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MATHEMATICS
Paper 1
APRIL, 2019
Time: *2hrs 30mins*

UGANDA CERTIFICATE OF EDUCATION

PRE-MOCK EXAMINATIONS 2019
MATHEMATICS
PAPER ONE

INSTRUCTIONS TO CANDIDATES:

- *Answer* **all** *the* **ten** *questions in section* **A** *and* **five** *questions from section* **B**.
- *Any additional question(s) will* **not** *be marked.*
- **All** *working* **must** *be shown clearly.*
- *Silent non-programmable calculators and mathematical table with a list of formulae may be used.*
- *Draw this grid on the first page of your answer scripts,* ***do not*** *hand in question paper.*

		Marks attained
	Section A	
Indicate The five Questions Attempted in Section B		
	Total marks	

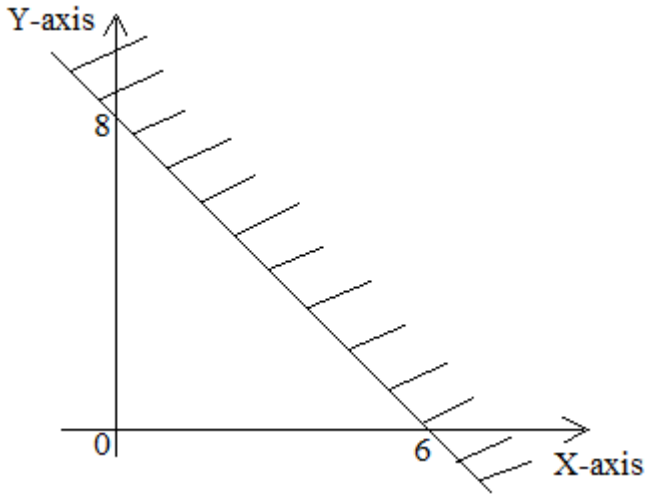
Section A (40 marks)

1. Given that $a * b = 5 - a^b$, evaluate $\left(27 * \frac{1}{3}\right) * 3$. **(04 marks)**

2. Make r the subject in the formula $ar = \frac{y + r}{3}$, hence, find the value of r, if $a = -2$ and $y = 3$. **(04 marks)**

3. Given that the determinant of $\begin{pmatrix} x & 1 \\ 3x & 2x \end{pmatrix}$ is 10, find the values of x. **(04 marks)**

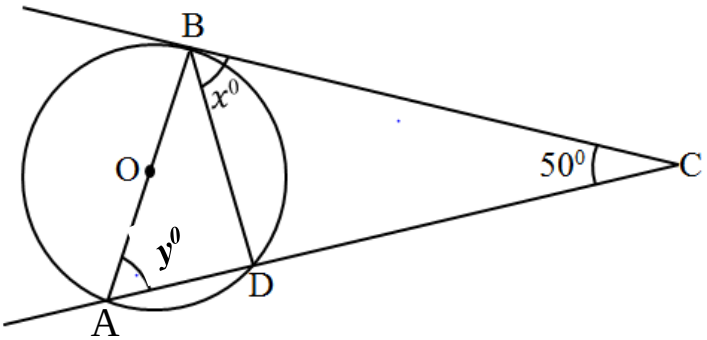
4. The graph below shows a line passing through the points shown. Write down the inequality satisfying the shaded region.



(04 marks)

5. Given that $\sin\theta = \frac{3}{5}$ and θ is obtuse, evaluate $4\tan\theta + 5\cos\theta$. **(04 marks)**

6. In the figure below, AB is a diameter, BC is a tangent and angle $BCA = 50^0$, angle $DBC = x^0$ and angle $BAD = y^0$



Calculate the sizes of angles $y^0 and\ x^0$. **(04 marks)**

7. The probability that a teacher selects a girl to answer a math question is $\frac{8}{15}$. If there are 70 boys in class,

(i) What is the probability of selecting a boy to answer a math question?

