NAME: ..... ADM NO: .....

SCHOOL: ..... DATE : .....

CANDIDATE'S SIGNATURE:.....

121
MATHEMATICS
TIME: 2½ HOURS

2016
FORM 2

Kenya Certificate of Secondary Education (KCSE)
MATHEMATICS
TIME: 2½ HOURS

INSTRUCTIONS TO CANDIDATES

a) Write your **Name, Index Number** and **School** in the spaces provided at the top of this page.
b) **Sign** and write the **date** of examination in the spaces provided above.
c) This paper contains **TWO** sections: section I and section II
d) Answer **all** the questions in section I and any **FIVE** questions from section II.
e) All answers and working **must** be written on the question paper in the spaces provided below each question.
f) Show **all** the steps in your calculations, giving your answers at each stage in the spaces provided below each question.
g) Marks may be given for **correct working** even if the answer is **wrong**.
h) Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where 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

SECTION 1: (50 MARKS)

Answer ALL Questions in this section

1. (4mks)

$$\frac{\left(-\frac{1}{2}\right)\div\left(-\frac{2}{3}\right)of--\left(4\frac{1}{2}\right)}{\frac{3}{4}-\left(2\frac{3}{4}\right)\div\frac{11}{8}}$$

2. The LCM and GCD of three numbers is 300 and 10 respectively. Two of the numbers are 100 and 60. Find all possible numbers that could represent the third number. (4mks)

3. Find the difference between 8,934,710,245M and 16,231,489M. (3mks)

4. (a) Arrange the prime numbers between one to ten in descending order. (1mk)

   (b) Four added to the number formed and test whether the resultant number is divisible by 11. (2mks)

5. Simplify: (4mks)

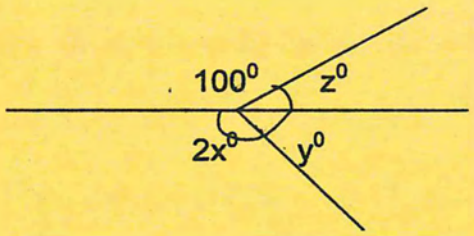
$$8^{\frac{2}{3}} \times \left(\frac{3}{2}\right)^{-3} \div \sqrt{\frac{64}{729}}$$

6. A square room is covered by rectangular stabs of sides 30cm by 21cm. Calculate the least possible area of the room in square metres. (3mks)

7. Convert -207.723 into a recurring decimal. (3mks)

8. Use factor method to find the cube root of 0.001331. (3mks)

Given that $y = \frac{1}{3}x$ and $z = \frac{1}{6}x$, Calculate the values of angles x, y and z. (3mks)



0. Use reciprocal table to find the values of $\frac{1}{0.152}$, hence evaluate $\frac{1}{0.152} \times \sqrt[3]{0.000210}$ (4mks)

1. The gradient of a line L which passes through points P(2x,6) and Q(1,x) is $\frac{4}{3}$. Find the equation of a line perpendicular of L and passes through Q. (3mks)

12. In a certain day, the bank rates for changing dollars to shillings are given below.

Currency	Buying	Selling
Dollar	78.43	79.25

After arriving in Kenya, an American tourist converted US dollars 1500 into shillings but on emergency case, he had to return to America immediately and he converted the shillings back to dollars using the same rates. How much did he lose? (3mks)

13. Use logarithm to evaluate:

$\left(\frac{0.5368\times(0.02593)^2}{0.009328}\right)$ Correct to 4 decimal places. (2mks)

14. Determine the smallest positive number such that 84,000k is a perfect cube. (2mks)

Without using mathematical tables or a calculator, evaluate:- (3mks)

$$\frac{0.030 + 0.09 \div 0.3}{9.8 \times 0.4 + 0.01}$$

Solve the equation: (3mks)

$3^{3x-1} \times 27^{x-1} = 6561$

SECTION II (50 MARKS)

Answer any five questions in this section

17. A(1,1), B(4,1), C(4,3) and D(1,3) are vertices of a rectangle A,B,C,D. The rectangle undergoes a reflection in the line y = -x.

