456/1
MATHEMATICS
Paper 1
2023
$2\frac{1}{2}$ *hours*

EXAMINATIONS BOARD

Uganda Certificate of Education

PRE - MOCK EXAMINATIONS SET 1 – 2023

MATHEMATICS

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

Answer **ALL** *questions in Section* **A** *and* ***not more than*** **FIVE** *from section* **B**.

Any additional question(s) answered will not be marked.
All necessary calculations must be shown and should be done on the same page as the rest of the answer.

Mathematical tables and graph papers are provided.

Silent, non-programmable scientific calculators may be used.

SECTION A (40 MARKS)
Answer all questions in this section.

1. Given that a * b = $\frac{(3a-b)^2}{a}$, evaluate (5*5) * 5. (4 marks)

2. Make the subject of the formula $t = 20 - \frac{a-b^2}{a}$ (4 marks)

3. The number of goals scored by a school netball team in various matches are given below.

1	3	4	5	4	6	4	7	8	9
3	5	4	3	4	2	3	6	7	8
7	5	4	3	2	1	4	3	4	4

Represent the above information on a histogram (4 marks)

4. Given T = $\begin{pmatrix} 1 & 2 \\ -3 & -2 \end{pmatrix}$ and TA = $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, find matrix A. (4 marks)

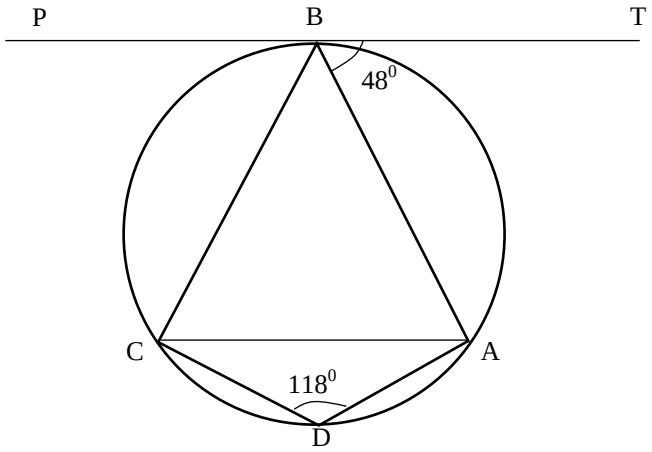
5. A one , two and three-digit number is formed using the numerals 2, 3and 7 without repeating any numeral.

(a) Write down the possibility space (2 marks)

(b) Find the probability that the number formed is a prime number. (2 marks)

6. In the figure shown, PBT is tangent to the circle at B. <ABT = 48^0 and <ACD = 118^0. Find (i) <ABC

(ii) <BAC (4 marks)



7. Under an enlargement of centre (2, 1) the image of P(1, -1) is P'(4, 5). Determine the scale factor of the enlargement. (4 marks)

8. Use factors to solve the equation x(x+2) = 3 (4 marks)

9. Solve the inequality

$$\frac{x+3}{3} - \frac{x+2}{2} < \frac{x+4}{4}$$

(4 marks)

10. A woman of height 1.4 m is 18 m from the foot of a tree. When she looks at the top of the tree, the angle of elevation is 32^0. Determine the height of the tree. (Give your answer to one decimal place). (4 marks)

SECTION B

Attempt five questions

11. Three ships A, B and C are such that B is 120 km from A on a bearing of 060^0. The bearing of C from A is 150^0 and the bearing of C from B is 170^0. Calculate

(a) The distance between A and C

(b) The distance between B and C

(c) The bearing of ship A from ship C. (12 marks)

12. (a) Given that $\begin{pmatrix} x & y \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ -y \end{pmatrix} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$

Find the possible values of *x* and *y*. (6 marks)

(b) The total cost of 2 pens and 3 rulers is Sh. 8000. Five similar pens cost Sh. 3000 more than the cost of one ruler.

(i) Write down two equations to describe the two purchases.

(ii) Find the cost of one pen and one rule. (6 marks)

13. The table below shows the marks obtained in a chemistry test.

Marks	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Number of students	2	8	14	26	28	10	4

a) i) Draw a histogram to represent this data.

ii) Estimate the mode from the histogram (05 marks)

b) Using an assumed mean of 64.5, calculate the mean mark. (07 marks)

14. Using a pencil, a ruler and a pair of compasses only.

a) i) Construct a triangle PQR in which PQ = 8.6 cm, QR = 9.2 cm and angle PQR = 75^0.

ii) Measure angle QPR

b) i) Construct a circle touching which all the points P, Q, R of the triangle PQR.
ii) Measure the radius of the circle
iii) Calculate the area of the circle use. ($\pi = 3.142$). (12 marks)

15. a) Copy and complete the table below for the function $y = x^2 - 4x + 3$

x	**-1**	**0**	**1**	**2**	**3**	**4**	**5**
x^2		0	1		9		
-4x		0	-4		-12		
+3		+3	+3		+3		
Y		3	0		0		

(04 marks)

b) Using 2 cm to represent 1 unit on both axes, draw a graph for the function $y = x^2 - 4x + 3$ (03 marks)
c) Use the graph to solve the equation $x^2 - 5x + 3 = 0$ (05 marks)

16. Rectangle OPQR was transformed into a parallelogram O'P'Q'R' by the matrix M = $\begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}$ where O'(0, 0) P'(6,3) Q'(8,7) R'(2, 4).
Find the
a) Matrix which maps the parallelogram O'P'Q'R' back onto the rectangle OPQR. (03 marks)
b) Coordinates of OPQR. (03 marks)
c) Area of the rectangle OPQR and hence the area of the parallelogram O'P'Q'R. (06 marks)

17. Alinda intended to buy x kg of rice and y kg of beans. The total mass of rice and beans was at least 10kg. The cost of rice was shs 3000 per kg while that of beans was shs 2000 per kg. She intends to buy at least more rice than beans and she has only shs 30000 to spend.
a) Write down three inequalities to represent the given information. (3 marks)
b) Represent the inequalities above on a graph. (4 marks)
c) Find the maximum mass of each commodity Alinda bought and how much money did she spend? (5 marks)