(ii) How many students are in the whole class? **(04 marks)**

8. The mean of the numbers *n+10, 10, n+15, n+5, n+10* and *n+10* is *50.*

Find the;

(i) value of n

(ii) seventh numbers so that the mean is 55. **(04marks)**

9. Given that $A = \begin{pmatrix} -1 & 2 \\ -1 & -4 \end{pmatrix}$, find;

(i) $\det A$

(ii) A^{-1}

10. Three bells ring at different intervals for change of lessons. The bell for $S1 - S2$ rings every after 30 minutes, $S3 - S4$ rings after 40 minutes and for $S5 - S6$ rings after 1 hour. If they all ring at $7:30\ am$, when will the 3 bells ring again at the same time. **(04 marks)**

Section B (60 marks)

11. Quadrilateral ABCD was mapped onto A" (-4, 6), B" (-4, 10), C"(0, 8) and D"(2, 4) after an enlargement of scale factor 2 about the origin followed by a negative quarter turn about the origin.

(a) Write down the matrix for the:

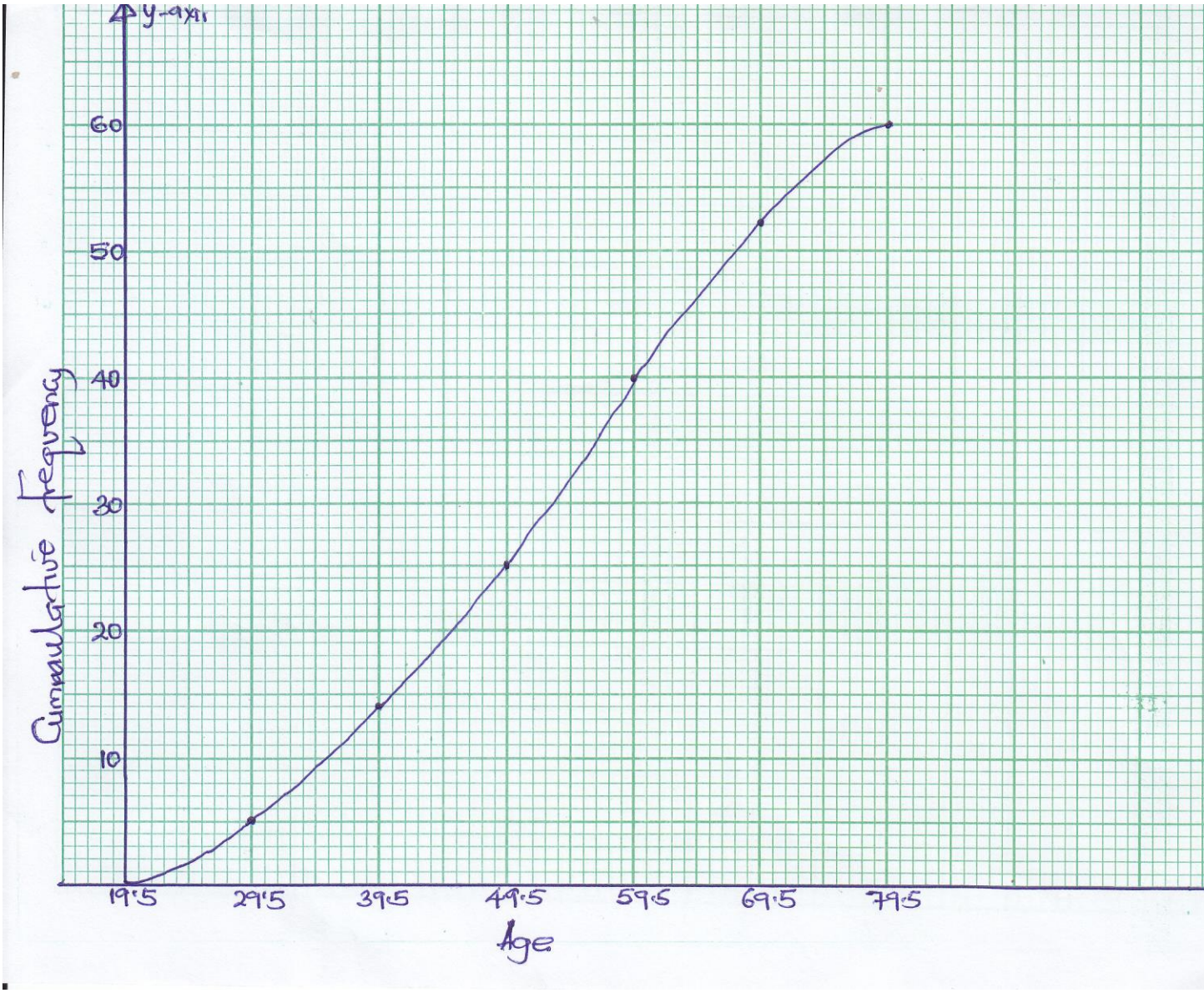
(i) Enlargement.

