Prepared Scoring Guide by Sentomu (0787-762458)

456/1
MATHEMATICS
PAPER 1
July/August 2024
2¼ hours

WAKISSHA JOINT MOCK EXAMINATIONS

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.*

Answer **four** *examination items in all.*

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

All *answers* **must** *be written in the Answer booklet(s)/ sheets provided.*

Graph Paper is provided.

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

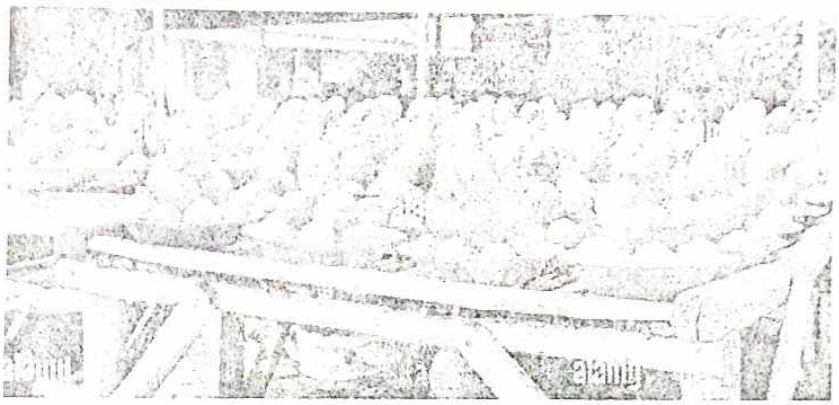
SECTION A

Answer all items from this section.

Item 1.

Your friend is a market vender. She realizes that her customers prefer buying tomatoes in small quantities, so she decides to re-package her tomatoes into heaps of four. One day she bought nine heaps of tomatoes which had eight tomatoes each from the market at a cost of Ugx 2,000 per heap and was given a discount of 5%. She decides to sell her heaps of four tomatoes at Ugx 1,200 each and hence wants to find out how much gross profit she will earn from all her heaps. She further intends to visit Queen Elizabeth National Park in December 2024. Her uncle visited the same tourism centre last December 2023 with his 3 children and spent Ugx 17,000 on entrance ticket. Mr and Mrs Mukasa visited the same park in june 2024 with their child and spent Ugx 14,000. She plans to buy entrance tickets for herself, husband and five children and hence needs to know how much she will need. If park charges are adjusted every after five years.

Support material



Task:

How much;

a) Gross profits will she earn from her heaps after re-packaging? (08 scores)

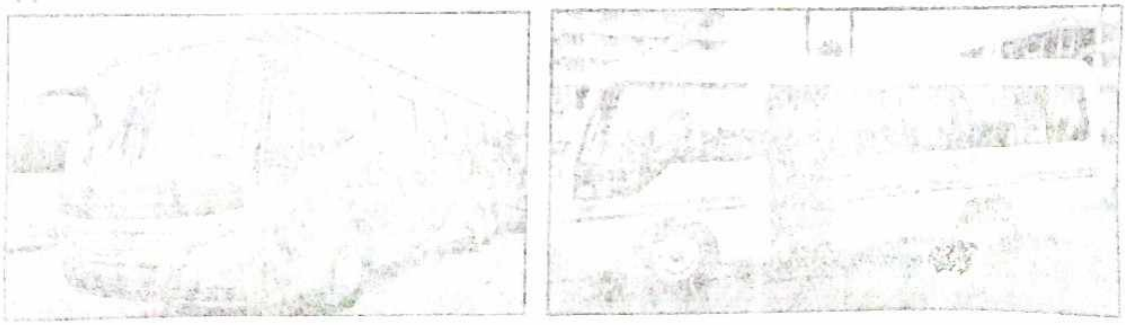
b) Money will she spend in total to buy the tickets she needs? (12 scores)

Item 2.

Your Mathematics teacher is planning to transport not more than 400 students to a seminar in a neighbouring school located 10 kms away. He however does not know how many trips each vehicle will make so as to minimize transport expenses.

After consultations with the manager, Super free express bus company, the teacher realizes that if all students paid, their total contribution, should not be less than sh 360,000. The school is to hire a bus which carries 64 students per trip and a mini bus which carries 16 students per trip. The number of trips made by the bus should be at least two and those made by the minibus should be at most 6. The minibus should make more trips than the bus and the charges will be Ugx 40,000 and Ugx 90,000 per trip for the minibus and bus respectively.

Support material



Task:

(a) Help the teacher to find out the number of trips each vehicle should make to achieve his goal.

(b) What is the maximum number of students that the teacher can transport?

(20 scores)

SECTION B

*This section has two parts; **I** and **II***

Part I

*Answer only **one** question*

Item 3.

