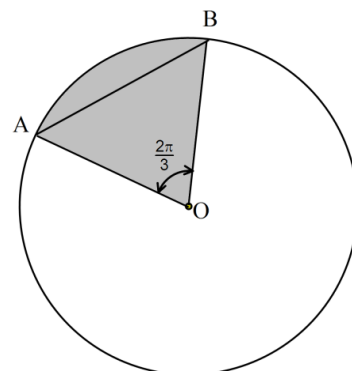


Test - Trigonometric Functions & Equations

■ **Part 1** – NO calculator – Questions 1-6

total marks on test: **45**

1. The diagram shows a circle with centre O. Angle AOB has a measure of $\frac{2\pi}{3}$ radians. The shaded region (a sector of the circle) has an area of $12\pi \text{ cm}^2$. Find the **exact** area of triangle AOB. **[6 marks]**

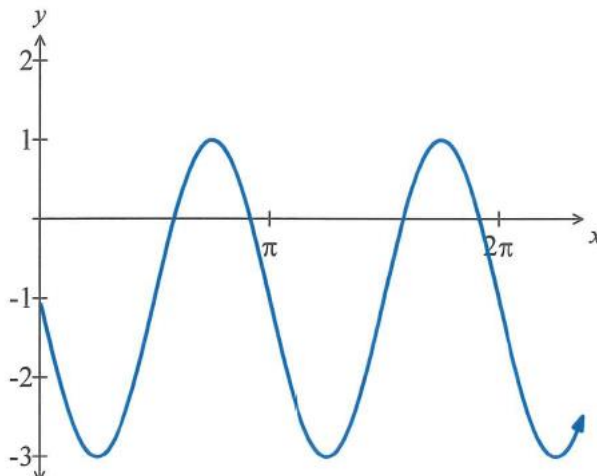


2. (a) Write the expression $\cos 2x + \sin x$ in terms of $\sin x$ only. **[1 mark]**
 (b) Solve the equation $\cos 2x + \sin x = 0$ for $0 \leq x \leq 2\pi$, giving your answer **exactly**. **[3 marks]**
3. The graph of a sine function $y = a \sin(bx) + c$, where a , b and c are integers, is graphed below. Write down the values of a , b and c . **[3 marks]**

$a =$ _____

$b =$ _____

$c =$ _____



4. Write down the domain, range and period of the function $g(x) = 3\cos(2x)$. **[3 marks]**

domain: _____ range: _____ period: _____

5. Given that $\tan \theta = \frac{5}{12}$ and that $0 \leq \theta \leq \frac{\pi}{2}$, find the exact values of: **[5 marks]**

(a) $\sin \theta$

(b) $\cos \theta$

(c) $\sin 2\theta$

6. The depth of water, h meters, measured at a sea pier t hours after midnight is given by the function

$$h = a + b \cos\left(\frac{2\pi}{k}t\right), \text{ where } a, b \text{ and } k \text{ are constants.}$$

The water is at a maximum depth of 21 meters at midnight and noon, and is at a minimum depth of 13 m at 06:00 and at 18:00.

Write down the values of: (a) a (b) b (c) k **[6 marks]**

Test - Trigonometric Functions & Equations

■ Part 2 – Calculator allowed – Questions 7-9

7. Find all of the values of θ in the interval $0 \leq \theta \leq \pi$ that satisfy the equation $\tan 2\theta = \frac{4}{3}$. [4 marks]

8. Solve for θ in the indicated interval. Give any solutions exactly. $4 \sin^2 \theta = 3$, $0 \leq \theta < 360^\circ$
[6 marks]

9. The temperature (C°) over a 24 hour day in Paris is modelled by the trigonometric function $C = 17 - 6 \cos\left(\frac{\pi}{12}t\right)$ where C is degrees Celsius and t is time in hours after midnight.

(a) What is the approximate temperature (to nearest tenth of a degree) at 10:00 am?

(b) What is the minimum temperature and when does it occur?

(c) What is the maximum temperature and when does it occur?

(e) At 18:00 (6 pm), the temperature given by the trigonometric function is $17C^\circ$. What other time during the day does the trigonometric function give the same temperature?

[8 marks]