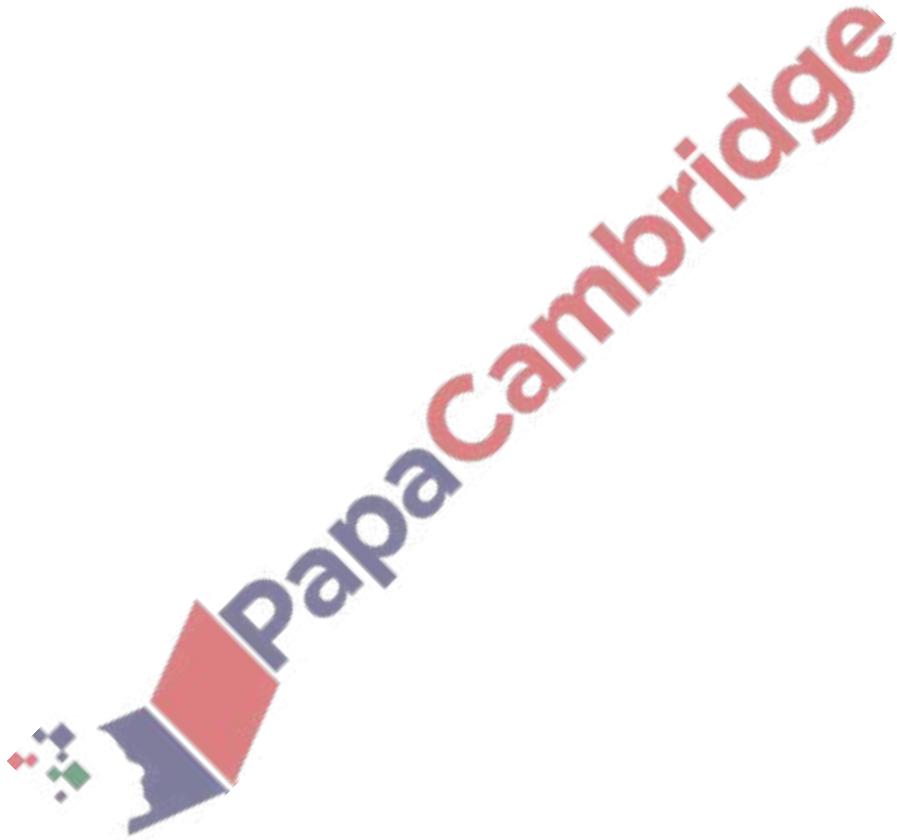


1. Nov/2020/Paper_9709/31/No.6

(a) Express $\sqrt{6} \cos \theta + 3 \sin \theta$ in the form $R \cos(\theta - \alpha)$, where $R > 0$ and $0^\circ < \alpha < 90^\circ$. State the exact value of R and give α correct to 2 decimal places. [3]

(b) Hence solve the equation $\sqrt{6} \cos \frac{1}{3}x + 3 \sin \frac{1}{3}x = 2.5$, for $0^\circ < x < 360^\circ$. [4]

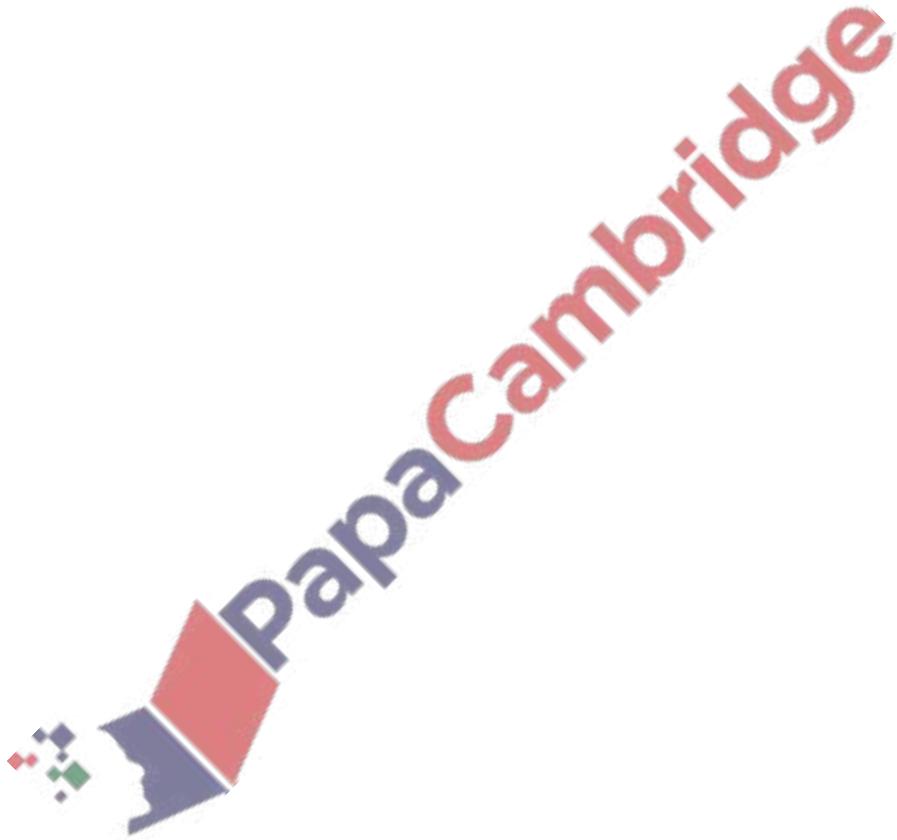


2. Nov/2020/Paper_9709/32/No.4

(a) Show that the equation $\tan(\theta + 60^\circ) = 2 \cot \theta$ can be written in the form