Your guardian realizes during holidays that he may find it difficult to pay for sports uniform that costs Ugx 38,000 at the beginning of term III. He decides to keep you busy during the last week of your holiday moving around the village buying cabbages at Ugx 800 per cabbage. You will later group them into two groups: Group A shall be cabbages whose weight is below the average weight and Group B will be cabbages whose weight is above the average weight.

Support material

Later, you will sell the cabbages and the profits from the sales will be used to cover the cost of the sports uniform. Group A cabbages will be sold at Ugx 1350 each while Group B cabbages will be sold at Ugx 1650 each.

Before displaying the cabbages for sale, you measure and record their weights in grammes as follows.

104	99	107	96	101	84	102	78	106	108
63	104	86	111	102	100	95	100	65	112
76	87	95	85	95	103	61	105	73	99
83	102	102	97	92	90	113	107	88	102
110	91	90	109	82	66	92	91	108	73

Task

(a) Using suitable statistical method, find the average weight of the cabbages. (10 scores)

(b) If you sell all the cabbages at the planned selling price; will the guardian be able to meet his goal? (10 scores)

Turn Over

Item 4

Your Aunt who works very far away from home tells you to identify a shop that can give you beans, sugar and posho on credit and she pays for these consumables every after two weeks. She also tells you not to exceed Ugx 100,000 for the two weeks on average. After touring the trading centre you decide to pick consumables from a shop that sells a kg of beans at Ugx 4,000, a kg of sugar at Ugx 5500 and a kg of posho at Ugx 2400. You plan to always pick consumables on every Mondays and Thursdays, while taking records as follows;

Week one:

Monday: 2 kgs of sugar, 3 kgs of posho and 2 kgs of beans.

Thursday: 4 kgs of posho and 3 kgs of beans

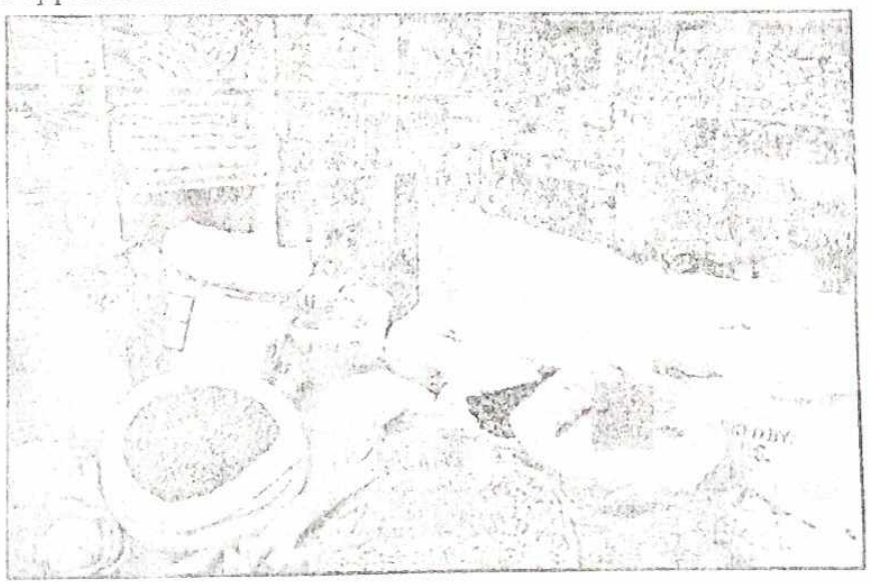
Week two;

You had visitors this week and picked more items as follows;

Monday: 3 kgs of sugar, 4 kgs of posho and 2 kgs of beans

Thursday: One kg of sugar, 2 kgs of beans and 5 kgs of posho.

Support material



Your Aunt is now back and asking you how much money you owe the shopkeeper.

Task

(a) How many kgs of each consumable did you pick from the shop all together for the two weeks?

(b) How much money will you tell your Aunt to pay?

(c) Did you fit in the planned expenditure budget proposal by your Aunt?

(20 scores)

SECTION B PART II

Attempt one question only

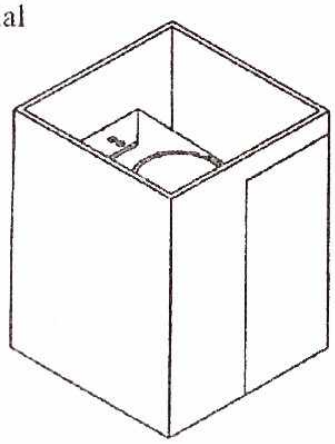
Item 5.

Your uncle has a bath room with three walls and the floor that he wishes to tile. The person who wishes to do this work gave him the quotations required to complete this work as follows:

- Each box of tiles can cover a space of 1.5 square metres and costs Ugx 32,000.
- The two opposite walls measure 6 feet by 6 feet each.
- The floor and the other remaining wall measures 5 feet by 6 feet.
- Labour charges is Ugx 9000 per square metre.
- Other expenses on consumable materials namely: adhesive, sand, cement, spacers and grout amount to Ugx 200,000. He has money for all other expenses in hard cash but must borrow the money for tiles and labour from his siblings at a compound interest rate of 5%, if he can pay back by the end of 1.5 years.

