Trigonometry (Further Maths)

1.

Prove that $\tan\theta + \frac{1}{\tan\theta} \equiv \frac{1}{\sin\theta\cos\theta}$

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(3 marks)

2.

$f(x) = \sin x \qquad 180° \leqslant x \leqslant 360°$

$g(x) = \cos x \qquad 0° \leqslant x \leqslant \theta$

(a) Calculate the value of f(210°).

Answer …… *(1 mark)*

(b) Complete this inequality for the range of $f(x)$.

Answer …… $\leqslant f(x) \leqslant$ …… *(2 marks)*

(c) You are given that $0 \leqslant g(x) \leqslant 1$

Work out the value of θ.

$\theta =$ ..... degrees *(1 mark)*

3.

Express $1 - \tan\theta \sin\theta \cos\theta$ in terms of $\cos\theta$.

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Answer ..... *(3 marks)*

4.

Solve $3\cos^2\theta - 1 = 0$ for $0° \leqslant \theta \leqslant 180°$

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Answer ..... *(4 marks)*

5.

Prove that $\dfrac{\sin\theta - \sin^3\theta}{\cos^3\theta} \equiv \tan\theta$

[3 marks]

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6.

Solve $16\sin^2 x = 1$ for $0° \leqslant x \leqslant 270°$

[5 marks]

7.

Prove that $2\tan^2\theta + 1 \equiv \dfrac{1+\sin^2\theta}{1-\sin^2\theta}$ where $\sin^2\theta \neq 1$

[3 marks]

8.

Work out the values of x between 0° and 360° for which

$$25\cos^2 x = 9$$

Give your answers to 1 decimal place.

[4 marks]

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9.

(a) Prove that $\sin^2 x - 3\cos^2 x \equiv 4\sin^2 x - 3$

[2 marks]

(b) Hence, or otherwise, work out the values of x between $0°$ and $360°$ for which

$$\sin^2 x - 3\cos^2 x = 0$$

[4 marks]

Answer _____

10.

Angle θ is obtuse and $\sin\theta = \frac{\sqrt{11}}{6}$

Work out the value of $\cos\theta$

[4 marks]