

COMPLETE MATHEMATICS ITEM BANK

MASTERING O'LEVEL MATHEMATICS

EDITION 2025

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Preface

Mathematics is not only a subject to be studied but a skill to be mastered, a language through which we understand patterns, reason logically and solve real-world problems.

This item bank has been carefully compiled to help O'level students strengthen their understanding of key mathematical concepts and to prepare effectively for examination. The aim is to build confidence through progressive practice, encourage analytical thinking and nurture problem-solving ability.

It is my sincere hope that this collection of items not only assists learners in achieving academic excellence but also inspires them to appreciate the beauty and logic of mathematics.

Ssekyanzi Ronald

Author

Acknowledgement

The completion of this mathematics item bank has been made possible through the support, encouragement and contribution of many individuals.

The author wishes to express sincere appreciation to the teachers, colleagues and students whose insights and feedback greatly influenced the selection and refinement of the items contained in this book.

Special thanks are extended to the SOSK administration for their continued support and to the reviewers whose constructive comments helped improve the quality and clarity of this work.

Above all, gratitude is offered to all learners whose curiosity and dedication to mastering mathematics remain true inspiration behind this publication.

RONALD SSEKYANZI
Author

Dedication

This item bank is dedicated to all SOSK candidates 2026 and 2025 whose enthusiasm, curiosity and determination to understand mathematics have been a constant source of inspiration.

To my classes, who have challenged me to explain more clearly, teach more effectively and think more deeply, this work is a reflection of your effort and commitment.

May it serve as a guide, a challenge and a reminder that with persistence and practice, every mathematical problem has a solution.

Ssekyanzi Ronald

456/1
MATHEMATICS
Paper 1
 $2\frac{1}{4}$ hours

SET 1

Uganda Certificate of Education

MATHEMATICS

Paper 1

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES

*This paper consists of **two** sections; **A** and **B**. It has **six** examination items.*

*Section **A** has **two compulsory** items.*

*Section **B** has **two** parts; **I** and **II**. Answer **one** item from each part.*

*Respond to **four** examination items in all.*

*Any additional item(s) answered will **not** be scored.*

***All** responses **must** be written in the Answer booklet(s) provided.*

Graph paper is provided.

Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used.

SET 1

SECTION A

Respond to both items in this section

Item 1

A parish agricultural officer has received 450 kilogrammes of fertilizers for maize and 120 litres of anti-tick vaccine for cattle. He intends to distribute fertilizers equally among the farmers and also distribute anti-tick vaccine equally among the same farmers. He wants to establish the number of farmers that will get the items.

Joseph is one of the farmers and his daily milk production is 180 litres. He sells sixty percent of the milk at shs 850 per litre and donates $\frac{1}{5}$ of the remaining milk to orphanage. He has been advised to use the quantity of milk left after selling and donating, to make yoghurt and butter in the ratio 1:3. However, Joseph has a challenge of determining the amount of milk he should use to make butter.

Task

Help:

- (a) The parish agricultural officer to establish the number of;
 - (i) Farmers that will receive the items.
 - (ii) Kilogrammes of fertilizers and litres of vaccine each farmer will get.

- (b) Joseph to determine the amount of;
 - (i) Money he collects from the milk he sells.
 - (ii) Milk he should use to make butter.

Item 2

Jariah has a cattle section and goats section on her farm. She employed a farm manager.

According to the manager's record, each worker in the cattle section takes care of 50 heads of cattle and each worker in the goats' section takes care of 30 goats. The farm has a total of 310 animals in both sections.

Each worker in the cattle section is paid shs 150,000 per months and each worker in the goats' section is paid shs 100,000 per month. A total of shs 950,000 is spent on paying workers every month.

Jariah needs help to determine the number of workers in each section of the farm using the manager's records.

The records also show that for the past three months, the manager has been selling milk to customers at a constant wholesale price as indicated in **table 1**.

Table 1

Months	1	2	3
Milk (litres)	100	80	120
Amount paid (shs)	150,000	120,000	180,000

The manager has informed her that the farm is likely to produce 135 litres for sale at wholesale price next month. Jariah needs assistance to use the sales records to form an equation that she would use to determine the amount of money to be paid by any customer who buys any quantity of milk at wholesale price.

Task

Help Jariah to:

- Determine the number of workers in each section of the farm.
- Form an equation she would use basing on the records and state the constant wholesale price of each litre of milk.
- Calculate the amount of money she is likely to receive from the sale of milk next month.

