S5 MATHEMATICS TEST 2 2026

TIME: 2HRS

ATTEMPT ALL QUESTIONS:

1. Solve the following simultaneous equations.
   $2x + 3y - z = 1.8$
   $x + 4y + 2z = 1.9$
   $5x + 2y - 3z = 2.8$

2. Solve for x:
   $4^x - 6(2^x) + 8 = 0$

3. Rationalize the denominator
   $\frac{2\sqrt{2}}{2-\sqrt{2}}$

4. Show that $\frac{(5+\sqrt{3})^2-(5-\sqrt{3})^2}{5\sqrt{3}} = 4$

5. The roots of the equation $x^2 - 5x + 4 = 0$ are α and β. Calculate:
   (i) $\alpha + \beta$ and $\alpha\beta$
   (ii) $(4\alpha - 5) + (4\beta + 9)$
   (iii) $(3\alpha - 1)(3\beta - 1)$
   (iv) $\alpha^2+\beta^2$
   (v) $\alpha^2-\beta^2$
   (vi) $\sqrt{\alpha}$ and $\sqrt{\beta}$.

6. Simplify the following
   (a) $\frac{\frac{3}{8}(4+x)^{\frac{4}{3}}-\frac{1}{4}(4+x)^{1/3}}{(4+x)}$
   (b) $\frac{\frac{5}{4}(2+x)^{2/3}(2-x)^{-2/5}-\frac{9}{8}(2+x)^{-1/3}(2-x)^{3/5}}{(2+x)}$

7. Solve for m in $\left(\frac{1}{4}\right)^{3m-2} \div 32^{1-m} = 2^7$

8. Prove $\log 16 + 3\log 2 - \log 4 = 5\log 2$

9. Show that $\log_9 x = \frac{1}{2}\log_3 x$ and hence evaluate $\log_9 243$

10. If one root of the equation $ax^2 + bx + c = 0$ is 5 times the other, show that $5b^2 = 36ac$.