**456/1**

**MATHEMATICS**

**Paper 1 S.4**

**April 2017**

**2 ½ Hours**

**THE MATHEMATICS DEPARTMENT**

**END OF TERM ONE EXAMINATIONS 2017**

**MATHEMATICS**

**INSTRUCTIONS TO CANDIDATES**

* *Answer* ***all*** *questions in section* ***A*** *and* ***not more than******five***  *questions 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*
* *Graph paper is provided*
* *Silent, non-programmable calculators and mathematical tables with a list of formulae may be used.*

**SETION A( 40 MARKS)**

1. Factorize completely (04 marks)
2. Solve the equation (04 marks)
3. Given that and that Determine the value of . (04 marks)
4. Given that and . Find (04 marks)
5. Make P the subject of the formula. (04 marks)
6. An object of area 4 is mapped onto its image of area 64 under a transformation of matrix. Calculate the value of n. (04 marks)
7. The mode of 3, 10,8, 4,4,1,2,, 3 and 2 is 3.find the:
8. The value of *x*
9. The median
10. The mean (04 marks)
11. The representative fraction of a map is . Find the actual area of a swamp in which is represented by on the map. (04 marks)
12. Express in the form where p and q are integral numbers. Represent the solution on a number line. (04 marks)
13. A bag contains 3 red marbles, 2 blue marbles and 5 green marbles. What is the probability that it is;
14. Red
15. Blue or green (04 marks)

**SECTION B (60 MARKS)**

**Answer only five questions from this section.**

1. A rectangular plot 12m long and 10 m wide has a uniform path around it.
2. Given that the area of the path is of the area of the plot, find the width of the path. (08 marks)
3. The edges of the path are to be lined with tiles. If each tile is 0.8 m long, how many of them are needed? (04 marks)
4. (a) Given that find the possible values of x and y(06 marks)
5. Solve the simultaneous equations using the matrix method. (06 marks)
6. (a) Draw the graph of for (06 marks)

(b) Use your graph to find the roots of (02 marks)

(c) By adding a suitable line to your graph, find the roots of

(04 marks)

1. The masses of four month babies were measured to the nearest kilogram and recorded as shown in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mass | Midpoint  (*x*) | Frequency  *(f)* |  | *fd* |
| 6.5-6.9 |  | 2 | -1.5 | -3.0 |
| 7.0-7.4 |  | 5 |  |  |
| 7.5-7.9 |  | 9 |  |  |
| 8.0-8.4 | 8.2 | 15 | 0 | 0 |
| 8.5-8.9 |  | 6 |  |  |
| 9.0-9.4 | 9.2 | 2 |  |  |
| 9.5-9.9 |  | 1 | 1.5 | 1.5 |
|  |  |  |  |  |

1. Copy and complete the table (04 marks)
2. State the assumed mean hence use it to calculate the mean. (03 marks)
3. Draw a cumulative frequency curve and use it to estimate the median mass (05 marks)
4. A trapezium has vertices and . T is a transformation whose matrix is .
5. Draw a trapezium and its image under the transformation T.

(05 marks)

1. Find the matrix of the transformation which maps the trapezium onto a trapezium with vertices (04 marks)
2. Determine the matrix of a single transformation which will map back onto (03 marks)
3. Using a ruler, pencil and pair of compasses only; Construct triangle DMK in which  and angle DMK = 105o. Measure and state the length of DK and the size of angle MKD.
4. Draw a circle passing through the points D, M and K and hence calculate the area of the segment cut off by chord . (Use )

(12 marks)

1. A company was contracted to transport 1200 tonnes of sand. The company used type A and type B trucks to do the job. Each type A truck carries 10 tonnes of sand per trip while each type B truck carries 15 tonnes per trip.the total number of trips must not be less than 70 and type B trucks must make atleast twice ac many trips as type A trucks while the later (type A) must not make less than 10 trips. Taking x to represent the number of trips made by type A trucks and y to represent number of trips made by type B trucks,
2. Write down all the inequalities in to represent the above information
3. Represent the inequalities graphically

The company makes a profit od shs 2000 per trip made by each type A truck and shs 3000 per trip made by each type B truck.

1. (i) write down the objective function for profit

(ii) determine the number off trips each type of truck must make to maximize the profit.

(iii) hence calculate the maximum profit. (12 marks)

**END**