SECTION B

This Section has two Parts; I and II

Part I

*Respond to **one** item from this part*

Item 3

Elisheba employs two workers, Moses and Sarah, to sell soft drinks in a carpark while she attends to her wholesale shop.

Moses has been given 12 bottles of soda, 15 bottles of juice and 20 bottles of water for sale.

Sarah has been given 12 bottles of juice, 18 bottles of soda and 15 bottles of water for sale.

The price of each bottle of soda, juice and water is shs 1000, shs 2000 and shs 500 respectively.

Elisheba needs help to arrange the information about the drinks as well as their respective prices in rows and columns, so that she can easily determine how much money to expect from each worker.

Elisheba will be going for shopping tomorrow and has thereafter decided to toss two similar coins at once as a fair way of selecting one of the workers to attend to the shop while the other one goes to the park.

The workers have agreed that if at least one head appears on top, the Moses will attend to the shop and if no head appears on top, then Sarah will attend to the shop.

Elisheba needs to determine the worker with the highest chance of being selected to attend to the shop.

Task

Help Elisheba to;

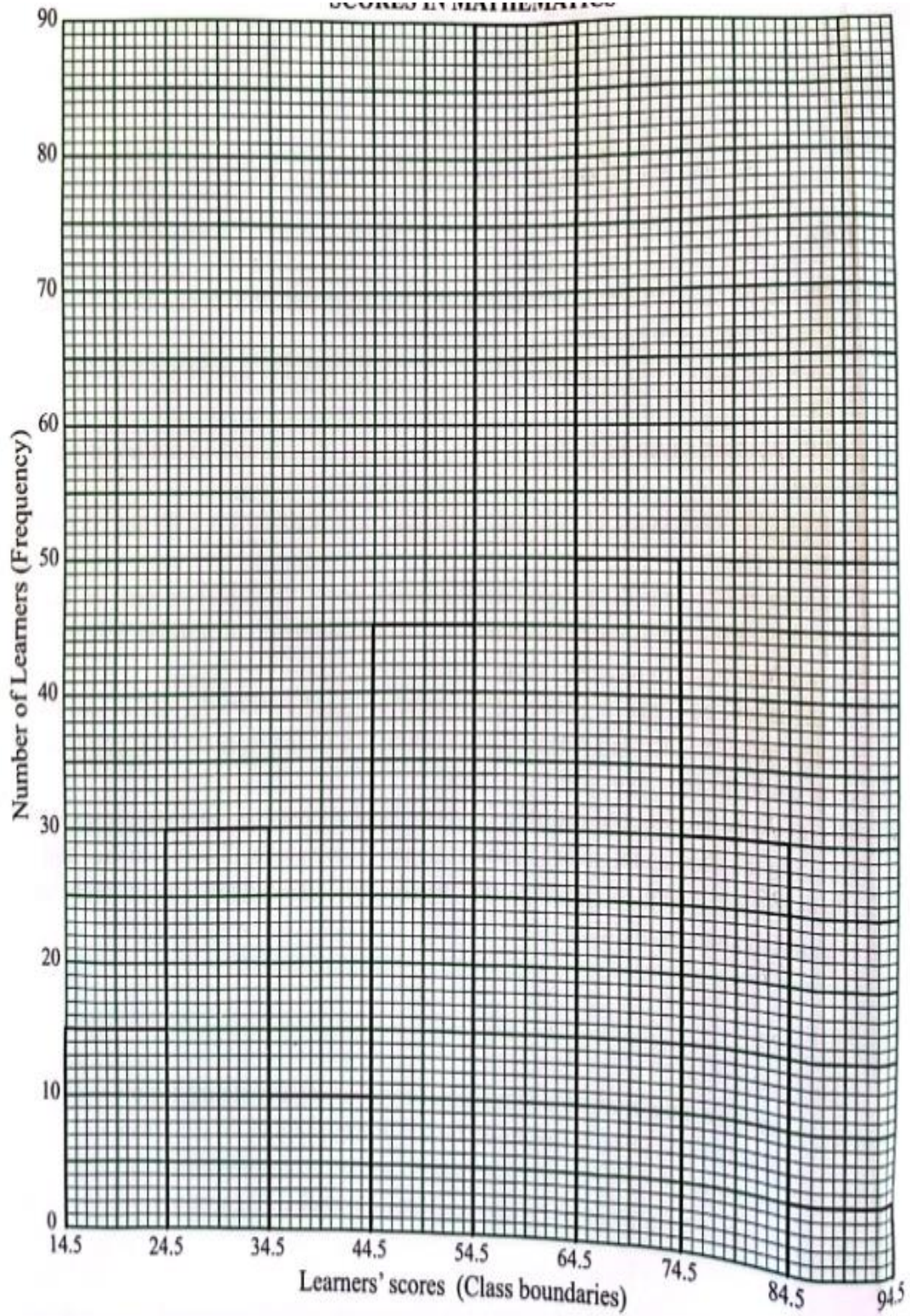
- (a) Organize the information in rows and columns, clearly stating the order of the information you have organized for the drinks and that for the prices respectively.
- (b) Calculate the amount she should expect from each of the workers.
- (c) Determine the probability with which the worker with the highest chance will be selected, hence name the worker to attend to the shop.

