

Trigonometry

Question Paper 1

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Trigonometry
Sub Topic	
Booklet	Question Paper 1

Time Allowed: 59 minutes

Score: /49

Percentage: /100

Grade Boundaries:

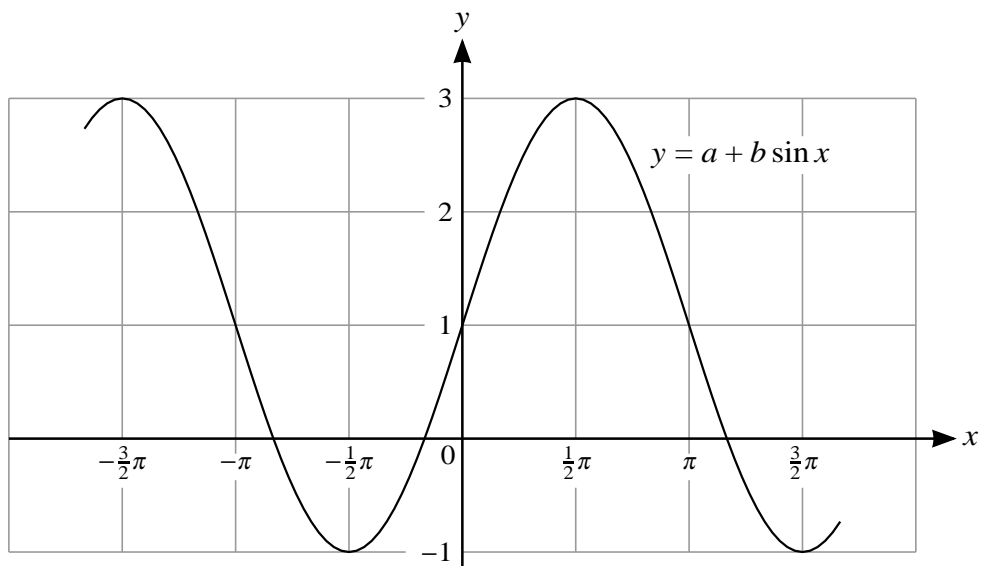
A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

- 1 Given that θ is an obtuse angle measured in radians and that $\sin \theta = k$, find, in terms of k , an expression for
- (i) $\cos \theta$, [1]
 - (ii) $\tan \theta$, [2]
 - (iii) $\sin(\theta + \pi)$. [1]
- 2 (i) Prove the identity $\frac{\sin \theta - \cos \theta}{\sin \theta + \cos \theta} \equiv \frac{\tan \theta - 1}{\tan \theta + 1}$. [1]
- (ii) Hence solve the equation $\frac{\sin \theta - \cos \theta}{\sin \theta + \cos \theta} = \frac{\tan \theta}{6}$, for $0^\circ \leq \theta \leq 180^\circ$. [4]
- 3 (i) Express the equation $3 \sin \theta = \cos \theta$ in the form $\tan \theta = k$ and solve the equation for $0^\circ < \theta < 180^\circ$. [2]
- (ii) Solve the equation $3 \sin^2 2x = \cos^2 2x$ for $0^\circ < x < 180^\circ$. [4]
- 4 Find the value of x satisfying the equation $\sin^{-1}(x - 1) = \tan^{-1}(3)$. [3]
- 5 Solve the equation $\frac{13 \sin^2 \theta}{2 + \cos \theta} + \cos \theta = 2$ for $0^\circ \leq \theta \leq 180^\circ$. [4]
- 6 (i) Show that the equation $1 + \sin x \tan x = 5 \cos x$ can be expressed as
- $$6 \cos^2 x - \cos x - 1 = 0. \quad [3]$$
- (ii) Hence solve the equation $1 + \sin x \tan x = 5 \cos x$ for $0^\circ \leq x \leq 180^\circ$. [3]

7 (i) Show that $\sin^4 \theta - \cos^4 \theta \equiv 2 \sin^2 \theta - 1$. [3]

(ii) Hence solve the equation $\sin^4 \theta - \cos^4 \theta = \frac{1}{2}$ for $0^\circ \leq \theta \leq 360^\circ$. [4]

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The diagram shows part of the graph of $y = a + b \sin x$. State the values of the constants a and b . [2]

9 (i) Prove the identity $\frac{\sin \theta}{1 - \cos \theta} - \frac{1}{\sin \theta} \equiv \frac{1}{\tan \theta}$. [4]

(ii) Hence solve the equation $\frac{\sin \theta}{1 - \cos \theta} - \frac{1}{\sin \theta} = 4 \tan \theta$ for $0^\circ < \theta < 180^\circ$. [3]

10 The reflex angle θ is such that $\cos \theta = k$, where $0 < k < 1$.

(i) Find an expression, in terms of k , for

(a) $\sin \theta$, [2]

(b) $\tan \theta$. [1]

(ii) Explain why $\sin 2\theta$ is negative for $0 < k < 1$. [2]