

Trigonometric Equations and Identities

January 2014

Question 1

2 marks

Find the coterminal angle to $\frac{27\pi}{5}$ over the interval $[-360^\circ, 0^\circ)$.

Question 2 (calculator)

3 marks

Solve the following equation over the interval $0 \leq \theta < 2\pi$.

$$(\tan \theta - 3)(\tan \theta + 1) = 0$$

Question 7**4 marks**

Solve the following equation over the interval $[0, 2\pi]$.

$$2 \cos 2\theta - 1 = 0$$

Question 12**a) 2 marks b) 2 marks**

a) Prove the identity below for all permissible values of θ .

$$\frac{1+2\cos^2\theta}{\cos^2\theta} = \tan^2\theta + 3$$

b) Determine all the non-permissible values for θ .

Question 14**a) 3 marks b) 1 mark**

Given that $\sin \alpha = \frac{5}{13}$, where α is in Quadrant II, and $\cos \beta = \frac{2}{5}$, where β is in Quadrant IV, find the exact value of:

a) $\cos(\alpha + \beta)$

b) $\sin 2\alpha$

June 2013

Question 2 (Calculator)**4 marks**

Solve the equation $\csc^2\theta + 3\csc\theta - 4 = 0$ over the interval $[0, 2\pi]$.
Express your answers as exact values or correct to 3 decimal places.

Question 7

4 marks

Solve the following equation algebraically where $180^\circ \leq \theta \leq 360^\circ$.

$$2\sin^2\theta + 5\cos\theta + 1 = 0$$

Question 15**3 marks**

Prove the identity below for all permissible values of x .

$$\frac{\sin^2 x}{\sec x + 1} = \cos x - \cos^2 x$$

Question 39**2 marks**

On the interval $0 \leq \theta < 2\pi$, identify the non-permissible values of θ for the trigonometric identity:

$$\tan \theta = \frac{1}{\cot \theta}$$