Trigonometry

Question Paper 5

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Trigonometry
Sub Topic	
Booklet	Question Paper 5

Time Allowed: **57 minutes**

Score: **/47**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 **(i)** Show that the equation

$$3(2\sin x - \cos x) = 2(\sin x - 3\cos x)$$

can be written in the form $\tan x = -\frac{3}{4}$. [2]

(ii) Solve the equation $3(2\sin x - \cos x) = 2(\sin x - 3\cos x)$, for $0^\circ \leqslant x \leqslant 360^\circ$. [2]

2 **(i)** Show that the equation $2\sin x \tan x + 3 = 0$ can be expressed as $2\cos^2 x - 3\cos x - 2 = 0$. [2]

(ii) Solve the equation $2\sin x \tan x + 3 = 0$ for $0^\circ \leqslant x \leqslant 360^\circ$. [3]

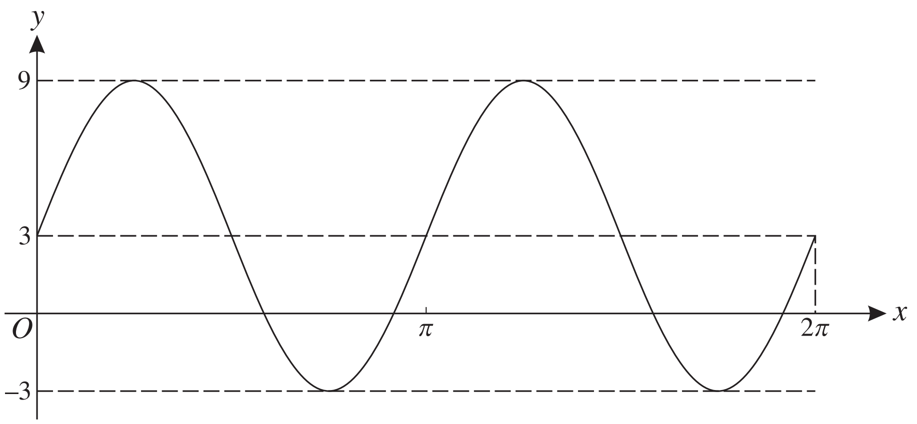
3 Solve the equation $3\tan(2x + 15^\circ) = 4$ for $0^\circ \leqslant x \leqslant 180^\circ$. [4]

4 **(i)** Prove the identity $(\sin x + \cos x)(1 - \sin x \cos x) \equiv \sin^3 x + \cos^3 x$. [3]

(ii) Solve the equation $(\sin x + \cos x)(1 - \sin x \cos x) = 9\sin^3 x$ for $0^\circ \leqslant x \leqslant 360^\circ$. [3]

5 Prove the identity $\dfrac{\sin x}{1 - \sin x} - \dfrac{\sin x}{1 + \sin x} \equiv 2\tan^2 x$. [3]

6



The diagram shows the graph of $y = a\sin(bx) + c$ for $0 \leqslant x \leqslant 2\pi$.

(i) Find the values of a, b and c. [3]

(ii) Find the smallest value of x in the interval $0 \leqslant x \leqslant 2\pi$ for which $y = 0$. [3]

7 Prove the identity

$$\frac{1+\sin x}{\cos x} + \frac{\cos x}{1+\sin x} \equiv \frac{2}{\cos x}.$$ [4]

8 **(i)** Show that the equation $2\tan^2\theta\cos\theta = 3$ can be written in the form $2\cos^2\theta + 3\cos\theta - 2 = 0$. [2]

(ii) Hence solve the equation $2\tan^2\theta\cos\theta = 3$, for $0° \leqslant \theta \leqslant 360°$. [3]

9 **(i)** Show that the equation $3\sin x\tan x = 8$ can be written as $3\cos^2 x + 8\cos x - 3 = 0$. [3]

(ii) Hence solve the equation $3\sin x\tan x = 8$ for $0° \leqslant x \leqslant 360°$. [3]

10 Prove the identity $\dfrac{1-\tan^2 x}{1+\tan^2 x} \equiv 1 - 2\sin^2 x$. [4]