Year 2 Pure Chapter 7: Double Angle - Exam Questions (37 Marks)

1) Determine all the values of x between 0 and 2π which satisfy the equation

$$5 \cos 2x + 3 \sin x = 4,$$

giving your answers in radians to three significant figures or exactly in terms of π.

(Total 7 marks)

2) Solve the equation

$$3 \cos 2\theta - \cos \theta + 1 = 0$$

giving all solutions in degrees to the nearest degree in the interval $0° \leq \theta \leq 360°$.

(Total 6 marks)

3) (a) Solve the equation $\sec x = 2$ for $0 \leq x \leq 2\pi$.

(2)

(b) Use the identity $\cos (A + B) \equiv \cos A \cos B - \sin A \sin B$ to show that

$$\cos 2x = 2 \cos^2 x - 1.$$

(2)

(c) Hence solve the equation

$$\cos 2x + 3 \cos x - 1 = 0 \quad \text{for } 0 \leq x \leq 2\pi.$$

(5)
(Total 9 marks)

4) (a) (i) Express $\sin 2x$ in terms of $\sin x$ and $\cos x$.

(1)

(ii) Express $\cos 2x$ in terms of $\cos x$.

(1)

(b) Show that

$$\sin 2x - \tan x = \tan x \cos 2x$$

for all values of x.

(3)

(c) Solve the equation $\sin 2x - \tan x = 0$, giving all solutions in degrees in the interval $0° < x < 360°$.

(4)
(Total 9 marks)

5) Solve the equation

$$3 \sin\theta \sin 2\theta = 2\cos^3\theta,$$

giving all solutions in radians in the interval $0 < \theta < 2\pi$, leaving your answers in terms of π.

(Total 6 marks)