

# **6.1 Trigonometric Equations**

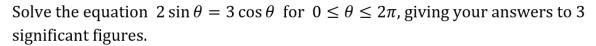
## **Question Paper**

Course	Edexcel IAL Maths: Pure 2
Section	6. Trigonometry
Topic	6.1 Trigonometric Equations
Difficulty	Hard

Time allowed: 60

Score: /49

Percentage: /100



[3 marks]

## **Question 2**

Solve the equation  $2\sin^2\theta = \cos\theta + 1$  for  $-180^{\circ} \le \theta \le 180^{\circ}$ .

[5 marks]

## **Question 3**

Given that the angle  $\theta$  is obtuse and that  $\sin \theta = \frac{3}{4}$ , find the exact value of  $\cos \theta$ .

[3 marks]

Solve the equation  $\tan 2x = \frac{3}{\tan 2x}$  for  $-180^{\circ} \le x \le 180^{\circ}$ .

[5 marks]

## **Question 5**

Solve the equation  $2 \tan x - \sin x = 0$  for  $-\pi \le x \le \pi$ .

[5 marks]

An isosceles triangle has sides 8 cm, 8 cm and 4 cm and equal base angles  $\theta$ .

Find exact values for  $\sin \theta$ ,  $\cos \theta$  and  $\tan \theta$ .

[6 marks]

#### **Question 7**

(a) Find all the solutions to the equation  $\sqrt{3} \tan 2\theta = -1$  in the interval  $-\pi \le \theta \le \pi$ , giving your answers in radians as multiples of  $\pi$ .

[4 marks]

## **Question 7**

(b) Find all the solutions to the equation  $6 \sin^2 x + 7 \sin x - 3 = 0$  in the interval  $0 \le x \le 2\pi$ , giving your answers in radians to three significant figures.

[5 marks]

(a) Show that  $x = \frac{1}{2}$  satisfies the equation  $8x^3 - 4x^2 - 6x + 3 = 0$ .

[1 mark]

## **Question 8**

(b) Hence solve the equation  $8\cos^3 x - 4\cos^2 x - 6\cos x + 3 = 0$  for  $0^\circ \le x \le 360^\circ$ .

[6 marks]

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#### **Question 9**

(a) A seagull sits on the surface of the sea and moves up and down as waves pass.

Its height, h metres, above its position in calm water is modelled by the function  $h = \frac{2}{5}\sin(180t)^\circ$  where t is the time in seconds after timing commenced.

Find the first time the seagull is 0.3 metres above its calm water position. Give your answer to 2 decimal places.

[4 marks]

## **Question 9**

(b) How many times in the first minute after timing commences is the seagull 0.3 metres above its calm water position?

[2 marks]