TRIGONOMETRY: A2

$$\sec^2\theta \equiv 1 + \tan^2\theta \ \ \& \ \ \csc^2\theta \equiv 1 + \cot^2\theta$$

A2 Unit 3: Pure Mathematics B

WJEC past paper questions: 2010 – 2017

Total marks available 84 (approximately 1 hour 40 minutes)

1. Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$2\tan^2\theta = \sec\theta + 8.$$ [6]

(Summer 10)

2. (a) Show, by counter-example, that the statement

$$\sec^2\theta \equiv 1 - \csc^2\theta$$

is false. [2]

(b) Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$3\csc^2\theta = 11 - 2\cot\theta.$$ [6]

(January 11)

3. Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$2\csc^2\theta + 3\cot^2\theta + 4\csc\theta = 9.$$ [6]

(Summer 11)

4. Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$\sec^2\theta + 8 = 4\tan^2\theta + 5\sec\theta.$$ [6]

(January 12)

5.   Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$13\tan^2\theta = 5\sec^2\theta + 6\tan\theta.$$ [6]

(Summer 12)

6.   Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$4\csc^2\theta = 9 - 8\cot\theta.$$ [6]

(January 13)

7.   (a)   Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$4\cot^2\theta - 8 = 2\csc^2\theta - 5\csc\theta.$$ [6]

       (b)   Find all values of ϕ in the range $0° \leqslant \phi \leqslant 360°$ satisfying

$$\sec\phi + 2\tan\phi = 0.$$ [3]

(Summer 13)

8.   Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$15\csc^2\theta + 2\cot\theta = 23.$$ [6]

(January 14)

9.   Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$8\tan^2\theta - 5\sec^2\theta = 7 + 4\sec\theta.$$ [6]

(Summer 14)

10.   (a)   Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$7\csc^2\theta - 4\cot^2\theta = 16 + 5\csc\theta.$$ [6]

       (b)   Without carrying out any calculations, explain why there are no values of ϕ in the range $0° \leqslant \phi \leqslant 90°$ which satisfy the equation

$$4\sec\phi + 3\csc\phi = 6.$$ [1]

(Summer 15)

11.

(a) Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$3 \operatorname{cosec} \theta (\operatorname{cosec} \theta - 1) = 5 \cot^2 \theta - 9.$$ [6]

(b) Find all values of ϕ in the range $0° \leqslant \phi \leqslant 360°$ satisfying

$$2 \operatorname{cosec} \phi + 3 \sec \phi = 0.$$ [3]

(Summer 16)

12.

(a) Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$6 \tan^2 \theta - 6 = 4 \sec^2 \theta + 5 \sec \theta.$$ [6]

(b) Find all values of ϕ in the range $0° \leqslant \phi \leqslant 360°$ satisfying

$$3 \sec \phi + 5 \tan \phi = 0.$$ [3]

(Summer 17)