

S.4 Add Maths Quiz 6(a)

Time allowed: 25 minutes

Total Mark:18

1. Show that $\cos 2\theta + \cos 4\theta + \cos 6\theta = 4 \cos \theta \cos 2\theta \cos 3\theta - 1$.

Hence deduce that $\cos \frac{\pi}{12} = \frac{\sqrt{6} + \sqrt{2}}{4}$.

(5 marks)

2. If the equation $4(\cos \theta - \sin \theta) + k \sin \theta = 5$ has no root, find the range of values of k .

(6 marks)

3. (a) If $\cos \theta + \cos \phi = a$ and $\sin \theta + \sin \phi = b$ ($b \neq 0$), show that

$$\cos(\theta - \phi) = \frac{1}{2}(a^2 + b^2 - 2) \text{ and } \tan \frac{\theta + \phi}{2} = \frac{b}{a}.$$

- (b) Solve the system of equations

$$\begin{cases} \cos \theta + \cos \phi = \sqrt{2} \\ \sin \theta + \sin \phi = \sqrt{2} \end{cases}$$

where $0 \leq \theta < 2\pi$ and $0 \leq \phi < 2\pi$.

(4 + 3 marks)

End of Quiz