SCACO

S5 End of Term I Examinations 2023

P425/2: Pure Mathematics

Paper 1 **Duration**: 2 Hours

INSTRUCTIONS

Answer **ALL** *questions in this paper*

Silent, non-programmable scientific calculators and mathematical tables may be used.

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1. Solve the simultaneous equation.
   a) $\log_9(x-y) = \log_3(x+y), x^2 - y^2 = 8.$
   b) $2^x + 4^y = 12, 3(2^x) - 2(2)^{2y} = 16.$
   c) $2^{3x+1} = 3^{3x+2}$
2. Simplify the following
   a) $\frac{2+5\sqrt{3}}{2-\sqrt{3}}$
   b) $\frac{1}{3-\sqrt{7}} + \frac{1}{3+\sqrt{7}}$
   c) $(8^{(n+2)}x4^{(2n-1)})\frac{1}{2^n x 4^{\frac{n}{2}}}$
3. Prove the following
   a) If $secX = cosY + sinY$, then $tan^2X = sin2Y$
   b) $sec^2H = 2 - \frac{2}{1+cosec2H}$ **(Strictly use the L.H.S)**
   c) $(1 - sinA + cosA)^{\mathbf{2}} = 2(1 - cosA)(1 + cosA)$
4. Solve the following equations for $-180° \leq x \leq 180°$
   i) $4cot^2x - 24cosecx + 39 = 0$
   ii) $3sec^2x - 4tanx - 2 = 0$
   iii) $5cos^2 3x = 3(1 + sin3x)$
5. If $sinx = \frac{3}{5}$ and $cosy = \frac{15}{17}$, where x is obtuse, and y is acute. Find the exact value of
   i) $\mathrm{Sin}(x+y)$
   ii) $\mathrm{Cos}(x+y)$
   iii) $\cos(x-y)$
   iv) $\sin(x-y)$

Success goes to the ones who never give up