

Name..... Index No.....

Candidate's Signature..... Date 17/08/2018



YESMARK EDUCATION CENTRE-THIKA

Kenya Certificate of Secondary Education (K.C.S.E)

Mock Examination 2018

121/1

MATHEMATICS

Paper 1

July/august 2018

2 ½ Hours

Instructions to candidates

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. The paper contains two sections: **Section I** and **Section II**.
4. Answer **All** the questions in **section I** and **strictly any five** questions **from Section II**.
5. All answers and working must be written on the question paper in the spaces provided below each question.
6. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
7. Marks may be given for correct working even if the answer is wrong.
8. Non-programmable silent electronic calculators and **KNEC** mathematical tables may be used, 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 the questions in this section in the spaces provided below each question

1. Without using mathematical table or calculator evaluate.

3marks

$$\frac{2\frac{3}{7}-4\frac{1}{5}}{4-(-3)^3} + 3 \text{ of } \frac{1}{35}$$

2. Find the equation of a mirror line such that $p_1(2, -3)$ is the image of $P(4, 7)$ under the reflection through this line. Express your answer in the form $ax + by = c$ where a, b, c are integers.

4marks

3. Using a pair of compasses and a ruler only construct a rhombus PQRS such that $PR = 8\text{cm}$ and angle $QPS = 60^\circ$. Hence state the length of QS

4marks

4. If the arc of a circle of length 6.35 cm subtends an angle of 0.85 radian at the circumference of the circle, calculate the area of the sector of the circle.

3marks

5. Find all the integral values of x that satisfy the following pairs of simultaneous inequalities

$$3 - x \leq 1 - \frac{1}{2}x \text{ And } -\frac{1}{2}(x - 5) \leq 7 - x$$

3mks

6. The cube root of $\frac{1}{T}$ varies jointly as P and inversely as the square of R . When $P = \frac{2}{3}$, $R = 2$ and $T =$

1.728. Determine the relationship between T , P and R .

(3marks)

7. Solve for θ in the equation $\sin 2(\theta + 40^\circ) = \cos \frac{3}{5}(\theta - 120^\circ)$ (3marks)

8. Without using a calculator or mathematical tables, evaluate $\frac{4^x \times (\sqrt{32})^x}{(256)^{\frac{1}{x}}} = 1$ (3marks)

9. The following data represents masses of certain animals.

Mass(kg)	$1.5 \leq x < 5.5$	$5.5 \leq x < 7.5$	$7.5 \leq x < 13.5$	$13.5 \leq x < 15.5$
Frequency	16	20	18	14

Determine the number of animals whose weight is below 11.5 kg

3marks

10. Korir and Anyango working together can cultivate a piece of land in 6 days. Anyango working alone takes 5 days longer than Korir. Find the number of days each working alone takes to cultivate the land. 3marks

11. A two digit number is such that four times the sum of its digits exceed the number by 3. The number is increased by 27 when the digits are reversed. Find the number. 3marks

13. Two similar solids weigh 18.75 kg and 1.2 kg. Given that the cross-sectional area of the smaller solid is 20.5 cm^2 , calculate the cross-sectional area of the larger solid. 3marks

14. Use square root and reciprocal tables only to evaluate x if $\frac{1}{x} = \frac{1}{\sqrt{16.8}} - \frac{1}{26.3}$ 3marks

6. A point P divides a line AB externally in the ratio 4:3. Given that A is (-2, 4) and point B (2, -3). Find the coordinates of P. (3marks)

15. Evaluate $\int_{-1}^2 \left(\frac{6x^3 + 14x^2 - 12x}{3x - 2} \right) dx$ (4marks)

16. A number P is the product of all the numbers between 100 and 210 that are both divisible by 5 and 11. A number Q is the number formed using the prime numbers from 0 to 9 in descending order. Get the product of PQ and hence perform the divisibility test of 11. 3mks

SECTION II (50 marks)

Answer any five questions in this section

17. A cylindrical water tank is of diameter 7m and height 2.8m.

a) Calculate the capacity of the water tank in litres.

3marks

b) Six members of the family uses 15 litres each day. Each day 80 litres are used for cooking and washing .A further 60 litres are wasted. Find the number of complete days a tank last the family.

3marks

c) Two of the family members were absent for 90 days .During the 90 days wastage was reduced by 20% but cooking and washing remained the same. Calculate the number of complete days a full tank would now last the family.

