**CHOGORIA - MURUGI PRE – MOCK**

**2023 END OF TERM 1 EXAM**

**FORM 4 MATHEMATICS**

121/1

MATHS

PAPER 1

TIME: 2 ½ Hrs

**NAME: …………………………………………….ADM.NO: …………….CLASS: ..……….**

**CANDIDATE’S SIGNATURE: …………………………………DATE: …………………...**

**END OF TERM 1 2023**

**INSTRUCTIONS TO CANDIDATES.**

1. Write your name and admission number in the space provided at the top of this page.
2. This paper consists of two sections; section 1 and section II
3. Answer a;; questions in section 1 and only FIVE sections in section II
4. Show all the steps in your calculations; giving your answers at each stage in the spaces provided below each question.
5. Marks may be given for correct working even if the answer is wrong.
6. Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

**For Examiners use only.**

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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | TOTAL |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Total  |
|  |  |  |  |  |  |  |  |  |

**SECTION 1: ANSWER ALL QUESTIONS**

1. Simplify:

$\frac{1}{2}$ of $\frac{2}{5}$ $÷ \frac{3}{15 }$ + $\frac{7}{10}$ x $\frac{6}{7}$ - $\left(1 \frac{1}{2} x \frac{1}{3}\right)$ (3mks)

1. Three bells ring at intervals of 40 minutes, 45 minutes and 60 minutes. If they ring simultaneously at 6.30am, at what time will they ring next together? (3mks)
2. Two of the interior angles of a polygon are 95o and 115o. The rest are 150o each. Find the number of sides of this polygon. (3mks)
3. Solve for x in the equation

$32^{\left(x-3\right)}$ $÷$ $8^{\left(x-4\right)}$ = 64 $÷$ $2^{x}$ (3mks)

1. Use reciprocal tables to evaluate

1 $÷$ $\frac{1}{7.31}$ + $\frac{1}{7.934}$ (3mks)

1. Find the equation of the line L1 in the form y = mx +c which is perpendicular to the line 3y + 2x = 6 and passes through the point (-3, 4). (3mks)
2. Find x if cos (3x – 30o) = sin (7x + 50o) (3mks)
3. Solve the following simultaneous equations by substitution method. (3mks)

3x + 2y = -3

X + 3y = 6

1. The length of an arc of a circle is $\frac{1}{5}$th of its circumference. If the area of the circle is 346.5cm2. find
2. The angle subtended by the arc at the centre of the circle. (1mk)
3. The area of the sector enclosed by the arc. (2mks)
4. A car dealer charges 10% commission for selling a car. If he received a commission of ksh 27,500 for selling a Toyota Mark X, calculate the amount of money that the owner received from the sale of his car if the dealer added an extra charges of 5%. (3mks)
5. Three men working for 8 hours a day take 6 days to dig a trench 9 metres long. How long would 5 men working 4 hours a day take to dig a trench 45 metres long. (3mks)
6. The coordinates of P and Q are (6, 5) and (2, 3) respectively. Find to one decimal place the magnitude of 2$\vec{PQ}$. (3mks)
7. Simplify:

$\frac{2y^{2}-3xy-2x^{2}}{4y^{2}-x^{2}}$ (3mks)

1. From the top of a cliff 100m high, the angles of depression of two boats A and B in a horizontal plane from the observer are 25o and 47o. Calculate the distance between the two boats. (4mks)
2. A rhombic cardboard whose diagonals are of lengths 16cm and 12cm is to be surrounded by a golden chain. Calculate the length of the chain enough to surround it just once. (3mks)
3. (a) Using a pair of compasses and ruler only construct triangle PQR in which PR = RQ = 4cm and angle QPR = 30o using line PQ as base. (2mks)

(b) A pint T is always on the same side of PQ as R and angle PRQ = 2$<$PTQ. Construct the locus of T and describe it. (2mks)

