S.3 MATHEMATICS
Paper 1
SECTION A

Item 1

Apio (A), Melisa (M) and Devine (D) wish to start a business, they assigned 2, 3 and 5 as their secret codes as the founders respectively.
The capital to be generated follows the ratios 4:3 and 4:5 for A: M and M: D respectively and after calculations, Mellissa realized that she is to contribute Ugx. 840 000.
Some of the capital will be kept in a safe whose combination code has been forgotten. But Apio remembers that it's 11201_{three} plus the product of their secret codes.
Also Melisa will access the safe every after 10 days and for Apio and Devine, it's 15 and 20 days respectively.
Task:

a) Determine the total capital to be generated and what other members are to contribute.
b) Using mathematics computations, estimate the likely combination code of the safe.
c) If they all access the safe on 1st august when will they meet when accessing the safe?

Item 2

To get the marks scored in an interview, an interviewer multiplies the number of question attempted correctly and adds five marks for attendance.
Friends Mary, John, Michael and Jane sat for this interview and failed 2, 3, 1 and 4 questions respectively.
The test was done in a small room with the width being the square root of the length and covering 64 square meters.

Task:

a) If the test had five questions, determine the marks scored by the friends and present the results in an arrow diagram.
b) Determine the dimensions of the room.

SECTION B

Item 3

On a Monday morning, Mr. Ogwang, a dedicated mathematics teacher, instructed his senior four students to come prepared for class with essential scholastic materials. He emphasized the benefits of having pens, books, and rulers during their mathematics lessons. Eager to comply with their teacher's request, three senior four students, Martin, Brian, and Bernard decided to visit a nearby supermarket to buy the items. At the supermarket, Martin bought 3 pens, 5 books, and 4 rulers. Brian also bought 4 pens, 3 books, and 2 rulers while Bernard bought 4 pens, 8 books and 3 rulers. At the supermarket, each pen costs Shs1500, each book is priced at Shs8800, and each ruler costs Shs2500. Mr. Ogwang asked them to report back with their receipts to discuss how much they spent collectively on their scholastic materials.

Task:

a) As the student who has studied matrix help the students to present their receipts to Mr Ogwang.
b) Juanita is a senior three student who is seeking information on the amount of money she can spend on buying 8 pens, 3 dozens of books and 5 pairs of rulers.
Help Juanita with the necessary information if she is to receive a 12% discount on the price of each item.

Item 4

As part of ways to boost security in Uganda, many cameras were put in strategic places to monitor traffic in the country.
For a certain period the following numbers of cars were registered passing through a choke point with a high risk of accidents happening at night.

20	40	60	55	36	69	59	78	47	66
59	70	53	24	63	50	46	38	68	57
30	65	58	61	57	86	77	54	29	88
62	44	89	45	87	65	47	49	52	69
41	80	37	56	74	27	76	58	79	39

The police wishes to assign traffic officers if the average number of cars is greater than the median number of cars.
Task:
a) Prepare a frequency distribution table with a 10 class interval.
b) Using mathematical analysis, show whether traffic officers should be assigned.

PART II

Item 5
Your sister bakes cakes and has received an order for cakes from your friend, Joseph, who needs them in cylindrical shapes with radius of 7cm and height 20cm.
Joseph has sent a box of dimensions 56cm by 28cm and 40cm in height which is to be totally filled with cakes. He also prepared Shs. 850 000 and expects to remain with the balance of Shs. 50 000.
Task:
a) Which amount of space remained in the box after cakes have been filled in.
b) What is the likely cost of each cake.

Item 6
A chapatti seller in a busy town has been struggling with excessive sunshine affecting her outdoor seating area. To address this issue, she has decided to purchase identical triangular tables with each of the tables having two of its sides measuring 10 m and 8m, intersecting at a 75° angle. The tables will feature a central hole to accommodate a circular umbrella, providing shade for her customers. The tables will be used to serve delicious chapattis to her loyal customers.

The chapatti seller is interested in buying 80 tables for her expanding business, which will be sold to her at UGX 21,500 each. The furniture maker offers a discount structure for bulk purchases as follows:

- 0% discount for the first 10 tables.
- 10% discount on the total cost for the next 30 tables.
- Additional 5% discount on the total cost for any excess tables bought.

Tasks:

a) By applying construction skills, assist the furniture maker in drafting accurate design for the table surface that meet the chapatti seller's requirements.
b) What minimum radius is required for a circular umbrella to fit around the vertices of the triangular tables?
c) What will be the total cost of 80 tables with the applicable discounts?

END