(ii) Rotation described above.

(b) Use the above matrices to find the co-ordinates of points A, B, C, and D.

(c) If the area of the image quadrilateral A"B"C"D" is 36 square units, find the area of the object ABCD. **(12 marks)**

12. The diagram below shows the number of people by age who turned up for the National identity card registration at Lukuli Zone B.



Study the diagram and use it to;

(i) Find the median age of the people who registered

(ii) Prepare a frequency distribution table from the diagram above and state the modal frequency

(iii) State the class width.

(iv) Calculate the mean age. **(12 marks)**

13. Using a ruler and a pair of compasses only, draw a triangle ABC in which $\overline{AB}$ = 8.2 cm, $\overline{BC}$ = 6.0cm and $\angle ABC = 75^0$. Construct the line passing through C and perpendicular to AB, to cut AB at X.

(i) Measure length $\overline{CX}$.

(ii) Measure angle ACX

(iii) Calculate the area of triangle ACX

(12 marks)

14. The school welfare master bought $10kg$ of rice and 5kg of meat at shs. 90,000 for the teachers meal. Later he decreased each of the above quantities by $2kg$ thus decreasing his expenditure by shs. $28{,}000$.

(a) Write down two equations that represent the master's purchases.

(03 marks)

(b) Use your equations to find the cost of rice and meat per kilogramme.

(06 marks)

(c) How much would the welfare master pay for $30kg$ of rice and $25kg$ of meat?

(03 marks)

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

(03 marks)

x	-2	-1	0	1	2	3	4
$4 - x$	6				2		
$x + 2$	0				4		
y	0				8		

(b) Use your completed table to draw a graph of $y = (4 - x)(x + 2)$ using a scale of $2cm$ for $1\ unit\ on\ the\ x - axis$ and $1\ cm\ for\ 1$ unit on the y-axis.

(04 marks)

(c) Use your graph in (b) above to find the:

(i) coordinates of the maximum point,

(01 mark)