(a) Draw the rectangle and its image on a Cartesian plane. (4mks)

(b) Write down the equations of the lines of the symmetry of the image A'B'C'D' formed in (a) above. (2mks)

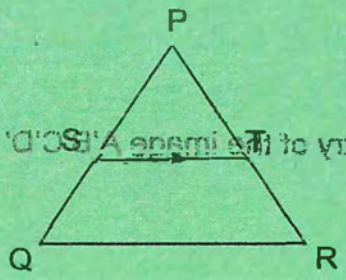
(c) A triangle has vertices at A(-4,6), B(-1,3) and C(-3,2). Find the co-ordinates of the image points under a rotation of 180^0 about (2,3). (4mks)

18. (a) Solve the simultaneous equations using graphical method (4mks)

$y - 2x = 1$

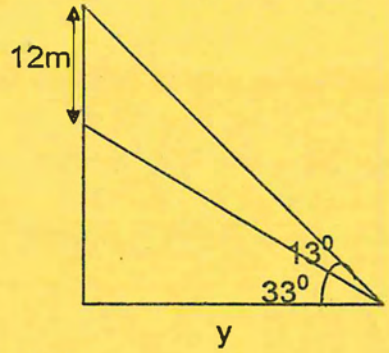
$y + x = 7$

(b) In figure below QR is parallel to ST, PT:TR = 7.5. Determine the ratio of the area of triangle PST to that of trapezium STRQ. (3mks)



(c) The image of the point A(6,7) under enlargement with scale factor 3 is (10,8). Find by calculation the centre of the enlargement. (3mks)

9. A fling pole 12m long is fixed on top of a tower. From a point on horizontal ground the angles of elevation of the top and bottom of the flag post are 460 and 330 respectively as shown.



Calculate

(a) The horizontal distance from the point on the ground to the base of the tower. (4mks)

(b) The total height of the tower and the flag. (2mks)

(c) The shortest distance from the point on the ground to:

(i) The top of the flag post. (2mks)

(ii) To the top of the tower. (2mks)

20. A slaughter house bought a number of sheep at sh. 1200 each and a number of oxen at sh. 15000 each. They paid a total of sh. 135,000. If they had bought twice as many sheep and three oxen less they would have saved sh. 15000.

(a) Find the number of each type of animals they bought. (6mks)

(b) The slaughter house sold all the animals at a profit of 30% per sheep and 35% per ox. Determine the total profit. (4mks)

1. The dimension of a rectangle are 5cm and 3cm.

(a) What is the new area of the rectangle if the dimensions are increased by 10%? (4mks)

(b) What is the percentage increase in the area? (3mks)

(c) If the length is increased by 15%, what is the percentage change in the area of the rectangle? (3mks)

12. Given that $\cos\theta = \frac{2}{\sqrt{5}}$, evaluate the following without use of mathematical tables: (10mks)

(a) $Sin\theta$

(b) $Cos^2\theta + Sin^2\theta$

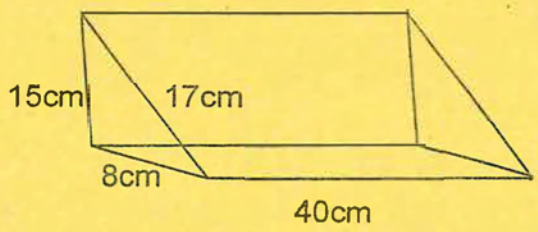
(c) $Tan\theta$

(d) $Tan^2\theta - Sin^2\theta$

(e) $Tan(90 - \theta)$

3. (a) The internal measurements of a wooden box with lid are 10cm by 8m by 7m. The wood is ½cm thick the external surface area of a box. If it costs sh. 30 to paint a square metre of the box, find the total cost of painting the outer surface of the box. (6mks)

(b) Find the volume of the triangular prism shown below.



24. The following table represents the number of kilograms of maize sold in a market.

Mass in kg	1 – 5	6 – 10	11 – 15	16 –20	21 – 25	26 – 30	31 – 35
Frequency							

(a) State the modal class. (1mk)

(b) Calculate the mean mass. (5mks)

(c) Calculate the median mark. (4mks)