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Mathematics
Paper 1
July - August, 2022
2 ½ hours

UGANDA MUSLIM TEACHERS' ASSOCIATION

UMTA JOINT MOCK EXAMINATIONS 2022

UGANDA CERTIFICATE OF EDUCATION

Mathematics

Paper 1

2 hours 30 minutes

Instructions to candidates:

- *Answer all questions in section **A** and not more than **FIVE** questions from section **B**.*
- *All questions in section **B** carry equal marks.*
- *All necessary calculations must be done on the same answer sheets provided.*
- *Graph papers will be provided.*
- *Scientific, non-programmable calculators and mathematical tables may be used.*

SECTION A (40 MARKS)

Attempt all questions in this section

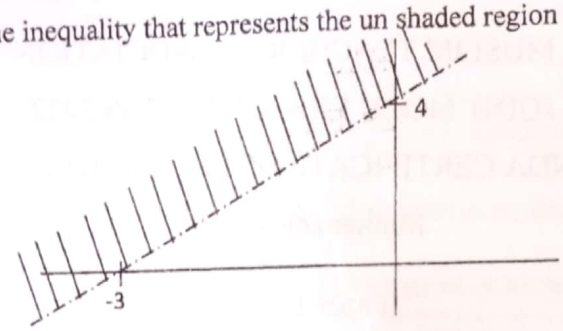
1. Make r the subject of the formula

$$V=\frac{r^2}{(r-t)\ (r+t)}$$ (4 marks)

2. Given that $a*b=a^2-3b^2$, evaluate $2*(5*-3)$ (4 marks)

3. Given that $A=\begin{pmatrix}-2 & 2\\ 1 & 0\end{pmatrix}$ .Find the inverse of A^2 (4 marks)

4. Determine the inequality that represents the un shaded region in the diagram below



(4 marks)

5. Factorize $2x^2-13x-7$. Hence solve the equation $2x^2-13x-7=0$ (4 marks)

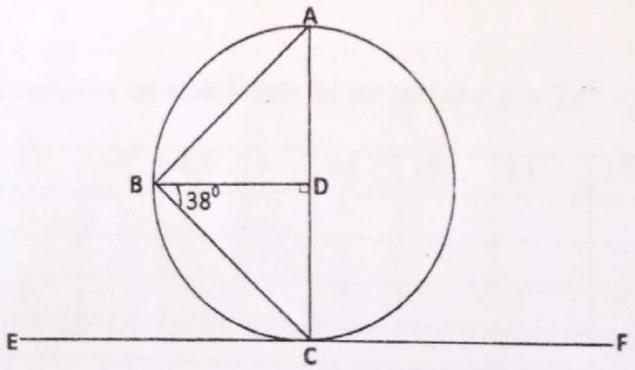
6. The mean of seven numbers is 20. When five numbers are added to the original seven numbers, the new mean is 15. Find the mean of the five numbers. (4 marks)

7. By matrix methods solve the equations

   $5b+3a-1=0$ ..... (i)

   $2a-b+8=0$ ..... (ii)

8. In the figure below AC is the diameter of the circle. EF is a tangent to the circle at C.



Find the size of angle

(i) ABD

(ii) BDC (4 marks)

9. A bag contains 5 red beads 3 white beads and 4 blue beads. Two beads are taken out at random from the bag one after the other and without replacement.

Find the probability that the two beads are of the same color (4 marks)

10. Under the matrix transformation, $\begin{pmatrix} 1 & x \\ y & -4 \end{pmatrix}$ the image of (2,-3) is (-10,4) .Find that value of x and y. (4 marks)

SECTION B

Answer any five questions from this section .All questions carry equal marks

11. The table below shows the weights of 100 children measured in kgs

Weight(kg)	Number of children
10-14	05
15-19	09
20-24	12
25-29	18
30-34	25
35-39	15
40-44	10
45-49	06

(a) Calculate the mean weight using 27 as the working mean

(b) Draw the cumulative frequency curve and use it to estimate the median weight (12 marks)

12(a) Copy and complete the table below for the equation $y = 2x^2 - 3x - 7$

x	-1.5	-1.0	-0.5	0	0.5	1.0	1.5	2.0	2.5	3.0
$2x^2$										
$-3x$										
-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
y										

(b)Using scales 2cm to 1 unit on the X-axis and 1cm to 1 unit on the y-axis draw the graph for $y = 2x^2 - 3x - 7$

(c) Use your graph to solve the equation $2x^2 - 3x - 8 = 0$ (12 marks)

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

(a) Construct a triangle PQR in which PQ=3cm, QR=5cm and angle PQR =120°

(b) Through R, construct a perpendicular to meet PQ produced at S.Measure RS and calculate the area of triangle PQR.

(C) Circumscribe triangle PQR and find the area of the circum circle. (12 marks)

14. Four traders A, B, C and D made the following orders of three items from a super market

Traders	**2kg tins of Blue band**	**3litrwe Jerry can of cooking oil**	**1kg tin of assorted biscuits**
A	10	20	03
B	05	15	04
C	20	05	10
D	04	30	02

The prices of the tin of blue band, cooking oil and assorted biscuits at the time of ordering were shs 2800, shs 5500 and shs 5000 respectively. Due to inevitable circumstances, the orders delayed to be handled and by the time they were handled the prices had changed to shs.3000, shs 6500 and shs.6000 respectively.

(a)(i)Write down a 3× 4 matrix for the orders made

(ii) Write down a 3× 2 *matrix* for the cost

(b) Find how much more each trader had to pay after the increase in prices. (12marks)

15. To start a parking business, Mr. Musoke needs at least 5 buses and at least 10 Lorries, He does not need to have more than 30 vehicles altogether. A bus requires 3 units of space and a lorry requires 1 unit of space. There are 54 units of space available If x and y are the number of buses and Lorries respectively,

(a) Write down the four inequalities

(b)Draw a graph to show the feasible region which represents the above inequalities

(c) If he expects to charge shs. 2000 and shs 3000 per unit of space consumed per day by each bus and lorry respectively. Write down the expression for his expected income per day, Hence find his maximum daily income expected from his business (12 marks)

16 .The vertices of a triangle ABC are A(3,2) ,B(3,4) and C(1,4),ABC is mapped on to triangle A'B'C' under a reflection in the line $x - y = 0$.Triangle A'B'C' is then mapped onto triangle A"B"C" by a positive three quarter turn about the origin 0(0,0)

(a) Write down the matrix of transformation for the;

(i) reflection

(ii) rotation, using I(1,0) and J(0,1)

(b) Find the co-ordinates of the image

(i) A'B'C'

(ii)A"B"C"

(c) Find the single matrix of transformation that would map triangle ABC directly to triangle A"B"C". (12 marks)

17. The sides of a right angled triangle PQR, the base, height and the Hypotenuse are (y+5) cm,$(y + 2)$ cm and $(2y + 1)$ cm respectively. Find;

(a)the value of y.

(b) the sides of the triangle and hence find the area of the triangle PQR. (12 marks)

END