456/1
MATHEMATICS
PAPER 1
July/August
2½ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

MATHEMATICS

Paper 1

2hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

- *Answer **all** questions in section A and any five questions from section B.*
- *Any additional question(s) answered will not be marked.*
- *All necessary calculations **must** be done in the same answer booklet/sheets provided, with the rest of the answers. Therefore no paper should be given for rough work.*
- *Graph paper is provided.*
- *Silent non-programmable scientific calculators and mathematical tables with a list of formulae may be used.*

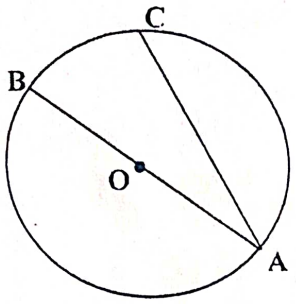
SECTION A (40 marks)

Answer **all** *questions in this section*

1. Determine the value of x in the equation $(250 \times 0.1)^{3x} - 5^{(2x+1)} = 0$ (4 marks)

2. Given that $\tan\theta = 4\frac{4}{9}$. Find without using mathematical table or calculations the value of $\sin\theta$. (4 marks)

3. From the same shop, Kato spent Shs. 3,500 to buy 2 books and 3 pens. Waswa spent Shs. 5,500 to buy 4 books and 3 pens. Determine the price of each book and each pen. (4 marks)

4. 

The figure shows a circle of radius 10cm with centre at O. $\overline{BC}$=12cm.

Find: (i) $\overline{AC}$ (2 marks)

(ii) $\angle ABC$ (2 marks)

5. The mean of; k, 3, 4, 4k, 9, 5k is 6.

Determine:- (a) Value of k. (2 marks)

(b) The median. (2 marks)

6. Solve the equation; $x^2 = 15 - 2x$. (4 marks)

7. The points A (2,0) and B (0, 2) are rotated through -90^0 to form A^1 and B^1. Determine the coordinates of A^1 and B^1. (4 marks)

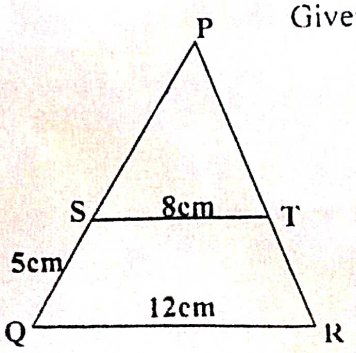
8. Using matrix method, solve the equations:

$2x - y = 5$

$3x + 2y = 4$ (4 marks)

9. In the figure below, $\overline{ST}$= 8cm, QR = 12cm and QS = 5cm.

Given that QR is parallel to ST. Find the length $\overline{PS}$. (4 marks)



10. Without using tables or calculators, evaluate $\dfrac{75.63^2 - 24.37^2}{512.6}$ (4 marks)

SECTION B (60 marks)

Attempt any **five** *questions from this section. All questions carry equal marks.*

1. The table below shows marks obtained in a Geography test by 50 students of a school in Wakiso District.

33	45	69	52	72	40	32	35	56	30
41	20	31	66	29	49	34	50	39	47
52	43	50	61	59	53	44	58	85	57
68	55	62	75	37	63	52	64	46	65
54	48	38	42	51	67	77	88	55	78

(a) Construct a frequency table for the data above starting with 20 – 29. (7 marks)

(b) Using a working mean of 44.5. Calculate the mean. (2 marks)

(c) Draw a histogram and use it to estimate the modal mark. (3 marks)

2. The seats in a stadium are graded as first, second and third classes. The categories of people who go to watch the matches are children and adults.

One day, the stadium seats were filled as below:-

First class seats were occupied by 1,500 children and 2,000 adults, second class seats were occupied by 3,000 children and 2,500 adults, while third class seats were filled by 500 children and 1,800 adults.

