Reciprocal Trig
Difficulty: Medium

Question Paper 1

Level	A Level
Subject	Maths Pure 3
Exam Board	CIE
Topic	Trigonometry
Sub-Topic	Reciprocal trig
Difficulty	Medium
Booklet	Question Paper 1

Time allowed: **52 minutes**

Score: **/37**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E
>90%	81%	70%	58%	46%	34%

By expressing the equation $\operatorname{cosec}\theta = 3\sin\theta + \cot\theta$ in terms of $\cos\theta$ only, solve the equation for $0° < \theta < 180°$. [5]

Question 2

(i) Express the equation $\cot\theta - 2\tan\theta = \sin 2\theta$ in the form $a\cos^4\theta + b\cos^2\theta + c = 0$, where a, b and c are constants to be determined. [3]

(ii) Hence solve the equation $\cot\theta - 2\tan\theta = \sin 2\theta$ for $90° < \theta < 180°$. [2]

Question 3

Prove the identity $\frac{\cot x - \tan x}{\cot x + \tan x} = \cos 2x$. [3]

Question 4

Sketch the graph of $y = \sec x$, for $0 \leq x \leq 2\pi$.

[3]

Question 5

(i) Prove the identity $\operatorname{cosec} 2\theta + \cot 2\theta \equiv \cot \theta$. [3]

(ii) Hence solve the equation $\operatorname{cosec} 2\theta + \cot 2\theta = 2$, for $0^\circ \leq \theta \leq 360^\circ$. [2]

Question 6

Solve the equation

$$\operatorname{cosec} 2\theta = \sec \theta + \cot \theta,$$

giving all solutions in the interval $0^\circ < \theta < 360^\circ$. [6]

Solve the equation $\tan 2x = 5\cot x$, for $0° < x < 180°$. [5]

Question 8

Express the equation $\sec\theta = 3\cos\theta + \tan\theta$ as a quadratic equation in $\sin\theta$. Hence solve this equation for $-90° < \theta < 90°$. [5]