**456/1**

**MATHEMATICS**

**Paper 1**

**Jul/Aug 2016**

**2 ½ Hours**



**MUKONO EXAMINATIONS COUNCIL**

**Uganda Certificate of Education**

**MATHEMATICS**

Paper 1

**2 Hours 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 calculation* ***must*** *be done in the answer booklet provided. Therefore, no paper should be given for rough work.*
* *Graph paper is provided.*
* *Silent, non-programmable scientific calculator and mathematical tables with a list of formulae may be used.*

**SECTION A (40 MARKS)**

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

1. Given that ˄= +  , find the value of:
2. ˄  ***(02marks)***
3. ˄  ˄ 3 ***(02marks)***

1. Use matrices to solve the following simultaneous equations:

 ***(04marks)***

1. Find the range of values of x in the inequality:

 ˂ ≤  ***(04marks)***

1. The figure below shows a circle centre O, of radius 9cm. AC = BC

 C

 B

O

 A

Find the:

1. Length BC ; ***(02marks)***
2. Area of the triangle ABC. ***(02marks)***
3. Find the two possible values of $x$ in the equation 3 = 6 for 

0° ˂ ˂ 360°. ***(04marks)***

1. The information below shows milk production in litres of a certain cow in 8 days.

6.2, , 9.1, 3.5, 7.2, 6.8, 5.8, 4.2.

Find the value of if the mean value is 6.35. ***(04marks)***

1. Simplify as far as possible

 ***(04marks)***

1. Four digits 6, 7, 8, 9 are used in random order to make a three- digit number. What is the probability that the number formed is odd? ***(04marks)***
2. Two towns P and Q are such that the bearing of Q from P is 075°. Find the bearing of P from Q. ***(04marks)***
3. The point M(4,5) is mapped onto M’ after an enlargement centre N(1,1), with scale factor 4. Using vectors, determine the values of  and y.

**SECTION B (60 MARKS)**

*Answer any* ***five*** *questions from this section*

*All questions carry equal marks.*

1. a) (i) Make  the subject of formula.

 -  =  ***(04marks)***

 (ii) Find the value of when y = 2 and z = 5. ***(02marks)***

 b) Matovu’s present age is  of his mother’s age. In eight years’ time, he will be  of his

mother’s age then. How old is his mother? ***(06marks)***

1. a) By shading the unwanted regions, show on a graph the region satisfying the

inequalities below:

  ≥ 1; y ≥ 0;  + y ≥ 1; 5 + 3y ≤ 15.

b) Use your graph to find the:

(i) maximum value of the function + 7y;

(ii) area of unshaded region.

1. Using a ruler, a pencil and a pair of compasses only:
2. Construct a triangle PQR, with PQ = 8cm, QR = 12cm and angle QPR = 120°

***(05marks)***

1. (i) Locate the point T on QP produced such that TP = TR ***(03marks)***

(ii) Measure the distance TQ ***(01mark)***

(iii) Draw a circle that passes through the points T, P and R ***(03marks)***

1. The following table shows the marks obtained in chemistry test by S.4 students in a certain school.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 51 | 52 | 33 | 58 | 38 |
| 32 | 36 | 54 | 36 | 43 |
| 67 | 58 | 62 | 53 | 53 |
| 42 | 43 | 47 | 46 | 63 |
| 56 | 62 | 56 | 36 | 54 |

1. Using class interval of 5 marks, make a frequency distribution table, starting with the 30 – 34 class. ***(02marks)***
2. Use the table in (a) above to estimate the;
3. Mean mark ***(04marks)***
4. Modal mark  ***(01mark)***
5. Draw a cumulative frequency curve (Ogive) for the data and use it to estimate the median mark. ***(05marks)***
6. a) Copy and complete the table below:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ° | \_180 | \_150 | \_120 | \_90 | \_60 | \_30 | 0 | 30 | 60 | 90 | 120 | 150 | 180 |
| y = 2sin ° |  |  |  | \_2.0 |  |  | 0 |  |  | 2.0 |  |  | 0 |
| y = 2cos2° |  |  |  | \_1.0 |  |  | 1.0 |  |  | \_1.0 |  |  | 1.0 |

b) On the same square paper, draw the graphs of y = 2sin ° and y = 2cos2°

***(06marks)***

 c) Use your graphs to solve the equation:

 2sin ° - 2cos2° = 0 ***(02marks)***

1. A triangle ABC has vertices A(1, 3), B(2, -4) and C (-4, 5). It undergoes a transformation

**M** = $\begin{matrix}2&1\\-4&3\end{matrix}$to give a triangle A’B’C’ is transformed by **N** = $\begin{matrix}1&-2\\3&-1\end{matrix}$ to

triangle A’’B’’C’’.

1. Find the coordinates of the vertices of:
2. triangle A’B’C’ ***(03marks)***
3. triangle A’’B’’C’’  ***(03marks)***
4. Find a single matrix of transformation which maps triangle ABC onto triangle A’’B’’C’’. ***(02marks)***
5. The area of triangle ABC is 16 ½ square units. Use the single matrix obtained in (b) to determine the area of triangle A’’B’’C’’. ***(04marks)***
6. a) Given that **A**= $\begin{matrix}4&2\\1&3\end{matrix}$ and **B** = $\begin{matrix}1&-3\\2& 4\end{matrix}$ ,

find the values of $x$ such that det = 14. ***(07marks)***

 b) Given that  **P** =$\begin{matrix}1&1\\2&3\end{matrix}$ , find: (i) **P2** ***(02marks)***

 (ii) **P-1** ***(03marks)***

 ***End -***