Item 4

A certain school employed a new teacher of mathematics to help the senior four learners to improve on their performance. Before the new teacher was employed, the analysis showed that the learners' mean score was 54% and 38% of the learners scored below the pass mark of 55%.

The new teacher has taught for a full term and learners have been given an exam whose results are shown in graph 1.

GRAPH 1 SHOWING NUMBER OF LEARNERS AND THEIR SCORES IN MATHEMATICS



The school needs help to analyze the results of the learners' performance shown on graph 1 and establish whether there is an improvement in the learners' performance basing on;

- (i) The mean score of the results on graph 1 in comparison to the previous mean score and
- (ii) The percentage of learners below the school pass mark of 55%.

Task

Provide the school with the help they need.

Part II

Respond to one item from this part

Item 5

A tourist travelled from the U.S to Kenya. While in Kenya, she exchanged US dollars \$1250 to Kenya Shillings at a rate of $\$0.0077 = \text{Kshs } 1$. She spent 30% of the exchanged money.

She has arrived in Uganda with the remainder of the Kenya shillings which she wants to exchange to Uganda shillings (Ugshs). The forex bureau in Town A, where she is now, buys and sells foreign currency as shown in table 2.

Table 2

Currency	Buying (UgShs)	Selling (UgShs)
Kshs 1	27.47	28.50
\$1	3490	3600

The tourist is not sure of how much she will get in Uganda Shillings.

After the exchanging the money, she intends to set off from town A to visit a game park for a few hours and then return to town A. The driver of the travel company she is going to use has informed her that the direct route they were supposed to use is closed to road repairs.

They will have to take an alternative route in a direction 210° from town A for 10km up to a junction. From the junction, they will turn West and drive at an average speed of 72 km/h and this will take them 5 minutes to reach the game park from the junction.

The tourist is supposed to pay Ugshs 12,500 per kilometer travelled and she wishes to know the extra amount of money she will pay when using the alternative route instead of the direct one to travel from town A to the game park and back to town A.

She has planned to spend a total of Ugshs 1,141,500 while in Uganda. This will include her transport from town A to the game park and back to town A, plus all other expenses.

On getting back to town A, she intends to exchange the remaining Uganda shillings to U.S dollars but needs help on how many dollars she will get.

Task

- (a) How much money in Uganda shillings will the tourist get on arrival in Uganda?
- (b) Determine the extra amount of money the tourists will pay for using the alternative route.
- (c) Calculate the amount of money in U.S dollars the tourist will get after exchanging the remaining Uganda shillings.

Item 6

A head teacher of a school with 500 students has been receiving reports of some students missing porridge in the morning. In defense the caterer claims that the students are many and use big cups, yet the container in which the caterer keeps porridge to be served is small.

The container has a surface area of $96,000 \text{ cm}^2$ and a volume of $128,000 \text{ cm}^3$. The caterer has requested the head teacher to buy a similar larger container of surface area of $150,000 \text{ cm}^2$ so that the volume of porridge to be served to each student increases when the larger container is filled to capacity.

As a way of improving the services at the kitchen, the head teacher has employed another cook who will earn a gross monthly income of shs 853,500. The income includes a transport allowance of shs 115,500, housing allowance of shs 81,150, lunch allowance which is 10% of the gross monthly income and utilities allowance of shs 35,500.

The cook is supposed to pay income tax according to the structure in the table 3, but all the allowances are free of tax.

