

Trigonometric identities and equations

AS Pure Mathematics | Edexcel 8MA0 | 12 questions, 51 marks

A-level Maths topic practice



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Name: _____ **Date:** _____ **Score:** _____ / 51

- 1** Solve, for $0 \leq x < 360^\circ$, the equation
 $\sin x = 0.4$
 Give your answers to 1 decimal place.

(2 marks)

Answer _____

- 2** Solve, for $0 \leq x < 360^\circ$, the equation
 $\tan x = -2$
 Give your answers to 1 decimal place.

(3 marks)

Answer _____

- 3** Show that
 $\frac{1 - \cos^2 x}{\cos x} \equiv \sin x \tan x, \quad \cos x \neq 0$

(3 marks)

Answer _____

- 4** Solve, for $0 \leq x < 360^\circ$, the equation
 $2 \cos(x + 30^\circ) = 1$

(3 marks)

Answer _____

- 5 Solve, for $0 \leq x < 360^\circ$, the equation
 $\sin 2x = 0.6$
Give your answers to 1 decimal place.

(4 marks)

Answer _____

- 6 Solve, for $0 \leq x < 360^\circ$, the equation
 $3 \sin x = 2 \cos x$
Give your answers to 1 decimal place.

(3 marks)

Answer _____

- 7 Given that $\sin \theta = \frac{2}{5}$ and that θ is obtuse, find the exact value of
a. $\cos \theta$
b. $\tan \theta$, giving your answer with a rational denominator.

(4 marks)

Answer _____

8 Kofi is asked to solve, for $0 \leq x < 360^\circ$, the equation

$$4 \sin x \cos x = 3 \sin x$$

His working is

$$4 \cos x = 3 \quad \text{so} \quad \cos x = 0.75 \quad \text{so} \quad x = 41.4^\circ \text{ or } 318.6^\circ$$

- Identify the error in Kofi's working.
- Find all the solutions of the equation in the interval, giving non-exact answers to 1 decimal place.

(4 marks)

Answer _____

9

a. Show that the equation $2 \cos^2 x + 3 \sin x = 3$ can be written as $2 \sin^2 x - 3 \sin x + 1 = 0$

b. Hence solve, for $0 \leq x < 360^\circ$, the equation $2 \cos^2 x + 3 \sin x = 3$

(6 marks)

Answer _____

10

Solve, for $-180^\circ \leq x \leq 180^\circ$, the equation

$$\tan(2x - 15^\circ) = \sqrt{3}$$

(5 marks)

Answer _____

11

- a. Show that the equation $3 \tan x \sin x = 8$ can be written as $3 \cos^2 x + 8 \cos x - 3 = 0$
- b. Hence solve, for $0 \leq x < 360^\circ$, the equation $3 \tan x \sin x = 8$, giving your answers to 1 decimal place.
- c. Hence find the solutions of $3 \tan 2\theta \sin 2\theta = 8$ for $0 \leq \theta < 180^\circ$, giving your answers to 1 decimal place.

(8 marks)

Answer _____

12

A passenger on a big wheel in Blackpool is at height h metres above the ground, t minutes after the ride starts, where

$$h = 20 - 18 \cos(12t)^\circ, \quad t \geq 0$$

- a. Find the height of the passenger when the ride starts.
- b. Find the maximum height of the passenger and the time taken for one full turn of the wheel.
- c. Find the times during the first turn when the passenger is 29 m above the ground.

(6 marks)

Answer _____

End of questions | Total 51 marks