456/1
MATHEMATICS
Paper 1
JUNE, 2023
$2\frac{1}{2}$ *hours*

MATIGO EXAMINATIONS BOARD

PRE MOCK 2023

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** *from section* **B**.
- *Any additional question(s) answered will not be marked.*
- *All necessary calculations must be shown and should be done on the same page as the rest of the answer.*
- *Mathematical tables and graph papers are provided.*
- *Silent, non-programmable scientific calculators may be used.*

Turn Over

© *Matigo Examinations Board Pre Mock 2023*

SECTION A (40Marks)
*Attempt **all** question in this section*

1. Factorise completely: $9(2a+b)^2-(a+b)^2$. (04 marks)

2. Solve the simultaneously equation.

$4x+y=7$

$3x+2y=9$ (04 marks)

3. A class was divided into two groups of 10 and 15 students. The average age of the first group is 11.5, while the average age of the second group is 14. Calculate the mean age for all students in the class. (04 marks)

4. Given that $a \star b = 2a+b-3$

(i) Find the value of $-1 \star 1$, (02 marks)

(ii) Find the value of n if $3 \star n = 7$ (02 marks)

5. The measures of two interior angles of a polygon are 120° and 40° and the sum of the rest of the angle measures is 380°, find the number of sides. (04 marks)

6. A matrix A is given by A = $\begin{pmatrix} x & 0 \\ 5 & y \end{pmatrix}$. Determine the possible pair of values of x and y, if $A^2 = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$. (04 mark)

7. Solve the inequality and illustrate your solution on a number line. (04 marks)

$$1+x \leq \frac{2x}{3}$$

8. Find the area of triangle ABC having $AC = 17.0cm$, $AB = 8.0cm$ and $Angle\ ABC = 90°$. (04 marks)

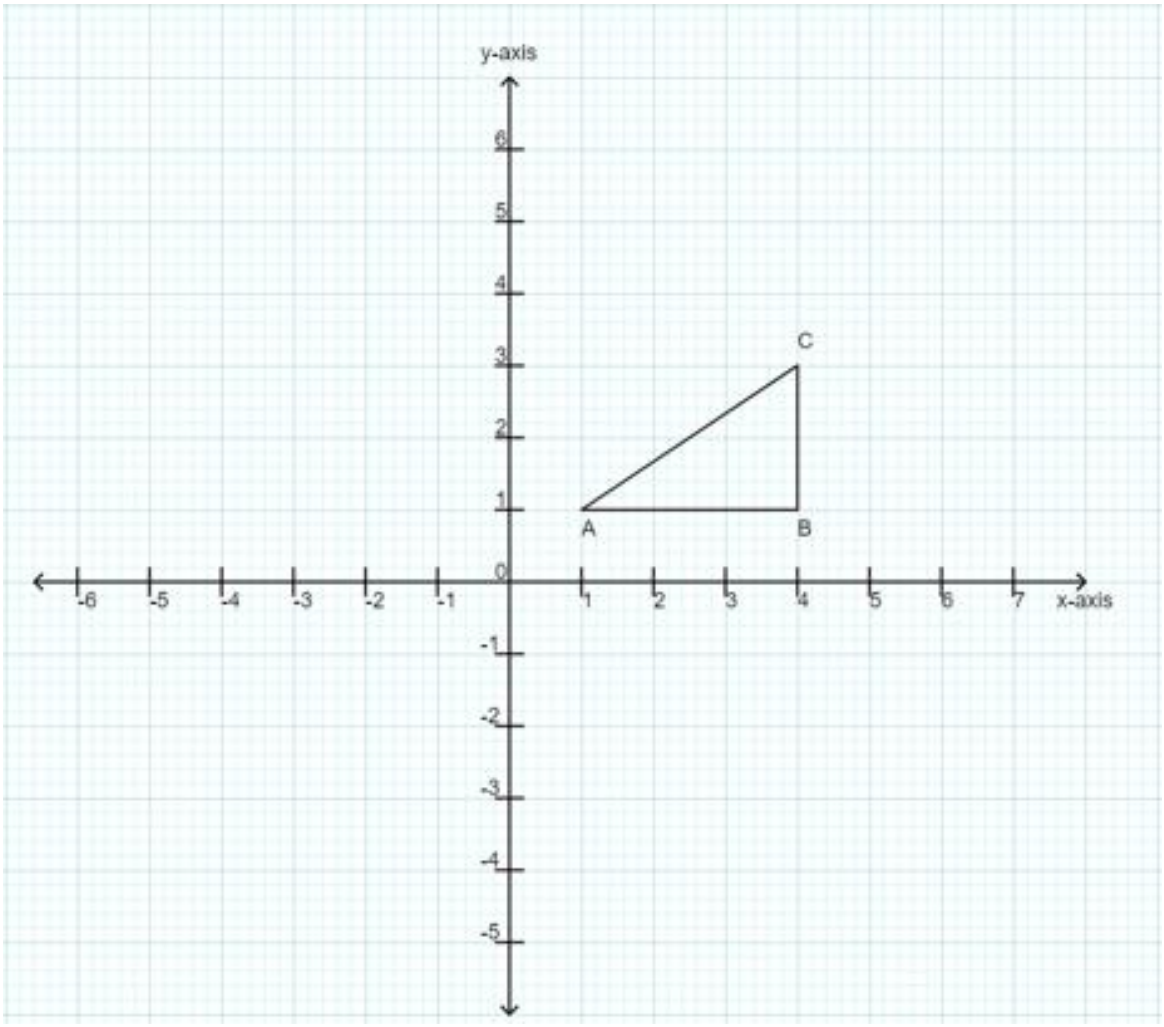
9. A card is picked from a standard pack of play cards. What are the following probabilities?