**SECTION B: ANSWER ANY FIVE QUESTIONS**

1. (a) United Millers imports wheat from USA at initial cost of 350 US dollar per tone. The shipping costs and customs duty are then charged as 25% and 15% of cost price respectively. When the wheat reached Mombasa an 8% of the initial cost is incurred to transport it to Kisumu.
2. Given that 1 US dollar = ksh 82.40. Calculate the initial cost of importing 5 tonnes of wheat in ksh. (5mks)
3. The United Millers intend to make a profit of 25%. Giving your answer to the nearest 10 cents, Calculate the price at which a 2kg packet of wheat should be sold. (3mks)
4. How much profit shall the company realize from the sale of 1 tone of wheat? (2mks)
5. The points P (1,5), Q(2,2), R(1,1) and S (4,2) are the vertices of a quadrilateral PQRS.
6. On the grid provided, draw the quadrilateral PQRS. (2mks)



1. On the same grid draw P1Q1R1S1 the image of PQRS under a rotation of positive quarter turn about the origin. State the coordinates of$ P^{1 }Q^{1} R^{1} $and $S^{1}$. (3mks)
2. The points $P^{11}Q^{11}R^{11}S^{11}$are the image of $P^{1 }Q^{1} R^{1}S^{1}$ under a reflection in the x – axis on the same grid, draw quadrilateral $P^{11}Q^{11}R^{11}S^{11}$ and state its coordinates.

 (3mks)

1. Quadrilateral $P^{11}Q^{11}R^{11}S^{11}$ is the image of PQRS under certain reflection. On your graph draw the mirror line LL for the reflection and state its equation. (2mks)
2. A line L1 whose equation is 6x + 2y + 5k = 0 passes through the point (-3,-1) and it is perpendicular to L2 whose equation is 2px + 9y = 10.

Find;

1. The value of k and p (4mks)
2. The equation of a line L3 which is parallel to L2 in the form ax + by = c. (3mks)
3. The obtuse angle with which line L2 makes with x – axis. (3mks)
4. In the figure below, ABCD is a cyclic quadrilateral and that angle ABD = 42o and angle BAC = 58o and angle DBC = 36o. Giving reasons, find the values of:

C

A

B

E

D

1. $<$ DAC (2mks)
2. $<$ADB (2mks)
3. $<$ACD (2mks)
4. $<$CDB (2mks)
5. $<$CEB (2mks)
6. A passenger train travelling at 25 km/h is moving in the same direction as a lorry travelling at 30km/h. The railway line runs parallel to the road and the lorry takes 1 ½ minutes to overtake the train completely.
7. Given that the lorry is 5 metres long, determine the length of the train in metres. (6mks)
8. The lorry and the train continue moving parallel to each other at their original speeds. Calculate the distance between them 4 minutes and 48 seconds after the lorry overtakes the train. (4mks)
9. The table shows marks obtained by 100 candidates in Thigaa secondary school in mathematics examination.

|  |  |
| --- | --- |
| **Mark**  | **Frequency**  |
| 15 – 24 | 6 |
| 25 – 34 | 14 |
| 35 – 44 | 24 |
| 45 – 54 | 14 |
| 55 – 64 | X |
| 65 – 74 | 10 |
| 75 – 84 | 6 |
| 85 - 94 | 4 |

1. Determine the value of x (2mks)
2. State the modal class (2mks)
3. Calculate the median mark (2mks)
4. Calculate the mean mark (5mks)
5. A number of people agreed to contribute equally to buy books worth ksh 1200 for a school library. Five people pulled out and so the others agreed to contribute an extra shs 10 each. Their contributions enabled them to buy books worth sh 200 more than they originally expected.
6. If the original number of people was x, write an expression of how much each was originally to contribute. (1mk)
7. Write down two expressions of how much each contributed after the five people pulled out. (2mks)
8. Calculate the number of people who made the contribution. (5mks)
9. Calculate how much each contributed. (2mks)
10. (a) Find the range of value of x which satisfy the following inequalities simultaneously.

 (3mks)

 4x – 6 $\geq $ x – 12

8 – 3x $>$ 2x - 7

 (b) Represent this range of values of x on a number line. (1mk)

 (c) By drawing appropriate straight lines and shading the unwanted region, illustrate on

 graph paper the region which satisfies all the inequalities, given (6mks)

1. 2y + 5x $\geq $ 10
2. 2y – x $>$ 2
3. y $\leq $ 5

