2022/Paper\_9709/12/No.7

(a) Show that  $\frac{\sin \theta + 2 \cos \theta}{\cos \theta - 2 \sin \theta} - \frac{\sin \theta - 2 \cos \theta}{\cos \theta + 2 \sin \theta} \equiv \frac{4}{5 \cos^2 \theta - 4}$ . [4]

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(b) Hence solve the equation

$$\frac{\sin^3 \theta}{\sin \theta - 1} - \frac{\sin^2 \theta}{1 + \sin \theta} = \tan^2 \theta (1 - \sin^2 \theta)$$

for  $0 < \theta < 2\pi$ .

[2]



(b) Use the quadratic formula to show that, when  $k > 5$ , the equation  $f(x) = 0$  has no solutions. [5]