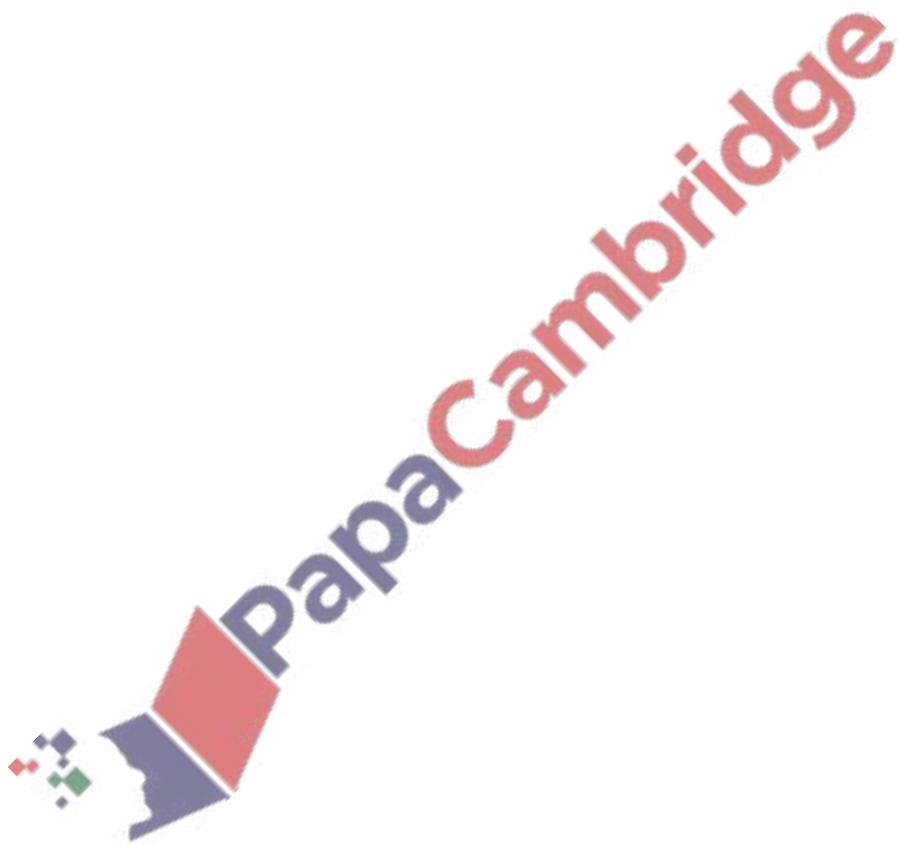
$$\tan^2 \theta + 3\sqrt{3} \tan \theta - 2 = 0. \quad [3]$$

(b) Hence solve the equation $\tan(\theta + 60^\circ) = 2 \cot \theta$, for $0^\circ < \theta < 180^\circ$. [3]



3. June/2020/Paper_9709/31/No.3

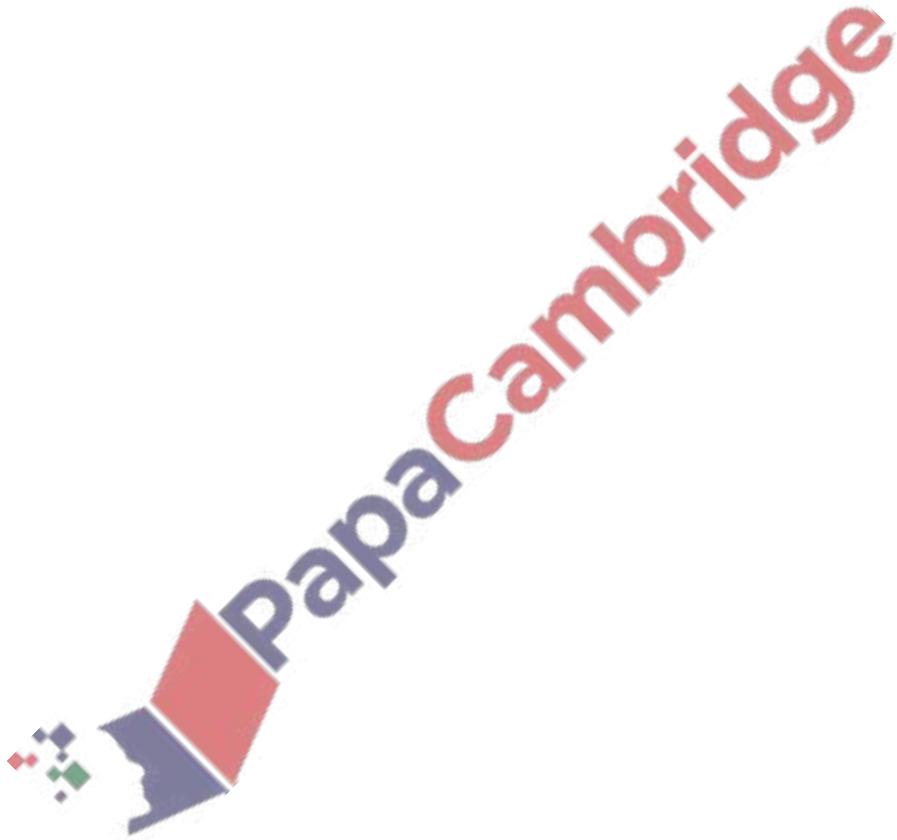
Express the equation $\tan(\theta + 60^\circ) = 2 + \tan(60^\circ - \theta)$ as a quadratic equation in $\tan \theta$, and hence solve the equation for $0^\circ \leq \theta \leq 180^\circ$. [6]