Table 3

Taxable income (shs)	Tax rate
0 – 105,000	Free
105,001 – 250,000	13
250,001 – 350,000	20
350,001 – 450,000	30
450,001 – 550,000	40
550,001 and above	45

The cook is interested in knowing his net income.

Task:

- (a) Determine the quantity of porridge in litres, that will be served to each of the 500 students if the caterer gets the larger container and each student is to receive the same quantity.
- (b) Compute the net income for the cook.

END

SET 2

SECTION A

Answer all items in this section

Item 1

To friends, Sarah and Moses started a poultry project to which they contributed shs 4,000,000 and shs 6,000,000 respectively.

They agreed to share the profits in the ratio of their contributions and the project started with 2,000 birds.

After selling all the birds, they made a profit of one million five hundred thousand shillings. They re-invested the profit in the project and the number of birds increased to 2,500. However, Moses was not sure of the amount he re-invested as well as the percentage increase in the number of birds.

On 1st March 2025, they bought feeds and also balanced their books of accounts. On that very day, they had a meeting in which they agreed to buy feeds after every 7 days and balance their books of accounts after every 15 days. However, Sarah wondered if there would be another date in the future on which they would buy feeds and balance their books of accounts on the same day.

Task:

- (a) How much of the profit did Moses re-invest in the business?
- (b) What was the percentage increase in the number of birds?
- (c) On what date in the future would they buy the feeds and also balance their books of accounts the same day?

Item 2

A tailor makes school uniforms for boys and girls. The tailor makes at least 80 sets of uniforms for boys and not more than 100 sets of uniforms for girls. Each set of uniform for boys requires 4m of material and each set of uniform for girls requires 3m of material. The tailor has at most 600m of material to use. The tailor makes a profit of shs 8,000 on each set of boy's uniform and shs 6,000 on each set of girl's uniform. The tailor is not sure of the number of sets of uniforms to make in order to maximize profit.

Task:

- (a) Express the tailor's conditions as inequalities and equations
- (b) Show the feasible region of the tailor's conditions on a Cartesian plane.
- (c) Help the tailor to determine the possible number of sets of boy's and girl's uniforms that should be made to maximize profit. Hence state the maximum amount of money the tailor is likely to make.

SECTION B

*This Section has **two** Parts; **I** and **II***

Part I

*Respond to only **one** item from this part*

Item 3

James has been sent to a certain region to find out whether it is necessary to set up a new office for processing National Identity cards, Driving permits and passports, if the probability of a person having only one document is less than 50%.

James randomly interviewed 75 people in that region. He found out that 18 people did not have any of the three documents, 30 people had Driving permits and 20 people had passports. The number of people who had both National Identity cards and driving permits only was twice those who had both passports and driving permits but no National identity cards. 4 people had passports only.

3 people had all the three documents and 12 people had Driving permits only. James has to report about the number of people who have National Identity Cards but he has some missing information.

Task:

- (a) Help James to find the total number of people with National Identity Cards.
- (b) Determine if there is need for a new office in the region. Give a reason for your answer.

Item 4

A farmer's cooperative society gave out fertilizers to a sample of maize farmers in the first season. The number of bags of maize harvested in the first season are given below.

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 society wants;

- (i) The data to be presented in a frequency distribution table with classes of interval 10 for easy interpretation.
- (ii) To determine the number of bags of maize above which half of the farmers harvested so as to establish the real effect of the fertilizers.
- (iii) To determine the number of farmers whose harvest is **44.5** bags of maize and below for re-training before the second season but they lack information.

Task:

Help the society to;

- (a) Represent the data in a frequency table.
- (b) Determine the number of bags of maize above which half of the farmers harvested.
- (c) Determine the number of farmers for re-training.

Part II

Answer one item from this part.

Item 5

Your sister bakes cakes and has received an order for a cake from your friend. Joseph, who needs a cylindrical cake with a base area of 660.5cm^2 .

Your sister has suggested two payment plans to Joseph. He can pay shs 400,000 cash or pay a deposit of shs 200,000 and 2 equal installments of shs 110,000 each. However, Joseph has found it hard to decide on the payment plan.

Your sister has a triangular board that she wants to use to cut out the circular tray on which the base of the cake will sit. The two sides of the triangular board measure 60cm and 48cm and the angle between these sides is 60° .

Your sister is not sure where the largest circular tray (inscribed circle) she can cut out of the triangular board will be enough for the base of the cake.

