

YAHS MATHS DEPARTMENT 2022

TOPICAL TEST SET 2

Uganda Advanced Certificate of Education

MATHEMATICS

Paper 1

TIME: 2HRS

NAME:	
SUB.COMB.	
MARKS	Comment

INSTRUCTIONS:

Answer **ALL** Questions

- Given that $\tan B = \frac{4}{3}$, and that B is acute. Without using tables or calculator, find the value of;
 - $\cos 2B$ (03 marks)
 - $\tan \frac{B}{2}$ (04 marks)
 - Express $8 \cos^4 \theta$ in the form $a \cos 4\theta + b \cos 2\theta + C$, giving the numerical values of the constants a , b and c . (05 marks)
- Solve the simultaneous equation;

$$\begin{aligned} \cos x + \cos y &= 1 \\ \sec x + \sec y &= 4 \end{aligned}$$
 (05 marks)
 - Express $10 \sin x \cos x + 12 \cos 2x$, in the form $R \sin(2x + \beta)$, where R is positive and β is an acute angle. Hence, find the maximum and minimum values and state clearly where they occur. (07 marks)
- Prove the identity

$$\sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}} = \operatorname{cosec} \theta - \cot \theta$$
 (05 marks)
 - Solve the equation $4 \cos \theta - 3 \sec \theta = 2$, for $-180^\circ \leq \theta \leq 180^\circ$ (05 marks)
- Simplify $\frac{\cos 3\theta + \cos 5\theta}{\sin 5\theta - \sin 3\theta}$. (05 marks)
 - Show that $\cot 2\theta = \frac{1 - \tan^2 \theta}{2 \tan \theta}$, hence solve the equation $\cot 2\theta = 4 - \tan \theta$ for values of θ between 0° and 360° . (07 marks)
- Show that;
 - $\tan^{-1} \left(\frac{1}{2} \right) + \tan^{-1} \left(\frac{1}{5} \right) = \tan^{-1} \left(\frac{7}{9} \right)$. (04 marks)
 - $\frac{\sin 3\theta \sin 6\theta + \sin \theta \sin 2\theta}{\sin 3\theta \cos 6\theta + \sin \theta \cos 2\theta} = \tan 5\theta$. (04 marks)
 - $\sin(2 \sin^{-1} x + \cos^{-1} x) = \sqrt{1 - x^2}$. (06 marks)
- If $t = \tan \frac{1}{2} \theta$, Show that $\sin \theta = \frac{2t}{1+t^2}$, and derive the expression of $\cos \theta$ in terms of t . Hence or otherwise, solve the equation $3 \sin \theta + \cos \theta = 2$ for values of θ in the range $0^\circ \leq \theta \leq 180^\circ$. (10 marks)