NYASANDA COMMUNITY HIGH SCHOOL
FORM 4 MATHEMATICS.
MASENO NATIONAL SENIOR TERM II 2012.
TIME: 2 HOUR.

ADM NO.................................*STREAM*.....................

Instructions:
1. This paper consists of 21 questions.
2. Attempt all questions and write your answer on the answer sheet provided in space provided for each question.
3. Write your name and class.
4. Electronic calculators and mathematical tables may be used where necessary.

QUESTIONS.

1. In a book with page numbers from 1 to 100, some pages are torn off. The sum of the page numbers on the remaining pages is 4949. Find the sum of the numbers on the torn pages.

2. Three nonzero real numbers a,b,and c are said to be in harmonic progression if

   $\frac{1}{a} + \frac{1}{c} = \frac{2}{b}$ given that all the three – term harmonic progression a,b and c are of Strictly increasing positive integers in which a = 20, and b divides c. How many pairs fulfill the condition of divisibility.

3. Circles X and Y lie inside circle Z as in the figure below. The diameters of Z and X are 12 cm and 8 cm respectively. Find the area o the shaded region in terms of
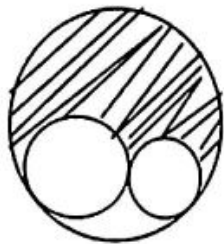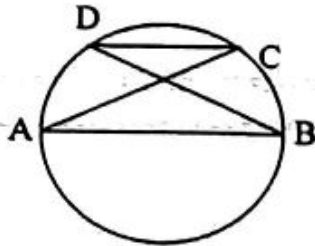

4. If $\log_4 \left\{ \log_6 (\log_2 {}^x) \right\} = 0$. Find x

5. Evaluate $\left\{ \dfrac{\text{Sin } x}{\sqrt{1 - \cos^2 x}} + \sec^2 x - \tan^2 x \right\}^{0.5}$

6. A trapezium ABCD, in which AB is parallel to CD, is inscribed in a circle with centre O as shown in the diagram below. Suppose the diagonals AC and BD intersect at M. and

OM = 2. If AMB = 60^0, determine the deference between the lengths of the parallel sides in surd form.

7. On a certain map, an estate is represented by an area of 48cm2. If the actual area of the estate is 1200 hectares. Find the scale of the map in the form 1:n.

8. In a triangle OAB, OA = a, OB = b, OP = 2/3 OA and AQ = 2QB. When the line PQ and OB are produced, they meet at R.
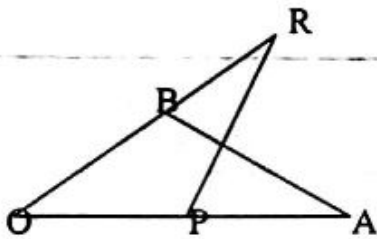
PQ = k PQ and OR = m OB. The coordinates of O, A and B are (0,0) (3,3) and (2,6) respectively. Find the coordinates of R.

9. Make a the subject of the formula $^R/w = \sqrt{\dfrac{4b^2 - 3a^2}{b^2 - a^2}}$

10. The velocity of a particle t seconds after passing a given point O is given by $v = 6t^2 - 6t + 1$. Find the value of t at which the parcel passes through the origin again.

11. Solve the pair of simultaneous equation.

$$^3/_x + ^2/_y = 14$$

$$^5/_x - ^3/_y = -2$$

12. Given that y is obtuse and that $\sin y = ^2/_3$. Find $\dfrac{2 \cos y \tan y}{1 + \tan}$ to 4 s.f

13. Income tax in a particular year was charged as shown below.

Income in K £ p.a	Tax rate in sh. Per £
1 – 1980	2
1981 – 3900	3
3901 – 5940	5
5941 – 7920	7
Over 7920	9

Calculate the basic salary to the nearest shillings for Mr. Pesa if he pays shs 8280 as P.A.Y.E. every month given also that he gets a house allowance of shs. 5000 per month and is entitled to a personal relief of shs. 1162 per month.

14. The first terms in the expansion of $(1 - ax)^n$ are $1 + 5x + 15x^2$. Find a and n.

15. Estimate $\int_1^3 \frac{1}{x^2} dx$ using mid – ordinate rule with two rectangles of equal width.

Give your answer to 4 s.f.

16. The thirteenth term of an arithmetic progression is 27, given that the seventh term is thrice the second term, find the sum of the first three even numbered terms of the progression.

17. Let ABCD be a convex quadrilateral and P,Q,R,S be midpoint of AB, BC, CD, DA respectively such that triangle AQR and CSP are equilateral. Determine the angles of the rhombus.
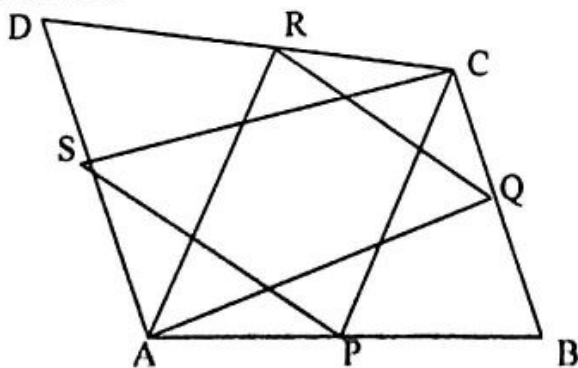
18. Positive integers are written on all the faces of a cube, one on each corner (vertex) of the cube, the product of the numbers on the faces that meet at the corner is written. The sum of the numbers written at all corners is 2004. If T denotes the sum of the numbers on all the faces, find all the possible values of T.

19. Given that xy = 5, yz = 1 and zx = 125. Find the value of xyz.

20. The GCD of three numbers 60,90 and $\frac{15}{n}$ is 30. Find the value of n.

21. The straight line whose double intercept equation is $\frac{x}{a} + \frac{y}{b} = 1$, passes through the points p(-4,9) and Q (4,-3). Determine the value of a and b.

ANSWER SHEET.

NAME...

SCHOOL CODE..

SCHOOL TYPE (Tick one) BOYS ☐   GIRL ☐   MIXED ☐

1		8		15	
2		9		16	
3		10		17	
4		11		18	
5		12		19	
6		13		20	
7		14		21	

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