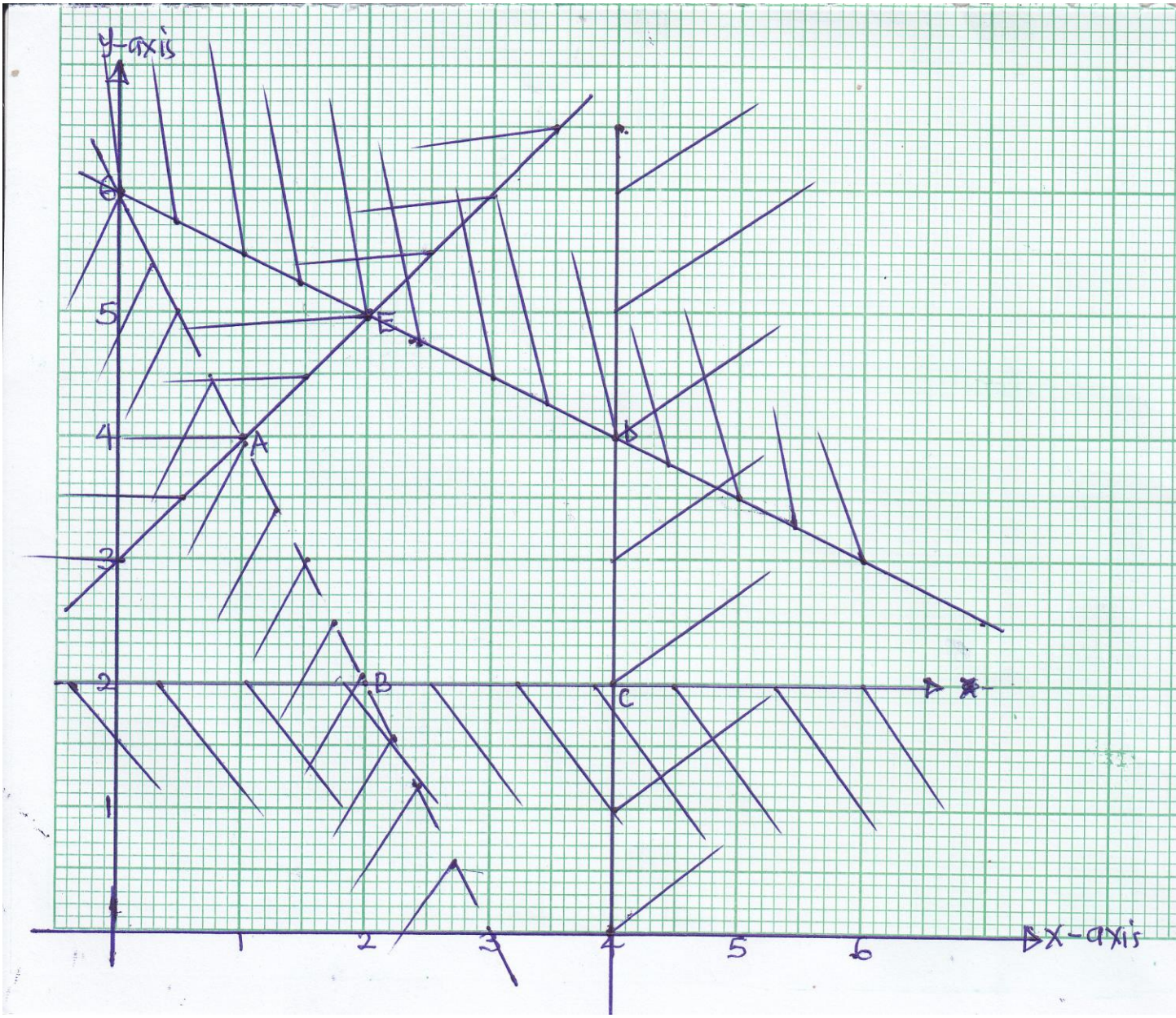
(ii) equation of the line of symmetry,

(01 mark)

(iii) solution to the equation $x^2 - 4x = 0$

(03 marks)

16. In the figure below A,B,C,D and E are vertices of the feasible region.



(a) Find all the inequalities, which satisfy the feasible region.

(b) Use that graph to minimize 7x + 2y.

(c) Find the area enclosed by the feasible region

17. (a) Solve the simultaneous equations using matrix method.

$2t - 8n = -46$

$t = 12 - 3n$

(6 marks)

(b) A house girl buys the following items in three weeks. Week one she buys 2 packets of tea , 2 tins of margarine , 2 kg of sugar and 3 packets of biscuits. Week two she buys 2 tins of margarine , 3 kg of sugar and 4 packets of biscuits . Week three she buys 1 packet of tea , 2 kg of sugar and 2 packets of biscuits.

(i) Write this information in a 3 x 4 matrix.

(ii) A packet of tea costs shs 1,000 , a tin of margarine costs shs 1,500, a kilogramme of sugar costs shs 2,800 and a packet of biscuits costs shs 500. Write a column matrix for the cost of the items.

Find her expenditure in the three weeks. **(6 marks)**

END