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 MATHEMATICS
 PAPER 1
 $2\frac{1}{2}$ Hours

MBOGO HIGH SCHOOL
 MOCK SET 1 2022
 UGANDA CERTIFICATE OF EDUCATION
 MATHEMATICS
 PAPER 1

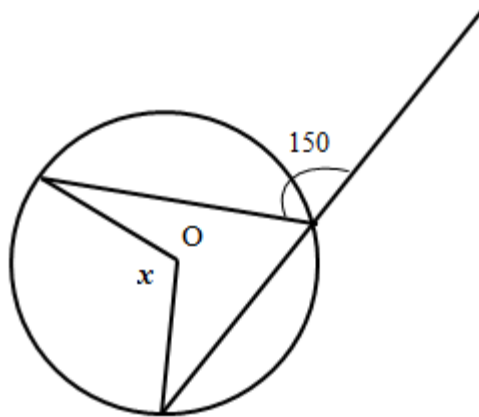
INSTRUCTIONS TO CANDIDATES:

- *Attempt all questions in sections A and only FIVE questions in section B*
- *Simple, silent Non programmable calculators may be used*
- *All necessary working must be shown on the same sheet of paper as the rest of the answer*

SECTION A: (40 MARKS)

1. Factorise $mn + 2m - 9n - 18$ (4marks)
2. Given that; $m \# n = n^2 - m^2$. (4marks)
 Find the values of k for which $\sqrt{6} \# k = 30$ (4marks)
3. Make x the subject of $n = \frac{360}{180-x}$ hence find x when $n = 12$ (4marks)
4. Given that $\mathbf{X} = \begin{pmatrix} x-1 & 4 \\ 3 & 2 \end{pmatrix}$ and matrix X is a singular matrix, find the value of x (4marks)
5. Use an assumed mean of 120 to find the mean of the values:
 105, 110, 115, 120, 125, 130 (4marks)
6. A ladder 4m long leaning against a wall. The ladder reaches 3.4m up the wall. What is the angle between the wall and the ladder? (4marks)

7. Two coins are tossed together. What are the following probabilities (H = head)
- $P(\text{one H})$
 - $P(\text{at most one H})$ (4marks)
8. Given O as the center of the circle, find the lettered angle x in the figure below. (4marks)



9. Use mathematical tables to find the two possible values of ϕ for which $\cos \phi = -0.6374$; in the range $0^\circ \leq \phi \leq 360^\circ$ (4marks)
10. Solve for y in the equation: $2y^2 - 3y - 5 = 0$ (4marks)

SECTION B (60 MARKS)

11. Copy and complete the table below for the masses of expectant mothers who visited an antenatal clinic during a certain month.

<i>Mass (kg)</i>	<i>Mid- class Mass (x)</i>	<i>Frequency (f)</i>	<i>fx</i>
45 - 49	47	2	94
50 - 54	52	11	
55 - 59	57		798
60 - 64			1860
65 - 69		21	
70 - 74		19	
75 - 79			616
80 - 84		3	
85 - 89		1	
90 - 94		1	
$\sum f = 110$			$\sum fx =$

- (a) State (i) Modal class
(ii) The class interval
- (b) Calculate the mean mass.
- (c) Find the median mass (12marks)
12. On the same axes, draw the graphs of $y = 2 \cos \frac{1}{2}x$ and $y = \sin x$ for $0^\circ \leq x \leq 360^\circ$. Hence find the values of x that satisfy the equation $2 \cos \frac{1}{2}x = \sin x$. (12marks)

13. (a) Given that $P = \begin{pmatrix} 2 & 8 \\ 1 & 5 \end{pmatrix}$ and $PR = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$. find the matrix R
(8marks)

(b) given that matrices $M + tN = R$ such that,

$$\begin{pmatrix} 3 & 4 \\ 1 & 8 \end{pmatrix} + t \begin{pmatrix} 3 & p \\ 0 & 2 \end{pmatrix} = \begin{pmatrix} 12 & 16 \\ q & 14 \end{pmatrix}. \text{ Determine the values of } t, p \text{ and } q$$

(4marks)

14. Using a ruler, pencil and a pair of compasses only,
 (i) Construct a triangle **ABC** in which $\overline{AB} = 3\text{cm}$, $\overline{BC} = 5\text{cm}$ and angle $ABC = 120^\circ$
 (ii) Through C construct a line perpendicular to AB, to meet $\overline{AB}$ produced at N
 (iii) Measure $\overline{CN}$ and calculate the area of $\triangle ABC$ (12 marks)
15. A helicopter flew from Entebbe to Luwero at a bearing of 060° for 470km. from Luwero it sets off at a bearing of 120° and after covering a distance of 290km the pilot realized that he took a wrong direction and changed a course to fly directly for Masaka at a bearing of 215° for 440 km.
 (a) Using a scale of 1 cm: 50km draw an accurate diagram showing the course of the plane.
 (b) How far and at what bearing is Masaka from Entebbe?
 (c) If the speed of the plane is 200kmhr^{-1} , find how long it will take to move from Entebbe via all those towns to Masaka.
 (12 marks)
16. Three points $P(2, 3)$ $Q(5, 3)$ $R(3, -4)$ are vertices of a triangle, $P^1 Q^1 R^1$ are images of PQR under a positive half turn.
 (i) Plot PQR and its image on a graph paper
 (ii) $\triangle P^1 Q^1 R^1$ is further transformed by a translation vector $T = \begin{pmatrix} 3 \\ 6 \end{pmatrix}$.
 State the coordinates of $P^{11} Q^{11} R^{11}$ the image of $P^1 Q^1 R^1$
 (12marks)

17. (a) A box contains 5 red, 6 blue and 7 green beads. One is selected at random; what is the probability that it is
- (i) Red
 - (ii) Blue
 - (iii) Green
- (b) A basket contains 6 mangoes, 4 tomatoes and 3 oranges, 2 fruits are selected from the basket at random
- (i) Find the probability that the two (2) fruits are oranges
 - (ii) Find the probability of selecting one mango; one orange and one tomato (assume selection is done with replacement)
- (12marks)

END