2.3 Further Trigonometric Equations

Question Paper

Course	Edexcel IAL Maths: Pure 3
Section	2. Trigonometry
Topic	2.3 Further Trigonometric Equations
Difficulty	Easy

Time allowed: **50**

Score: **/42**

Percentage: **/100**

Question 1

Solve the equation $\sec\theta = 1$ for $0° \leq \theta \leq 360°$.

[3 marks]

Question 2

Given that

$$\tan(A° - 30°) = \frac{\sqrt{3}}{3}$$

find the values of A such that $-180° \leq A° \leq 180°$.

[3 marks]

Question 3

Solve the equation

$$\frac{1}{\sec x} = \frac{\sqrt{2}}{2}, \qquad -\pi \leq x \leq \pi$$

[3 marks]

Question 4

(a) Sketch the graphs of $y = \arcsin x$, where x is measured in radians.
Label any points where the graphs intersect the coordinate axes.

[3 marks]

Question 4

(b) Find the only solution to $\arcsin x = \frac{\pi}{4}$.

[2 marks]

Question 5

Use the identity

$$R\cos(A-B) \equiv R\cos A\cos B + R\sin A\sin B$$

to show that

$$8\cos\theta + 6\sin\theta$$

can be written as

$$10\cos(\theta - \alpha) \qquad \text{where } \alpha = 0.644 \text{ to three significant figures.}$$

[4 marks]

Question 6

(a) Show that the equation $\text{cosec}^2 x = 2\,\text{cosec}\, x - 1$ can be written as

$$(\text{cosec}\, x - 1)^2 = 0$$

[2 marks]

Question 6

(b) Hence, or otherwise, solve the equation

$$\operatorname{cosec}^2 x = 2\operatorname{cosec} x - 1, \quad -2\pi \leq x \leq 2\pi$$

[3 marks]

Question 7

Solve the equation

$$\cos 2\theta = \frac{1}{2}, \qquad -\pi \leq \theta \leq \pi$$

State your answers as multiples of π.

[3 marks]

Question 8

(a) Write down the domain and range for the function

$$f(x) = \arccos x$$

[2 marks]

Question 8

(b) Solve the equation

$$f(x) = \frac{\pi}{6}$$

[2 marks]

Question 9

(a) Use a small angle approximation to estimate the solution to the equation

$$4\cot\theta - 2 = 3$$

[2 marks]

Question 9

(b) Solve the equation $4\cot\theta - 2 = 3, \quad 0 < \theta < \frac{\pi}{2}$.

Give your answer to three significant figures.

[2 marks]

Question 10

(a) Sketch the graph of $y = \sec x$ for $-\pi \leq x \leq \pi$.

[3 marks]

Question 10

(b) (i) Add a line to your graph demonstrate how the equation

$$\sec x = k, \qquad -\pi \leq x \leq \pi$$

where k is a constant could have no real solutions.

(ii) For which values of k does this equation have no real solutions?

[2 marks]

Question 11

Solve the equation

$$\cot^2\theta - \cos\theta \operatorname{cosec}^2\theta = 0, \qquad 0 < \theta < 2\pi$$

[3 marks]