Name ..... Adm No..... Class..... No..... Sign .....

NYABURURU GIRLS' NATIONAL SCHOOL

OUR LADY OF LOURDES

Date done	
Invigilator	
Date returned	
Date revised	

FORM 4 MATHEMATICS P.2
MARCH SERIES 2016
TIME: 2½ HOURS

INSTRUCTIONS

- Write your name, stream and class number in the spaces provided at the top of this page.
- The paper contains two sections i.e. **I** and **II**.
- Answer **ALL** the questions in Section I and only **FIVE** from section **II**.
- All answers and working must be written on the question paper in the spaces provided below each question.
- Marks may be awarded for correct workings even if the answer is wrong.
- You may use electronic calculators and/or KNEC mathematical tables (4th Edition) UNLESS stated otherwise.

FOR EXAMINER'S USE ONLY.

SECTION I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL

SECTION II

17	18	19	20	21	22	23	24	TOTAL

GRAND TOTAL

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SECTION I (50 MARKS)

Answer *ALL* questions in this paper

1. Use logarithms to evaluate (3 marks)

$$\frac{\sqrt[3]{0.076538}}{43.62\times 0.9025^2}$$

2. Solve for x, giving your answer correct to two significant figures. (3 marks)

$$2x = 7 - \frac{3}{x}$$

3. Solve the equation $6\cos^2\theta - \sin\theta - 4 = 0$ for $0 \leq \theta \leq 360^0$
(4 marks)

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4. Expand $(2-x)^5$ in ascending powers of x. Hence evaluate $(2.01)^5$ correct to six significant figures

   (4 marks)

5. If $\frac{5}{2\sqrt{3}-\sqrt{10}} - \frac{3}{2\sqrt{3}+\sqrt{10}} = a\sqrt{3} + b\sqrt{10}$, find the values of the rational numbers a and b
   (3 marks)

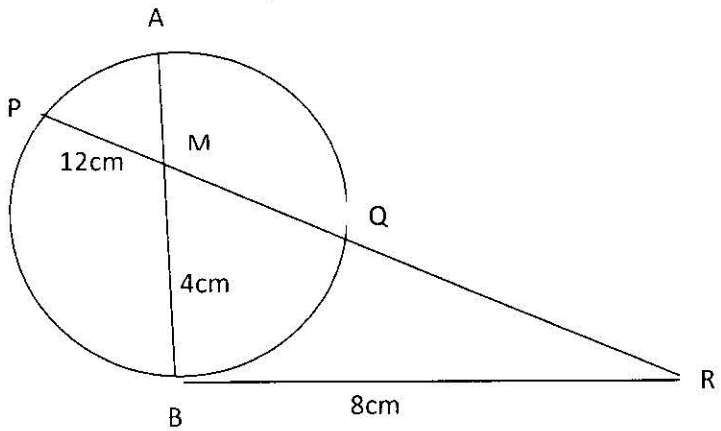
6. Make S the subject of the formula (3 marks)

   $T=\frac{4x}{\sqrt{p-2S^2}}$

7. The radius of spherical ball is measured as 10cm, correct to the nearest centimeter. Determine, to 2 decimal places, the percentage error in calculating the volume of the ball. (3 marks)

8. Find the equation of the normal to the curve $y=x^2-4x$ at (1,-3) (3 marks)

9. In the figure below, AB is the diameter of the circle. Chord PQ intersects with AB at M. RB is a tangent to the circle at B. PQ is produced to meet RB at R.



Given that PM=12cm, MB=4cm and BR=8cm, calculate the length of;

(a) MR (2 marks)

(b) AM (2 marks)

10. If $\begin{pmatrix} x & 5 \\ 2 & x-2 \end{pmatrix}$ is a singular matrix, find the possible value(s) of x. (3 marks)

11. Without using mathematical tables or a calculator, solve the equation. (3 marks)
$3\log 2-2=\log 32+2\log x$

12. The cash price of a car is sh.300 000. Mr. Maina decides to buy the car on Hire purchase terms by paying a deposit of sh. 100 000. Given that simple interest of 20% p.a is charged on the balance and Mr. Maina is required to repay by 36 equal monthly instalments, calculate the amount of each instalment.
(3 marks)

13. Onditi and Isaaka working together can do a piece of work in 6 days. Onditi working alone, takes 5 days longer than Isaaka. How many days does it take Isaaka to do the work alone? (3 marks)

14. A matrix is represented by the matrix $P=\begin{pmatrix} 2 & 1 \\ 0 & -2 \end{pmatrix}$. This transformation maps triangle ABC onto another triangle A'B'C' of area $20cm^2$. Find the area of triangle ABC. (3 marks)

15. Determine the deviation of the following set of numbers.
    7,5,10,6,3,2,9,12,20,8,5 (3 marks)

16. Determine the amplitude and period of the function $y=\frac{-3}{2}\sin(2x-60)^0$. (2 marks)

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SECTION II (50 MARKS)

Answer only FIVE questions from this section.

17. (a) Three quantities A,B and C are such that A varies directly as the square of B and inversely as the square root of C. Given that B increases by 5% and C decreases by 36%, find the percentage change in A.
(4 marks)

(b)If A=10 when B=15 and C=25. Find the value of A when B=20 and R=36. (2 marks)

(c) A quantity P is partly constant and partly varies inversely as the cube of Q. Given that when Q=0.5, P=850 and when Q=1, P=150, find the value of P when Q=10.
(4 marks)

18. The table below shows the income tax rates for the year 2015.

Taxable income (K£ p.a)	Rate (Ksh/K£)
1-5900	2
5901-11800	3
11801-16500	4
16501-22400	5
22401-27000	6
Over 27000	8

In the year 2015, Mr. Mogaka's monthly earnings were as follows:
Basic salary Ksh. 20,000
House allowance Ksh. 15,000
Medical allowance Ksh. 3,500
Transport allowance Ksh. 500
Mr. Mogaka was entitled to a monthly personal relief of sh. 1162 and an insurance relief of sh. 506. Every month the following deductions were made:
NHIF sh. 3000
Insurance premiums sh. 5000
Sacco shares contribution sh. 2000
Workers unions dues sh. 300
Calculate Mr. Mogaka's;
(a) Annual taxable income in K£. (2 marks)
(b) Monthly tax paid in Ksh. (5 marks)
(c) Net monthly income in Ksh. (3 marks)