Task:

- (a) Which of the two payment plans will you recommend to Joseph? Give a reason for your answer.
- (b) Determine whether the largest circular tray she plans to cut out of the triangular board will be enough for the base of the cake.

Item 6

Your brother wants to design a children's playground. The playground will have a triangular garden and a circular fence around the garden. The two sides of the triangular garden will measure 50m and 70m, and the angle between them will be 45° .

Your brother also wants to construct a circular fence around the garden such that the circular fence perfectly touches the three vertices of the triangular garden.

Your brother intends to put pavers in the region outside the triangular garden but inside the circular fence. Each square metre of pavers cost shs 35,000.

Your brother needs help in identifying the type of triangle represented by the triangular garden, coming up with an accurate design of the playground as well as the cost of buying the pavers.

Task:

Help your brother to;

- (a) Construct an accurate design of the children's playground.
- (b) Identify the type of the triangle represented by the triangular garden and give a reason for your answer.
- (c) Determine the amount of money needed to buy the pavers.

SET 5

SECTION A

Answer all items in this section

Item 1

Simon is the District Inspector of schools in one of the districts in Eastern region found that his casual workers use one third of his farm for bananas, **one quarter** for coffee and **two fifth** of the remainder for mixed farming. He still has some six acres of unused land.

A certain school has a student population of **1200** students. On a particular day, Simon invited the entire of $\frac{1}{5}$ of the boys and $\frac{1}{4}$ of the girls to go to **Nakaseke** resource Centre for a sport's meeting and **936** students were left behind.

Simon has a house valued at 45 million shillings. Its value increased by 25% after the first year but in the second year, the value of the house depreciated by 10%.

Task:

- (a) Find the size of his farm and clearly illustrate it on a diagram.
- (b) Find how many more boys than girls attended the meeting.
- (c) Find the value of her house at the end of the second (2nd) year.

Item 2

A certain school is to transport its S. 4 students for fieldwork in Kasenyi. All the 400 students are to be transported using either coasters or buses. Each coaster can carry 40 people while each bus can carry 80 people. The transport department of the school has only 8 drivers on duty and up to four coasters. If the cost of hiring a coaster is shs. 150,000 and that of hiring a bus is shs. 300,000.

While in Kasenyi their geography teacher visited a certain shop from which he found that three shirts and two trousers cost shs. 105,000 at that shop. Two shirts and five trousers cost shs. 180,000 at the same shop.

Task:

- (a)
 - (i) Write down the five inequalities representing the above information.
 - (ii) Represent the inequalities on a graph paper.
 - (iii) Find the possible number of coasters and buses that can be used and hence determine the minimum cost.
- (b) Find the cost of;
 - (i) Each shirt and each trouser.
 - (ii) Three items of each type at the shop.

SECTION B

This Section has two Parts; I and II

Part I

Answer one item from this part

Item 3

There are very few teachers who have three teaching subjects. A survey was done in a certain school and it was found that the school has a teaching staff of 22 teachers. The number of teachers who teach Mathematics, Physics and Chemistry is 8 in each department. Three teach both Mathematics and Physics and one teaches Mathematics and Chemistry. No teacher teaches all the three subjects. The number of teachers who teach Physics and Chemistry is equal to that of those who teach Physics and mathematics only.

In the school staffroom there are two similar cylindrical cans that have different heights. One 50 cm and the other 75cm. If the surface area of the larger can is $12,667\text{cm}^2$ and has a radius 21cm.

Task:

- Find the number of teachers who teach none of the three subjects.
- Find the probability that a teacher picked at random teaches only one subject.
- Find the surface area of the smaller can.

Item 4

Three schools want to participate in the National Schools Football Sports Gala to be held in Lyantonde district playground. Unfortunately, none of the schools has a school bus and they want to hire a bus for the one day for the activity. The bus charges shs. 15000 per km moved. The three schools through their Sports teachers agreed to share the cost of the bus equally amongst themselves.

One day they hired a bus from a certain school and they set off at 5:45am from Kampala and the bus increased the speed gradually to **90km/hr** reaching Mpigi at **6:45am**. From there the bus driver maintained this same speed for $1\frac{1}{4}$ hours reaching Masaka. From Masaka the he reduced slowly in speed reaching Lyantonde at **9:30am**. The games started at **10:00am** sharp and each team played six games. School A won **3** games, drew **2** and lost **1** game. School B won **4** games and lost **2** games. School C won 2 games and drew **4** games. The organizers award three points for a win, one point for a draw and no point for a loss. They declared these schools the

first three schools in order of their points they obtained from the games. They were to receive the price of money of sixteen millions five hundred thousand shillings.