4marks

18. In a square PQRS, A is the mid-point of PQ and B is the midpoint of QR, while C is a point on BP such that $2BC = 3CP$. The coordinates of P, Q and S, are (4, 4) (14, 4) and (14, 14) respectively. Find:

a) PQ and PS

2marks

b) The coordinates of R

2marks

c) Show that A, C and S are collinear

5marks

d) Determine the ratio in which C divides AS

1marks

19. PQRS is a quadrilateral with coordinates P (1, 2), Q (2, 0), R (4, 1) and S (4, 3).

PQRS is mapped onto $P'Q'R'S'$ under transformation T given by a shear with x – axis invariant such that P' (5, 2).

- a) Determine the 2×2 transformation matrix representing T and hence determine the coordinates of Q', R' and S'. (3 marks)

- b) $P'Q'R'S'$ is transformed to $P''Q''R''S''$ under a transformation H such that P''(-5,-2) and S''(-10,-3)

Determine the 2×2 matrix representing H and hence determine the coordinates of Q'' and R'' (3marks)

- c) $P''Q''R''S''$ mapped onto $p'''q'''r'''s'''$ under a transformation V representing a reflection in the line $y = -x$

Determine the 2×2 matrix representing V and hence determine the coordinates of $p'''q'''r'''s'''$. (2 marks)

- d) Determine the single matrix that will map $p'''q'''r'''s'''$ back to PQRS (2 marks)

20. A stadium can fully maximize on the profits when 72 000 people are accommodated. Each row of seats in a row accommodates the same number of people. On a certain, 25 rows were defective and it was therefore decided that each of the remaining rows would squeeze in 40 more people for the stadium to have maximum number of people.

Calculate

a) How many people each row of seats holds.

5mks

b) The number of rows in the stadium.

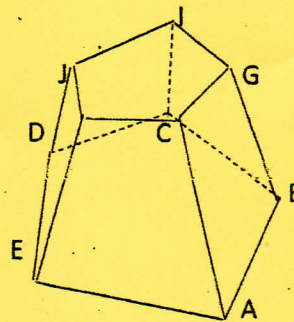
2mks

c) From the total tickets sale, a $\frac{1}{8}$ is used for the repairs of the defective rows and a $\frac{1}{7}$ of the remainder on other expenses. Khs 4 320 000 is left. Calculate the value of each ticket (4 marks)

21. A solid frustum with a pentagonal base is such that its top plane FGHIJ is of sides 6 cm each and the bottom plane ABCDE is of sides 12 cm each. If its height is 10 cm, Calculate to the nearest 2 significant figures:-

a) The length of the slant edge.

5marks



b) The surface area of the solid.

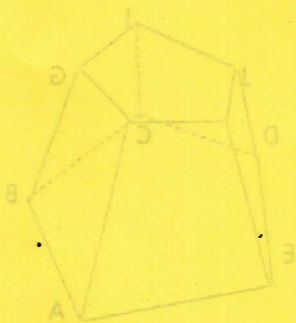
5marks

22. A cyclist leaves town A for town B at 11.15 am and travels at an average speed of 12km/h. Fifteen minutes later a bus leaves for town A from town B, arriving there at 12.00noon.

If town B is 25 km from town A, determine:-

a) When and where the cyclist met the bus.

4marks



b) The time at which the cyclist arrived at town B.

2marks

c) Where and when the cyclist was overtaken by the bus on its way back at the same average speed leaving at 12.30 pm.

4marks

23. a) Using mid-ordinate rule with 5 ordinates, estimate the area enclosed by the curve $y = x^2 + 2x$ and the x-axis for $-2 \leq x \leq 3$. 4marks

b) Find the exact area by integration. 3marks

c) Find the percentage error in the estimation in (a) above. 3marks

24. Given that PQRS is a rectangle, and P and Q are the points (4, 2) and (2, 8) respectively and the equation of the line PR is $y = x - 2$, find:

a) The equation of QR.

(3marks)

b) The coordinates of R.

(2marks)

c) The coordinates of S

(2marks)

d) The area of rectangle PQRS, leaving your answer in surd form

(3marks)

24. Given that PQRS is a rectangle, and P and Q are the points (4, 2) and (2, 8) respectively and the equation of the line PR is $y = x - 2$, find:

a) The equation of QR.

(3marks)

b) The coordinates of R.

(2marks)

c) The coordinates of S

(2marks)

d) The area of rectangle PQRS, leaving your answer in surd form

(3marks)