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MATHEMATICS
Paper 1
JULY/AUGUST
2 ½ hours

ELITE EXAMINATION BUREAU MOCK 2019

Uganda Certificateof Education

MATHEMATICS

PAPER1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

- *Answer all questions in section A and not more than five from section B.*
- *All necessary calculations must be shown and should be done on the same page as the rest of the answers.*
- *Mathematical tables and graph papers are provided.*
- *Silent, non – programmable scientific calculators may be used.*

SECTION A (40 MARKS)

1. Find the least integral valueof $\frac{x+1}{4} - \frac{x}{4} < \frac{1}{6}$. (4 marks)

2. If $(1 \quad 3 \quad 2)\begin{pmatrix} 4 & 3 \\ x & 2 \\ 10 & y \end{pmatrix} = (39 \quad 25)$, find the value of **x** and **y**. (4 marks)

3. Solve X – 6 = 2y and 3y – 2x = 5. (4 marks)

4. Make X the subject of the formula. $M = \sqrt[3]{\frac{a - x^2}{y}}$ (4 marks)

5. Two dice are thrown once. Find the probability that both dice show an even number. (4 marks)

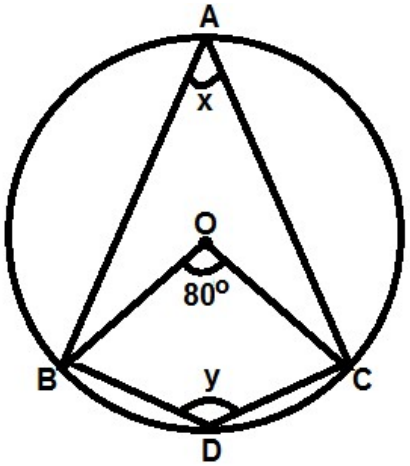
6. Given that $5\cos\propto = 4$ and $\propto$ is an acute angle. Find $5\sin\propto + 4\tan\propto$ (4 marks)

7. With an illustration, find the matrix corresponding to the reflection in the line, **y = -x**. (4 marks)

8. Simplify as much as possible: $\frac{X^2 + 6x - 16}{X^2 + 5x - 14}$. (4 marks)

9. Form a quadratic equation whose solution set is {2, 3}. (4 marks)

10. Find the value of **x** and **y**. (4 marks)



SECTION B (60 MARKS)

11. The table below shows marks scored by senior four students in a Biology test in a certain school.

Score	fx
41 – 48	222.5
49 – 56	787.5
57 – 64	1452
65 – 72	753.5
73 – 80	918
81 – 88	253.5

a) State the model class.

b) Calculate:

i) The mean score.

ii) The median score of the information.

iii) The modal score. (12 marks)

12. a) A transformation maps (1, 2) onto (-1, 4) and (2, 3) onto (-1, 7).

i) Find the matrix of this transformation.

ii) Determine the image of (3, 0) under this transformation.

b) ABC is a triangle whose vertices are A(2, 2), B(6, 4) and C(2, 6). ABC is enlarged using a scale factor of -1.5 about the origin to form A'B'C'. A'B'C' is then rotated through 90^{0} about the origin to form A"B"C".

i) Write down the matrices for enlargement and rotation.

ii) Use your matrices above to determine the coordinates of A'B'C' and A"B"C".

iii) Find the single matrix which maps A"B"C" back onto ABC.

(12 marks)

13. A helicopter is at airport H on a bearing of 060^{0} and 800km from another airport P. A third airport J is on a bearing of 135^{0} and 1450km from H.

a) Using a scale of 1cm to represent 100km;

i) Show the relative positions of P, H and J.

ii) Determine the distance between P and J.

iii) What is the bearing of p from J?

b) A jet flying at a speed of 620km/hr left J towards P. At the same time the helicopter at H took off towards P. Find the speed at which the helicopter will fly so as to arrive at P, 50 minutes earlier than the jet.

(12 marks)

14. a) Draw the graph of $y = 2x^2 + 5x - 3$ for $-4 \leq x \leq 1$. (Use scales of 1cm to 1 unit and 2cm to 1 unit on the y – axis and x – axis respectively)

b) Use the graph to solve the equations.

i) $2x^2 + 5x - 3 = 0$

ii) $x^2 + 2x - 2 = 0$ (12 marks)

15. A supplier supplies bread, milk and fish weekly to 3 families A, B and C as follows;

Family A; 2 loaves of bread, 3 litres of milk and 1 fish,

Family B; 2 litres of milk and a loaf of bread and

Family C; 2 fish, 2 loaves of bread and a litre of milk.

a) Write down a 3 x 3 matrix that represents all items for each family supplied in the first 2 weeks.

b) If the supplier supplied milk at Shs 500 per litre, bread at Shs 2,000 per loaf and Shs 1,500 per fish, write down a 1 x 3 cost matrix.

c) By multiplying the above matrices calculate how much each family pays in 2 weeks.

d) If the prices of each item increased by 20% by the end of 2nd week, how much more would the supplier earn in the third week than in the second week? (12 marks)

16. Using a ruler and a pair of compasses only construct;

A line $\overline{PQ}$, 8m long. On the line construct triangle PQR such that $\angle QPR = 75^0$ and line $\overline{PR}$ = 7cm. Measure $\overline{QR}$.

a) Construct a circumcircle of triangle PQR and measure its radius.

b) Calculate the difference in area between the circle and triangle PQR.

17. Water is drawn to fill an empty tank whose capacity is 1200 litres using two types of buckets. It requires at least **30** type **A** buckets and **50** type **B** buckets to fill the tank. Two type **A** buckets are required to fill at most three type**B** buckets. Each type **B** bucket has a capacity of not more than 20 litres.

a) Taking **X** litres and **Y** litres to represent the capacity of each type **A** bucket and each type **B** bucket respectively, write down inequalities to represent the above. Information.

b) Use graphical method to determine the minimum capacity of each type of bucket.

END