Task:

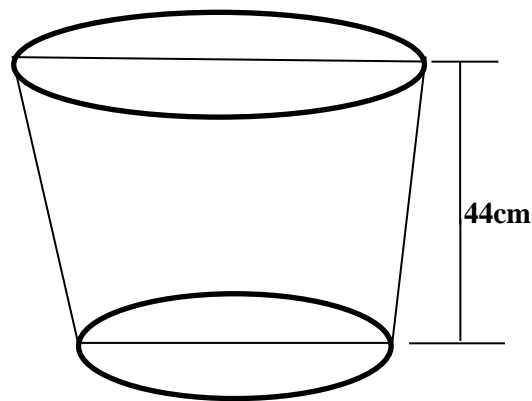
- (a) Find how much each school paid for the bus.
- (b) Decide the cash prize for each school

Part II

Answer **one** item from this part.

Item 5

A container is in shape of a frustum with an open end of diameter **45cm** and a bottom diameter of **35cm**. the bucket which is **44cm** deep is used to fill an empty cylindrical tank of diameter **2.1m** and height **1.5m**



Three hundred and sixty litres of a homogeneous paint is made by mixing three paints A, B and C. The ratio by amount of point A to point B is **3:2** and that of B to C is **1:2**. Paint A costs shs 1800 per litre paint B costs shs 2400 per litre and paint C shs 1,275 per litre.

Task:

- (a) (i) Determine the capacity of the container in litres correct to 3dp.
- (ii) The capacity of the tank in litres correct to 2 dp.
- (iii) The number of bucket that must be drawn to fill the tank.
- (b) (i) The amount of each paint in the mixture
- (ii) The amount of money needed to make 360 litre of the mixture
- (iii) The percentage profit made by selling the mixture at shs 2,210 per litre.

Item 6

Akiso bought a car in January 2017 from his friend at shs. 12,500,000. If the car depreciates at a rate of 10% per annum. He left Germany for Uganda through Switzerland. While in Switzerland he bought a watch worth 54 Deutsche Marks (Germany currency). Akiso is a secondary school teacher and as a requirement by the government pays PAYE every month according to the tax structure below.

Income (shs) per month	Tax rate(%)
1-50,000	5
50,001 - 100,000	9
100,001 - 180,000	15
180,001 - 300,000	18
300,001 - 400,000	23
400,001 - 500,000	30
Above 500,000	35

He earns Shs. 760,000 and his allowances include

- Marriage allowance - shs. 50,000 per month
- Water and electricity - shs. 60,000 per month
- Housing allowance - shs 150,000 per month
- Medical allowance - shs. 300,000 per annum
- Transport allowance - shs. 3,000 per day
- Paying for insurance and relief - shs. 180,000 per annum

Family allowance for only three children.

For children in the age bracket **0 to 10** years, **shs 212,000** per child, Between **10-15** years shs. **9000** per child **15** years and above **shs 5000**. Given that he has **five** children, **two** of whom are aged between 0 and 10, the other two aged between 10 and 15 while the other 18 years.

Support material

Take a month has 30 days

1 Swiss Franc = 1.28 Deutsche Marks

1 Swiss Franc = 1,350 Ugandan Shillings

Task:

- (a) Calculate the value of Akiso's car by January 2020.
- (b) Find the value of the watch in;
 - (i) Swiss Francs
 - (ii) Ugandan Shillings.
- (c) Determine his Net income
- (d) Determine the percentage of his gross income that goes to tax.

END

SET 19

SECTION A

Answer all items in this section

Item 1

David and Mark have been diligently saving a portion of their business earnings in a joint savings account. After accumulating a total of 7,080,000 Ugandan shillings, they now wish to divide the savings based on an agreed-upon ratio of 7:3 with David receiving 7 parts and Mark receiving 3 parts.

However, David has instructed Mark to give him 0.4 of his share, while the remaining amount will stay in the joint account for future use. 252 apples 210 oranges 294 pears
Additionally, David and Mark are planning to launch a new fruit packaging and selling business. Their initial stock consists of: They intend to pack these fruits into boxes without wasting any fruit. Their business is growing at a compound growth rate of 12% per year, and they currently generate an average monthly profit of 1,800,000 Ugandan shillings. They want to estimate how much profit they will make in 3 years if the growth rate remains constant.

