

PART A: MULTIPLE CHOICE (non-calculator)
SECTION I

Value: 11 marks

Allowable Time: 25 minutes

INSTRUCTIONS: No calculator may be used for this section of the examination. For each question, select the **best** answer and record your choice on the blue Response Form provided. Using an HB pencil, completely fill in the circle on the blue Response Form that has the letter corresponding to your answer.

1. The point (p, q) is the point of intersection of the terminal arm of angle θ in standard position and the unit circle centred at $(0, 0)$. Which expression represents $\tan \theta$?
A. p B. q C. $\frac{p}{q}$ D. $\frac{q}{p}$

2. Evaluate: $\csc \frac{5\pi}{3}$
A. -2 B. $\frac{-2}{\sqrt{3}}$ C. $\frac{2}{\sqrt{3}}$ D. 2

3. Determine all the restrictions for the expression: $\frac{\cos x}{\sin x (2 \cos x - 1)}$
A. $\sin x \neq 0, \cos x \neq \frac{1}{2}$ B. $\sin x \neq 0, \cos x \neq -\frac{1}{2}$
C. $\sin x \neq 0, \cos x \neq 0, \cos x \neq \frac{1}{2}$ D. $\sin x \neq 0, \cos x \neq 0, \cos x \neq -\frac{1}{2}$

4. Determine the phase shift of the function: $f(x) = \sin\left(\frac{1}{2}x - \pi\right)$
A. $\frac{\pi}{2}$ to the right B. π to the right C. 2π to the right D. 4π to the right

5. Solve: $\sec x + 2 = 0, 0 \leq x < 2\pi$
A. $\frac{\pi}{6}, \frac{5\pi}{6}$ B. $\frac{7\pi}{6}, \frac{11\pi}{6}$ C. $\frac{\pi}{3}, \frac{5\pi}{3}$ D. $\frac{2\pi}{3}, \frac{4\pi}{3}$

11. The zeros of the function $y = f(x)$ are $-4, 1$ and 2 . Determine the zeros of the new function $y = 2f(x+1)$.

- A. $-5, 0, 1$ B. $-3, -2, 3$ C. $-3, 2, 3$ D. $-1, 0, 5$

12. If the range of $y = f(x)$ is $-1 \leq y \leq 3$, what is the range of $y = \frac{1}{f(x)}$?

- A. $-1 \leq y \leq \frac{1}{3}$ B. $-1 \leq y \leq \frac{1}{3}, y \neq 0$ C. $y \geq \frac{1}{3}$ or $y \leq -1$ D. $y \geq 3$ or $y \leq -1$

13. Solve: $2\sin^2 x - \sin x - 1 = 0, 0 \leq x < 2\pi$

- A. $x = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$ B. $x = \frac{\pi}{2}, \frac{4\pi}{3}, \frac{5\pi}{3}$ C. $x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}$ D. $x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{3\pi}{2}$

14. If $A = B + \frac{\pi}{2}$, simplify $\sin A \cos B - \cos A \sin B$.

- A. 0 B. 1 C. $\sin 2B$ D. $\sin\left(2B - \frac{\pi}{2}\right)$

15. Solve for x : $9^{2x-1} = 27^x$

- A. -2 B. $-\frac{1}{2}$ C. $\frac{1}{2}$ D. 2

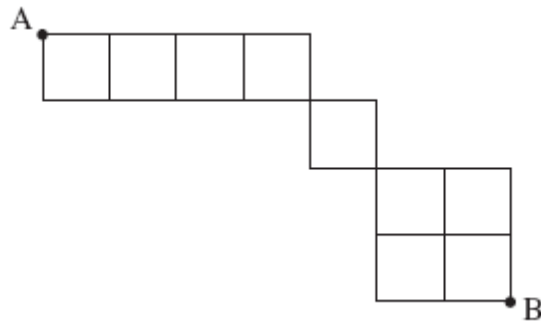
16. If $\log_8 x = 64$, determine the value of $\log_8\left(\frac{x}{64}\right)$.

- A. 0 B. 1 C. 60 D. 62

17. A class of 14 students is made up of 6 girls and 8 boys. From this class, a group of 5 students is chosen to represent the class at a competition. Determine the number of different groups of 5 that can be formed if there must be at most 1 boy in each group.

- A. 23 B. 30 C. 120 D. 126

18. Moving only to the right or down, determine the number of different pathways from A to B.



A. 13

B. 24

C. 60

D. 80

**This is the end of the multiple-choice section.
Answer the remaining questions directly in this examination booklet.**

PART B: WRITTEN RESPONSE (3 marks each)

1. Prove the identity:

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

LEFT SIDE

RIGHT SIDE

2. Solve for x algebraically: $\log_2(x-4) + \log_2(x-3) = 1$