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MATHEMATICS
Paper 1
2022
Time: 2HOURS: 30MINUTES

MATIGO MOCK EXAMINATIONS
UGANDA CERTIFICATE OF EDUCATION
MATHEMATICS
PAPER ONE

DURATION: 2HOURS: 30MINUTES

INSTRUCTIONS TO CANDIDATES:

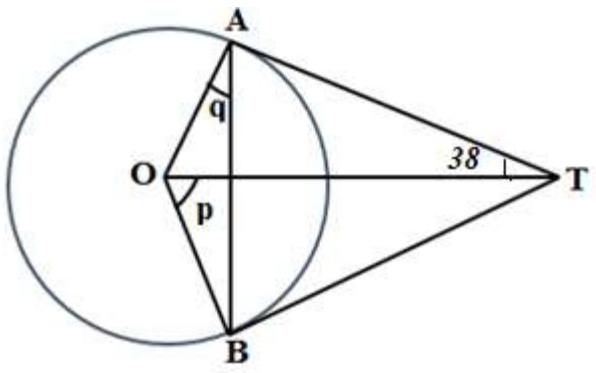
i) Attempt *all* questions in section **A** and not more than FIVE in section **B**.
ii) All necessary working must be shown on the same sheet of paper as the rest of the answer.
iii) Simple, silent non-programmable calculators may be used.

SECTION A (40 MARKS)
Attempt ALL questions in this section

1. The electrical resistances, R_1 and R_2 ohms, are placed in parallel. The overall resistance, R ohms, of the circuit is given by the formula $R = \frac{R_1 R_2}{R_{1+} R_2}$, Make R_1 the subject of the formula. (4 marks)
2. Factorise $4x^2 - 5x - 6$ hence solve $4x^2 - 5x - 6 = 0$ (4 marks)
3. Given that $a * b = a^2 - 3b$,
   Find the value of $(2 * 1) + (3 * -1)$ (4 marks)

4. Given that θ is an obtuse angle, and that $cos\theta = -0.6$, find the value of $sin\,\theta + tan\,\theta$. (4 marks)
5. If $Q(2, 5)$ is the image of P under a positive quarter turn about the negative quarter turn about the origin, find the coordinates of P. (4 marks)
6. A basket contains 6 mangoes, 4 tomatoes and 2 oranges. If two fruits are selected at random without replacement, find the probability that the two fruits are mangoes. (4 marks)
7. Mr. Maswanku's banana plantation is $56\,cm^2$ on a map of scale $1:125{,}000$. Find the actual area of the banana plantation in km^2. (4 marks)

8. In the figure, AT and BT are tangents. O is the centre of the circle. Find the angles marked with letters. (4 marks)



9. Find a transformation which is represented by a two by two matrix and will transform point K(2,1) onto L(4,5) and point T(-3,5) onto S(-6,-4). (4 marks)

10. Write down all the possible sets of four integers such that one of the four integers is 7 and they both have a mean and median of 9.

(4 marks)

SECTION B (60 MARKS)
Attempt only (five) questions in this section

11. (a) Using a ruler and pair of compasses, ruler and pencil only, construct a triangle ABC where AB = 8cm, angle CÃB = 105^0 and angle ABC = 30^0. Find the length of:

i) AC ii) BC

b) Point D is 7cm and equidistant from lines AC and AB, show the locus of point D on your diagram and complete the quadrilateral ABCD

c) Draw an inscribed circle of ABD and find its radius.

(12marks)

12. The cumulative frequency table below shows the marks obtained by 70 candidates in a Mathematics Mock exam.

Marks	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80 – 89
Cumulative Frequency	8	18	38	52	64	70

Use the information in the table above to:

a) Draw an O-give curve and use it to estimate:

i) the median.

ii) the number of students who scored below 50%.

b) Make a frequency table and find the mean mark using an assumed mean of 54. (12 marks)

13. Draw the curve $y = 2x^2 + 5x - 3$ for $-4 \le x \le 2$ and using a scale of $2\,cm$ to $1\,unit$ along the $x-$axis and $1\,cm$ to $1\,unit$ along the $y-$axis.

a) State:

i) the minimum value of the function.

ii) the range of values of x for which $2x^2 + 5x - 3 < -1$.

b) Use your graph to solve the equation $2x^2 + 4x = 0$. (12 marks)

14. A (4, 3), B (1, 2) and C (5,1) are the vertices of ▲ABC. R is the transformation of reflection in the line y = x + 3. Q is a positive quarter-turn about (0, 3).

(i) Taking 1cm to 1unit on each axis, draw ▲ABC and its image ▲$A^1B^1C^1$ under the transformation R

(ii) Draw ▲$A^{11}B^{11}C^{11}$, the image of ▲$A^1B^1C^1$ under transformation Q

(iii) From your diagram describe the single transformation which is equivalent to QR (ie the transformation which will map ABC onto $A^{11}B^{11}C^{11}$ (12 marks)

15. A dairy farm has x crossbred cows and y purebred cows, where $y > 3, y < 2x, 3y > 2x$ and $x + 2y < 15$.

(a) Find graphically all the possible combinations of crossbred and purebred cows. (6 marks)

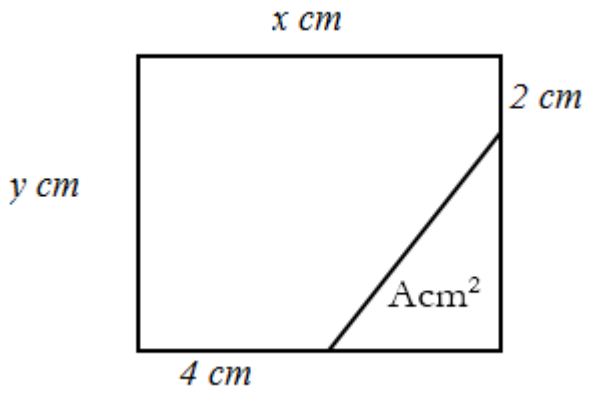
(b) State the maximum possible numbers of

(i) Crossbred cows

(ii) Purebred cows

(iii) All the cows (6 marks)

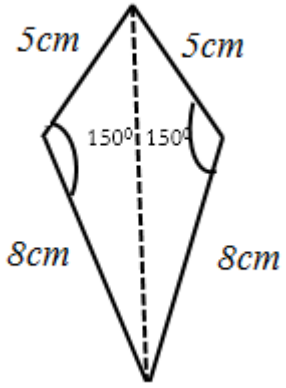
16. (a) The diagram below shows a rectangle xcm by ycm. The triangular area Acm^2



(i) Obtain an equation for A in terms of x and y

(ii) Express y in terms of x and A (8marks)

(b) Calculate the area of the kite shown in the diagram below.



(4marks)

17. (a) Use matrices to solve the simultaneous equations.(7marks)

$$x + 2y = -5$$
$$-y + 3x = 13$$

(b) the table below shows the number of copies of Etop and Orumuri newspapers sold by a news vendor in a Kampala suburb on two successive days in a certain week.

	Etop	Orumuri
Wednesday	70	82
Thursday	59	66

Suppose all newspapers were sold out and a copy of Etop was sold for Sh 300 and a copy of Orumuri for Sh 400. Using matrix method, calculate the total amount acquired. (5 marks)

END