Task:

- (a) How much of the savings will Mark give to David? (b)
- (b) (i) How many boxes can David and Mark create from the fruits they have?
 - (i) What will be the ratio of fruits in each box?
- (c) What will be the expected monthly profit of their business in 3 years, assuming the growth rate remains constant?

Item 2

Maya and Peter, bookstore owners, received an order to package 200 books for a customer. Previously, Maya packaged 48 books using 2 meters of packing tape and 168 books using 7 meters of packing tape. The customer requests that some books be packed in cardboard boxes (x) and some in paper wraps (y), with the following conditions:

The number of books in cardboard boxes should be more than those in paper wraps.
The number of cardboard boxes should not exceed 100. The number of books in paper

wraps should be at least 60. The total number of packing materials (boxes and wraps) should not exceed 200.

Task:

- (a) Establish a mathematical relationship between the number of books packaged and the amount of packing tape used.
- (b) Determine the amount of packing tape required to package 200 books.
- (c) Write down the mathematical inequalities for the number of cardboard boxes and paper wraps.
- (d) Find the maximum number of cardboard boxes and paper wraps they can use.

SECTION B

This Section has two Parts; I and II

Part I

Answer one item from this part

Item 3

Your school has organized a general election for various posts. The management committee decided that The Head Prefect (HP) of the school must be chosen from Form Five, on condition that to qualify to aspire for the post, students must score more than 60% in the B.O.T II Mathematics paper. Furthermore among those who qualify, students eligible for the open campaign must have successfully passed both oral and written interviews during the screening process.

The Form 5 class teacher submitted Math marks of 50 students to the school's electoral committee as follows:

60, 50, 40, 67, 53, 44, 69, 39, 45, 61
40, 71, 51, 26, 36, 38, 73, 37, 58, 48
48, 23, 39, 51, 59, 47, 46, 59, 40, 47
59, 68, 55, 67, 60, 51, 70, 46, 40, 62
43, 50, 50, 65, 58, 74, 32, 52, 51, 42

When the campaigning analyzed the class performance, it found out that out of the students who qualified for aspiring on the post of Head prefect and went through the screening interview stage, 5 performed well in oral interviews and 6 performed well in written interviews of which 2 were neither good in oral nor in written.

Task:

- (a) Based on mathematical calculations, determine whether more students qualified to aspire for the post or not.
- (b) Find the percentage of students who qualified to apply for the post.
- (c) How many students were allowed to participate in the open campaign ceremony?
- (d) Represent the above data on a statistical graph and use it to determine:
 - (i) The number of students who did not qualify.
 - (ii) The median mark.

Item 4

Two friends, Mark and Grace, recently returned to Uganda after working in the Middle East. At Entebbe International Airport, they exchanged their Bahraini Dinars (BHD) for Ugandan Shillings (UGX) at an exchange rate of 1 BHD = 1,400 UGX. They exchanged 10 BHD.

They decided to visit Ssesse Island Beach and later travel to Lake Victoria Resort, 40 km to the southeast. Since no direct road connects these locations, they hired a boat for the journey. The boat traveled: 45 km on a bearing of 090° 20 km on a bearing of 225° before stopping briefly, the boat rental company charges UGX 12,000 per kilometer traveled.

Task:

- (a) How much did Mark and Grace receive in Ugandan Shillings after exchanging their money?
- (b) From the stopping point, what bearing should the captain follow to reach Lake Victoria Resort?
- (c) Calculate their total transport expenditure for the boat journey.

Part II

Answer one item from this part.

Item 5

In Kasese County, Bundibugyo District, the government has launched a high yield seed distribution program in four parishes: Ekyama, Kabuweji, Konge, and Kibuli. The government procured 42,000 packets of seeds, to be distributed proportionally as follows:

Ekyama receives 25 packets per unit share

Kabweji receives 18 packets per unit share

Konge receives 32 packets per unit share

Kibuli receives 22 packets per unit share

To transport the seeds, two Lorries are dispatched: A Tata lorry from Ekyama, traveling 50 km/h for 1 hour, stops for 30 minutes in Konge, then proceeds to Kabuweji at 60 km/h. An Isuzu lorry from Kabuweji at 12:30 pm, traveling 40 km/h for 1 hour, then continues at V km/h, aiming to reach Ekyama by 4:30 pm.

