# MBARARA REGION SESEMAT 2023

# SARB EXAMINATIONS

# SENIOR THREE (S.3) MATHEMATICS

**TIME: 2 Hours**

**INSTRUCTIONS**

- Attempt all the questions in **section A** and choose only **FOUR** from **section B**
- Only non-programmable calculators should be used.
- All working should be done in the answer script.

## SECTION A (20 marks)

1. An Architect is building a roof for the house. The walls are $8m$ apart. The central angle of the roof is $110^0$. What is the shortest length of the iron sheets that can be used? (Give your answer correct to two decimal places) (04 marks)

2. A brother and a sister share out their pocket money of UGx50,000 in the ratio 5: 3. The brother shares his pocket money with two friends in the ratio 3:1:1 keeping most for himself. How much money does each of his friends receive? (04 marks)

3. In Geography, learners studied about mining in Uganda that enlightened them about minerals and where they are mined. The following data was collected by one of the learners. Mt. Rwenzori, Buhweju, Katwe, Hoima, Sand, Gold, Salt, Tin, Copper, Kabale, Oil, and Lake shores. Draw an arrow diagram to show the relation amongst the minerals and areas where they are mined. Help to sort the data into the Domain and the Range. (04 marks)

4. The owner of a certain recreational centre is trying to locate the point at which the two straight roads whose equations are

$2x - 3 = y$ *and* $x + y = 6$, meet so as to put a control tower. Assist the owner of the recreational centre to find the coordinates of the location of the control tower. (04 marks)

5. A river with straight banks runs due north. A woman stands on one bank and observes that the bearing of a tree on the other bank is $325^{o}$. After walking for $130m$ due north along the bank, she finds the bearing of the same tree to be $220^{o}$. By scale drawing, find the breadth of the river.

## SECTION B (60 MARKS)

6. In Uganda, many are worried about the fire problem in schools which is becoming a threatening hazzard. Research experts have carried out a survey to investigate the likely cause of the rampant fires in Education institutions. Findings showed that, three categories of stake holders were found to be responsible for the fire outbreaks in Education institutions. 50 respondents said they are learners, 50 respondents said they are parents and 40 respondents said they are school administrators. 10 respondents attributed it to all categories. 15 attributed it to learners and parents, 20 attributed it to parents and school administrators and 15 attributed it to learners and school administrators.
   a) Help the expert researchers to summarize their report and be able to establish number of respondents who attributed it to;
      i. Learners only
      ii. Parents only
      iii. School Administrators only
   b) Find the total number of the respondents in the survey.
   c) What is the probability that the fire problem in schools is attributed to learners? **(15 marks)**

7. Poor performance in Mathematics was observed among learners. The school administration through academic board came up with strategies to improve on the learner's performance. Some of the strategies are that a prize is given to learners scoring above 70% and a remedial exam be given to learners

scoring at most 45%. A Mathematics examination was given to S.3 learners and marks were obtained as below;

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 38 | 74 | 28 | 32 | 10 | 31 | 49 | 34 | 50 | 19 |
| 30 | 56 | 50 | 42 | 38 | 64 | 24 | 64 | 09 | 77 |
| 18 | 35 | 12 | 52 | 41 | 27 | 08 | 48 | 22 | 21 |
| 42 | 43 | 52 | 59 | 72 | 70 | 15 | 79 | 29 | 28 |

Using a class width of 10 marks and starting with a class of 1-10, 11-20 and so on;

a) Help the administration to find;
   i. The number of learners to be awarded prizes,
   ii. The number of learners to be given remedial examination.
b) What is the average performance of the class? **(15 marks)**

8. In Bukaaru village, Mr. Lubega had six children; Abdu, Isaac, James, Ashiraf, Mohammed and Tina. He made his will and kept it with a friend. After his death, children were fighting for the property as the elder son wanted to claim 50% as the heir. The lawyer saved the situation by reading the will. Tina was given 10% of the property. The remaining property was shared among the boys and the wife. Abdu was given 1/5, Isaac was given15%, James was given 20%,Ashiraf was given 5% and Mohammed was given 20%. The remainder was given to the wife.
   a) Help the family administrator to know how much property will each take given that Lubega had property worth UGx6,000,000.
   b) What percentage of Mr. Lubega's property was allocated to his wife?
   **(15 marks)**
9. It is believed that URA charges higher tax from interest on loans given out by commercial banks than loans given out by village SACCO's (Savings and Credit Cooperative Organisations). URA charges 10% tax on interest earned from commercial bank's loan and 5% tax on interest earned on a loan from SACCO. This tax is shifted to the customer by the bank OR SACCO. The commercial bank charges 3.5% interest compounded once a year. The SACCO charges 4.8% simple interest rate for every month.
   a) Help a customer who wishes to borrow UGx6,000,000 for one year to select an appropriate bank he/she can borrow from.
   b) How much money would be remitted to URA if the customer selected;

i. A commercial bank
ii. SACCO

**(15 marks)**

10. A designer wants to use a pentagonal shape in designing a textile print with corners A(3,6), B(3,9), C(4,10), D(6,9) and E(6,6). After reflection, a designer got another print with the corners $A^{I}(6,3)$, $B^{I}(9,3)$, $C^{I}(10,4)$, $D^{I}(9,6)$ and E(6,6).
    a) Find the equation of the mirror line.
    b) A designer reflected the object ABCDE again in the mirror line $y = 4.5$ to get $A^{II}B^{II}C^{II}D^{II}E^{II}$. State the coordinates of the image formed.
    c) A designer further reflected $A^{II}B^{II}C^{II}D^{II}E^{II}$ in the mirror line in (a) above to get the final image $A^{III}B^{III}C^{III}D^{III}E^{III}$. State the coordinates.
    d) Using the same pair of axes, complete the design
    e) Name the shape formed in the middle of the design. **(15 marks)**

11. Teacher Kenneth left his home to school which is 30km due east of his home. From school, he decided to pass by nearest trading centre which is on bearing of 150°from his home and 240°from school. As he proceeded to his home, he passed by his friends home which is 20km on a bearing of 250°from the trading centre.
    a) By scale drawing, show the positions of his home, school, trading centre and his friend's home.
    b) What is the shortest distance from Kenneth's home to his friend's home?
    c) What is the bearing of Kenneth's friend's home from Kenneth's home?

**(15 marks)**

**END**