First class children and adults are charged Shs.2,000 and 2,500respectively, second class children and adults are charged Shs.1,000 and Shs.1,500 respectively, while third class children and adults are charged Shs.500 and Shs.1,000 respectively.

(a) Form a 1 x 3 matrix showing how the three classes of seats were filled by;

(i) Children. (1 mark)

(ii) Adults. (1 mark)

(b) Use matrix multiplication to obtain the collections by the stadium managers from:

(i) Children only. (4 marks)

(ii) Adults only. (4 marks)

(c) Hence obtain the total collections by the stadium managers from the match that day. (2 marks)

13. A business man wants to stock two types of vehicles P and Q in his bond. The cost of type P is Ugx 20million each and that of type Q is Ugx100 million each. Vehicles P requires packing space of $20m^3$ and Q requires packing space of $30m^3$. The number of vehicles of type Q should not exceed that of type P. The business man has atleast Ugx800 million to invest and available space of $600m^2$. If x and y represent number of vehicles of type P and Q respectively.

(a) Write down **five** inequalities from the given information. (4 marks)

(b) Represent the **five** inequalities on the same axes. (6 marks)

(c) Find the greatest number of vehicles of both types P and Q that the investor can buy using the minimum amount of money. (2 marks)

14. (a) Copy and complete the table below for $y = \sin 2\theta$. (4 marks)

θ	0	15^0	30^0	45^0	60^0	75^0	90^0	105^0	120^0	135^0	150^0	165^0	150^0
2θ	0	30^0					180^0					230	
Sin 2θ	0	0.5					0					-0.77	

(b) Use the completed table to draw the graph for: $y = \sin 2\theta$ for $15^0 \leq \theta \leq 180^0$. (2 marks)

(c) Use your graph to solve the equation;

(i) $\sin 2\theta = 0.5$

(ii) $\sin 2\theta = 1$

(6 marks)

Turn Over

15. Two dice are tossed and the product of the numbers that appear upper most is recorded as in the table below:-

Die 1

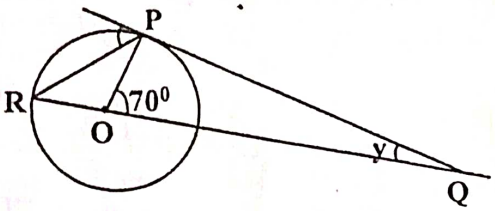
Die 2	X	1	2	3	4	5	6
	1	1					
	2						12
	3						
	4					20	
	5		10				
	6			18		30	

(a) Copy and complete the table. (4 marks)

(b) Find the probability that the product is a multiple of 5. (4 marks)

(c) Find the probability that the product is a triangular number. (4 marks)

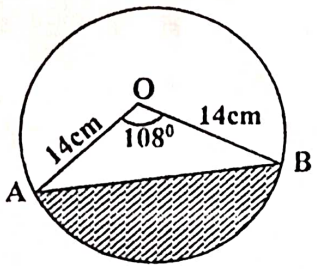
16. (a)



In the diagram above, PQ is a tangent to the circle with centre O and angle POQ = 30^0. Find the size of angle x and y.

(6 marks)

(b)



The diagram shows a circle with an arc which subtends an angle of 108^0 at the centre of the circle of radius 14cm.

Find the areas of:-

(i) triangle OAB.

(ii) minor sector OAB.

(iii) hence the area of the shaded segment.

(6 months)

17. A triangle with coordinates P(-5, 2), Q(-1, 2) and R(-2, 6) is rotated through 90^0 about the origin to form P' Q' R'. P' Q' R' is then reflected along the line $x + y = 0$ to form P'' Q'' R''.

(a) State the matrix for; (i) rotation.
(ii) Reflection.

(2 marks)

(b) Use your matrices above to determine the coordinates of ;

(i) P' Q' R'.

(ii) P'' Q'' R''.

(6 marks)

(c) Find the matrix which maps PQR on to P'' Q'' R''.
Hence describe the transformation. (4 marks)

END