Task:

- (a) Determine the number of seed packets each parish receives using a statistical diagram.
- (b) Using a distance-time graph, find:
 - (i) The meeting point of the two Lorries.
 - (ii) The arrival time of the Tata lorry at Kabuweji.
 - (iii) The speed V of the Isuzu lorry.

Item 6

At the school, each grade 8 teacher earns a monthly salary of UGX 1,500,000. They receive a housing allowance of UGX 350,000, utilities allowance of UGX 120,000, and an off station allowance of UGX 200,000. Teachers are also required to contribute 5% of their gross salary to a social security fund. However, the school bursar is unavailable due to illness, and teachers must still receive their salary before the trip.

The country's tax rates are as follows:

Monthly taxable income	Tax rates %
0 – 400,000	10
400,001 - 800,000	15
800,001 - 1,200,000	20
Above 1,200,000	25

Task:

- (a) Calculate the gross salary of each grade 8 teacher.
- (b) Determine the amount of money each teacher contributes to the social security fund.
- (c) Calculate the taxable income of each teacher.
- (d) Determine the amount of tax each teacher pays.
- (e) Calculate the take-home pay of each teacher after taxes and contributions.

END

SET 47
SECTION A

*Answer **all** items in this section*

Item 1

Two nurses M and N are assigned to check on a certain patient in shifts. One is to check on him every after 6 hours and the other every after 10 hours. Both were taken to the patient's room at 8 am on 2nd august 2024. They need to know the time and date they might collide on the same patient again and hence agree on who will visit the patient at that specific time.

M was told to write a receipt for the patient clearly showing him his remaining balance given the fact that on the total bill of four million five hundred forty-six thousand Ugandan shilling, the patient had deposited 60% as the hospital policy states. Now M needs to know the exact amount to put on the receipt.

M also wanted to predict on how many years it would take the hospital's average profits to increase to Ugx 5,184,000. Given the fact that currently they make average profits of ugx 3,000,000 that increases at an average compound interest rate of 20% per year.

Task

- (a) When and at what time are they expected to collide at the same patient?
- (b) What balance is M going to write on the patient's receipt?
- (c) In how many years will the hospital make the target average profits?

Item 2

A certain foreign farmer wants to plant acres of cotton and corn respectively in a maximum space of 150 acres of land that he has for export. He wants to import cotton seeds that can cover one acre at 3 dollars and corn seeds that can cover one acre at 5 dollars. At the same time, he wishes to hire farmers to help him in planting and pay them in foreign currency. He is to pay 15 dollars per acre of cotton planted by the farmer and 8 dollars per acre of corn planted by the farmer. To maximize income, the farmer can only incur a total cost that is not more than 540 dollars on seeds and a total cost less than 1800 dollars on labour. The farmer expects total income of 80 dollars per acre of cotton grown and 110 dollars per acre of corn grown. He needs to know how many acres of corn and cotton he should plant respectively to maximize income.

Task:

- (a) Form mathematical inequalities and expressions describing his situation.
- (b) Help the farmer decide on the acres of cotton he can grow respectively to maximize income.

SECTION B

*This Section has **two** Parts; **I** and **II***

Part I

*Answer **one** item from this part*

Item 3

The director of studies presented by the following summary of students' scores in a certain subject. He is finding it hard to use the presentation to come up with an average score and the score that 90% of the class got and yet it's the two values that he wishes to present in the school report. Below is how scores were presented to him.

Task

Use the presentation to help the director of studies get the values that he wishes to put in the end of term report.

Item 4

The head teacher promised to gift all those who won different games with money. Those who won only one of the games were to receive Ugx 10,000 each. And those who won two games strictly, were to receive Ugx 20,000 each and those who won in all the three games were to receive Ugx 30,000 each. Out of the 100 learners who participated in the competitions, 15 won in football, 20 won in netball, 30 won in volley ball. 6 won in volleyball and football, 7 won in netball and volley ball while 8 won in football and net ball. Some learners won in all the three games while others won none of the games. Those who won at least one game were 48 in total. Now the head teacher needs to know how many out of 100 will not receive gift money and the exact amount to organize for prizing those who fall in the categories he mentioned to gift money.

Task

- (a) How many out of the 100 will not receive money from the head teacher?
- (b) How much should the head teacher organize for prizing those who fall in the categories he mentioned?

Part II

Answer one item from this part

Item 5

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