4. June/2020/Paper_9709/32/No.5

(a) Express $\sqrt{2} \cos x - \sqrt{5} \sin x$ in the form $R \cos(x + \alpha)$, where $R > 0$ and $0^\circ < \alpha < 90^\circ$. Give the exact value of R and the value of α correct to 3 decimal places. [3]

(b) Hence solve the equation $\sqrt{2} \cos 2\theta - \sqrt{5} \sin 2\theta = 1$, for $0^\circ < \theta < 180^\circ$. [4]



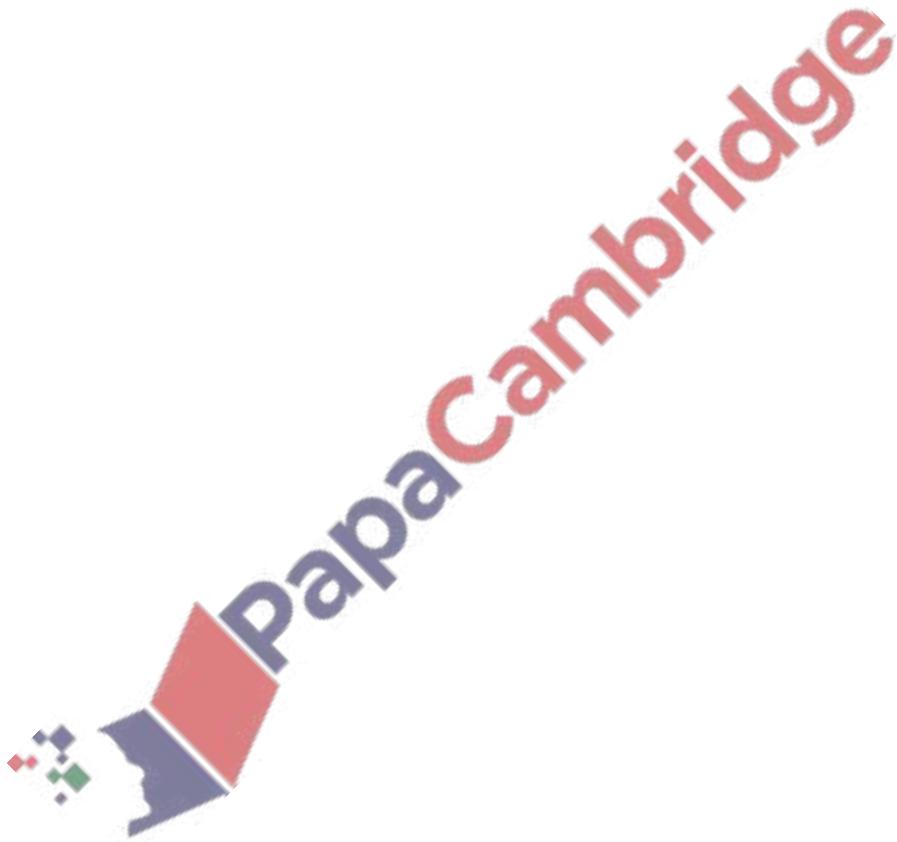
5. June/2020/Paper_9709/33/No.5

By first expressing the equation

$$\tan \theta \tan(\theta + 45^\circ) = 2 \cot 2\theta$$

as a quadratic equation in $\tan \theta$, solve the equation for $0^\circ < \theta < 90^\circ$.

[6]



(a) Show that $\frac{\cos 3x}{\sin x} + \frac{\sin 3x}{\cos x} = 2 \cot 2x$.

[4]

(b) Hence solve the equation $\frac{\cos 3x}{\sin x} + \frac{\sin 3x}{\cos x} = 4$, for $0 < x < \pi$.

[3]