(a) Probability of picking an ace. (02 marks)

(b) Probability of picking a red card. (02 marks)

© *Matigo Examinations Board Pre Mock 2023*

10. Write the coordinates of the vertices of the triangle ABC after a rotation of 90° clockwise about the origin. (04 marks)



SECTION B

11. (a) Copy and complete table of values for $y = (x - 1)(x + 6)$ (03 marks)

x	-6	-5	-4	-3	-2	-1	0	1
$x - 1$								
$x + 6$								
y								

(b) Use your completed table to draw the graph $y = (x - 1)(x + 6)$. Use a scale of $2cm$ to represent 1 $unit$ on the $x - axis$ and $2cm$ to represent $2units$ on the $y - axis$. (04 marks)

(c) Use the graph above to solve the equations

(i) $(x - 1)(x + 6) = 0$

(ii) $(x - 1)(x + 6) = -10$ (05 marks)

© Matigo Examinations Board Pre Mock 2023

12. Uganda Tech Company makes two computer models, The Dell and The Lenovo. The Dell requires 2 processor chips, 16 memory chips, and 20 vacuum chips, while Lenovo requires 1 processor chip, 4 memory chips and 40 vacuum chips. There is one company that can supply these parts, Mutaasa can supply them at Shs 10,000 per processor chips, Shs 5,000 per memory chip and 7,000 per vacuum tube.

(i) Write down all of this data in two matrices, one showing parts required for each model computer, and the other showing the prices for each part from Mutaasa supplier. (02 marks)

(ii) Using matrix multiplication, calculate the total cost for parts for each model. (04 marks)

(iii) If it costs Mutaasa only Shs 6,000 to make each processor chip, Shs 3,000 for each memory chip and 5,000 for each vacuum chip, use matrix operations to find the total profit Mutaasa would make in each model. (06 marks)

13. Using a ruler and a pair of compasses only, draw a parallelogram ABCD, such that angle $DAB = 75°$. Length $\overline{AB} = 6.0cm$ and $\overline{BC} = 4.0cm$. From point D, drop a perpendicular to meet line AB at N. (08 marks)

(i) Measure length DN. (01 marks)

(ii) Find the area of the parallelogram. (03 marks)

14. Triangle ABC has vertices $A(2,1), B(2,2), C(4,2)$. X $= \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ and

U $= \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$.

(i) Describe each of the transformations. (04 marks)

(ii) Use matrix multiplication to find the image of triangle ABC under the transformation given by **X** followed by the transformation given by **U**. (04 marks)

(iii) Identify the single transformation that maps ABC onto the final image. (04 marks)

15. An Examinations company uses two types of trucks, P and Q. type P carries 200 bags of exams while type Q carries 300 bags of exams per trip. There are more than 12000 bags to be moved, and the trucks are to make not more than 60 trips. Type Q trucks are to make at most twice the number of trips made by type P trucks.

(a) If $\boldsymbol{x}$ represents the number of trips made by type P trucks and $\boldsymbol{y}$ the number of trips made by type Q trucks, write down all the inequalities representing this information. (03 marks)

(b) Represent the above inequalities on the same axes. (06 marks)

(c) The transporter makes a profit of Shs 30,000 per trip on type P and Shs 60,000 per trip on type Q truck. Write down an objective function for the profit. And state the number of trips he should make in order to maximize his profit. (03 marks)

16. A number of people agreed to contribute equally to buy books worth 1200 Dollars for a school library. Five people pulled out and so the others agreed to contribute an extra 10 Dollars each. Their contributions enabled them to buy books worth 200 Dollars more than they originally expected.

(a) If the original numbers of people was x, write an expression of how much each was originally to contribute. (01 mark)

(b) Write down two expressions of how much each contributed after the five people pulled out. (02 marks)

(c) Calculate the number of people who made the contribution. (06 marks)

(d) Calculate how much each contributed. (03 marks)

17. There are 12 beads in a bag. 5 beads are red and the rest are blue. Two beads are taken out at random, one at a time, without replacement.

(a) Draw a tree diagram to show all outcomes. (05 marks)

(b) Find the probability that;

(i) All the two beads are blue

(ii) At least one bead is red

(iii) Exactly one bead is blue and the other is red. (07 marks)

END

(+256780413120)

© *Matigo Examinations Board Pre Mock 2023*