

1. (a) Given that $2 \sin^2 \theta + \sin \theta - 1 = 0$, find the two values for $\sin \theta$. (4)

(b) Given that $0^\circ \leq \theta \leq 360^\circ$ and that one solution for θ is 30° , find the other two possible values for θ .

(2)
(Total 6 marks)

2. (a) Factorize the expression $3 \sin^2 x - 11 \sin x + 6$.

(b) Consider the equation $3 \sin^2 x - 11 \sin x + 6 = 0$.

(i) Find the two values of $\sin x$ which satisfy this equation,

(ii) Solve the equation, for $0^\circ \leq x \leq 180^\circ$.

(Total 6 marks)

3. Consider the trigonometric equation $2 \sin^2 x = 1 + \cos x$.

(a) Write this equation in the form $f(x) = 0$, where $f(x) = a \cos^2 x + b \cos x + c$, and $a, b, c \in \mathbb{Z}$.

(b) Factorize $f(x)$.

(c) Solve $f(x) = 0$ for $0^\circ \leq x \leq 360^\circ$.

(Total 6 marks)

4. (a) Write the expression $3 \sin^2 x + 4 \cos x$ in the form $a \cos^2 x + b \cos x + c$.
- (b) Hence or otherwise, solve the equation

$$3 \sin^2 x + 4 \cos x - 4 = 0, \quad 0^\circ \leq x \leq 90^\circ.$$

(Total 4 marks)

5. (a) Express $2 \cos^2 x + \sin x$ in terms of $\sin x$ only.
- (b) Solve the equation $2 \cos^2 x + \sin x = 2$ for x in the interval $0 \leq x \leq \pi$, giving your answers exactly.

(Total 4 marks)

6. Solve the equation $3 \sin^2 x = \cos^2 x$, for $0^\circ \leq x \leq 180^\circ$.

(Total 4 marks)