**456/1**

**MATHEMATICS**

**Paper 1**

**July/August 2019**

**2½ hours**



**MUKONO EXAMINATION COUNCIL**

**Uganda Certificate of Education**

**MATHEMATICS**

**Paper 1**

**2hours 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 calculations must be done in the same answer booklet/sheets provided, with the rest of the answers. Therefore no paper should be given for rough work.*
* *Graph paper is provided.*
* *Silent non-programmable scientific calculators and mathematical tables with a list of formulae may be used.*

**SECTION A (40 marks)**

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

1. If and =, find the value of such that

*(04 marks)*

2. Make the subject of the formula:=

*(04 marks)*

Hence find the values of when

3. Tickets to a play cost for adults and for children. If the show sold 180 tickets and earned dollars, how many of each type of

*(04 marks)*

tickets were sold?

4. Given the matrices and . Find the

*(04 marks)*

determinant of

5. In the diagram below lie on the circle. is parallel to ,

*(04 marks)*

Angle, angle and angle .

**C**

**A**

**D**

**E**

**B**

**620**

***x*0**

**1270**

**400**

***y*0**

*(04 marks)*

Find the size of the angle marked

6. The image of under a reflection in the mirror line is

*(04 marks)*

By calculation, find the equation of the mirror line.

7. Calculate the area of a triangle where , ,

*(04 marks)*

angle and angle .

8. Determine the inequality which is represented by the un-shaded region.

**0**

**4**

**5**

*(04 marks)*

9. A bag A contains black and white beads while Bag B contains 2 black and 4 white beads. A bead is chosen at random from bag A and placed in bag B. A bead is then chosen at random from bag B. Find the probability that a black bead is taken from bag B.

*(04 marks)*

10. The pie-chart below represents Ssali monthly expenditure.

Rent

Transport

Food

1500

*q0*

1300

(a) Find the value of in degrees

(b) If Ssali spends shs, more on rent than on transport, calculate his monthly income.

*(04 marks)*

**SECTION B (60 marks)**

*Attempt any* **five** *questions from this section.*

11. Using a ruler, a pencil and a pair of compasses only:

(a) Construct a triangle , in which angle , angle

*(04 marks)*

and

(b) Measure and record the length .

*(02 marks)*

(c) (i) Circumscribe triangle

(ii) Calculate the area of a circle to 2sf.

*(06 marks)*

12. The masses of 50 babies born in Kumi hospital were recorded as below:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mass(kg) | 2.0-2.4 | 2.5-2.9 | 3.0-3.4 | 3.5-3.9 | 4.0-4.4 | 4.5-4.9 | 5.0-5.4 | 5.5-5.9 |
| No of babies | 4 | 6 | 10 | 12 | 9 | 4 | 3 | 2 |

(a) Calculate the:

*(05 marks)*

(i) mean mass;

*(03 marks)*

(ii) median mass

(b) Draw a histogram and use it to estimate the modal mass of the babies.

*(04 marks)*

13. (a) Copy and complete the table below of and .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 00 | 150 | 300 | 450 | 600 | 750 | 900 |
|  |  |  |  |  |  |  |  |
|  | 1 |  |  | 0 |  | -0.9 |  |
|  | 0 |  |  | 1 |  | 0.5 | *(03 marks)* |

(b) Using on a horizontal axis and 1cm for units on

vertical axis, on the same axes, draw graphs of and

*(06 marks)*

(c) Use your graphs to solve the equations:

*(01 mark)*

(i)

*(02 marks)*

(ii)

14. The vertices of a triangle are mapped onto a triangle by a transformation matrix

(a) Find the coordinates of the vertices of the image triangle

*(05 marks)*

(b) A triangle is mapped onto a triangle with vertices .

*(05 marks)*

Find the matrix of this transformation

(c) Determine the single transformation which maps a triangle

*(02 marks)*

directly onto the triangle .

15. (a) Given that the matrix

*(02 marks)*

**B** and **PAB**, determine the

(i) order of

*(01 mark)*

(ii) matrix

*(03 marks)*

*(02 marks)*

(iii) inverse of

(b) Using matrix method, solve the simultaneous equations:

*(06 marks)*

16. The length of a rectangle exceeds the width by and its area is .

(a) Find the

*(04 marks)*

(i) dimensions of the rectangle

*(02 marks)*

(ii) perimeter of the rectangle

(b) If the length and the width are both decreased by 10%:

(i) Calculate the new dimensions of the rectangle and its new area.

*(04 marks)*

(ii) Express the new area as a percentage of the original area.

*(02 marks)*

17. A manufacturing company makes two models and of a product. Each piece of model requires labour hours for fabricating and labour

hour for finishing. Each piece of model requires labour hours for

fabricating and labour hours for finishing. For fabricating and finishing,

the maximum labour hours available are and respectively. The

company makes a profit of shs.80,000 on each piece of model A and shs

120,000 on each piece of model B. If are numbers of pieces of

model A and model B respectively:

(a) Write down four inequalities to represent the given information,

*(04 marks)*

(b) Represent the inequalities on a graph,

*(04 marks)*

(c) Use the graph in (b) above to find the number of pieces of model A

***END***

*(04 marks)*

and model B that should be manufactured to realize a maximum

profit. Hence find the maximum profit.