

# 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

**Question 1**

Solve the equation  $2 \sin \theta = 3 \cos \theta$  for  $0 \leq \theta \leq 2\pi$ , giving your answers to 3 significant figures.

**[3 marks]****Question 2**

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

**[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]**

**Question 4**

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

**[5 marks]****Question 5**

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

**[5 marks]**

**Question 6**

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  $-\pi \leq \theta \leq \pi$ , 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  $0 \leq x \leq 2\pi$ , giving your answers in radians to three significant figures.

**[5 marks]**

**Question 8**

(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  $0^\circ \leq x \leq 360^\circ$ .

**[6 marks]**

**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

$$h = \frac{2}{5} \sin(180t)^\circ \text{ where } t \text{ is the time in seconds after timing commenced.}$$

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]**