However, Uncle is finding it hard to determine how much to borrow and how much is expected to pay back. Note: 1 feet = 0.305metres.

Support material



Task:

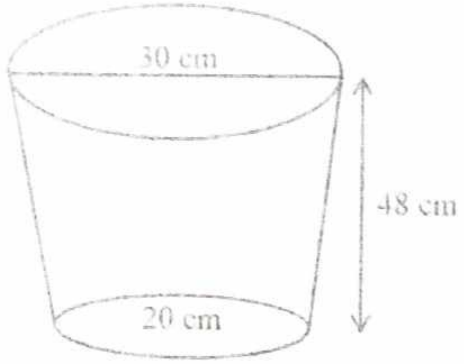
Help your uncle to find out how much money to borrow and how much to pay back to his siblings.

(20 scores)

Item 6

A manager owns a paint company which makes paint of various colours. He receives an order from his clients to make paint by mixing three colours; White(W), Blue(B) and Red(R) in the ratios W:B = 3:2 and B:R = 3:2. The customer orders for 380 litres of similar paint. Paint W costs Ugx 2200 per litre. Paint B costs Ugx 2700 per litre and Paint R costs Ugx 2850 per litre. The manager packs the similar paint made in buckets in a shape of a frustrum with top diameter 30 cm and bottom diameter 20 cm. The buckets are 48 cm deep as shown.

Turn Over



If the manager buys a cylindrical tank of diameter 1.8 m height 1.2 m which he wants to fill with paint so as to cater for any urgent demand that may arise.

Task

(a) (i) Determine the quantity of each paint in the mixture.

(ii) Find the amount of money needed to make 1 litre of the mixture.

(iii) Obtain the percentage profit made by selling the mixture at Shs. 3800 per litre.

(b) Help manager in determining the number of buckets that must be drawn to fill the tank.

(20 scores)

END

Total mark scored	

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DO NOT WRITE YOUR SCHOOL/CENTRE NAME OR NUMBER ANYWHERE IN THIS BOOKLET

Candidate's Name ..... Sentamu Geoffrey 0787-762458 .....

Signature .....

Subject ..... Paper code ...../.....

Random No.					
Personal Number					

READ THE INSTRUCTIONS BELOW CAREFULLY BEFORE USING THIS ANSWER BOOKLET.

1. Confirm that this answer booklet has 16 pages. Do **not** accept an answer booklet with missing pages.
2. Do **not** fold, dismantle, tear and/or mishandle any part of the answer booklet. Folding, dismantling, tearing and/or any other form of mishandling of the answer booklet is a malpractice and shall lead to cancellation of results.
3. Use a blue or black ink ball pen. Work in pencil, other than graphs, maps and drawings, will **not** be marked.
4. Answer only the number of questions as instructed on the question paper. Answers to extra questions will **not** be marked.
5. Write your answers on both sides of each sheet.
6. Do your rough work in this answer booklet. Cross through any work you do not want marked. All work must be handed in.
7. Do **not** share your work with another candidate or expose your work such that another candidate can copy from it. Sharing or exposing your work shall lead to cancellation of results.
8. List the question numbers in the order attempted, in the first column of questions attempted table. Do **not** list the multiple choice questions.
9. Check to confirm that you have written your **name, signature, random number and personal number on each page** of the answer booklet(s) used.
10. Tie all the used booklets together using a white thread.

Questions attempted

Question number	For Examiners' use only	
	Mark	Examiners' initials
Total		

Write the number of answer booklets you have used here. →	

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Item 1 (a)

9 heaps each of eight tomatoes

Total tomatoes bought = 9 × 8 I = 1

= 72 tomatoes.

Total cost of buying the 9 heaps (72 tomatoes)

1 heap costs Ugx 2000

9 heaps cost Ugx (2000 × 9) I = 1

= Ugx 18,000. I = 1

With the 5% discount: Selling percentage = 100 − 5 = 95%

Actual selling price = $\frac{95}{100} \times 18,000$ I = 1

∴ the Cost Price was = Ugx 17,100 M = 1

Number of heaps of four = $\frac{72}{4}$ I = 1

= 18 heaps.

1 heap Costs Ugx 1,200.

18 heaps Cost Ugx (1,200 × 18) I = 1.

= Ugx 21,600 M = 1

∴ the Selling price is Ugx 21,600.

Profit = Selling Price − Buying Price

= 21,600 − 17,100 I = 1

= Ugx 4500

∴ the Gross profit she will earn will be Ugx 4500. Ap = 1

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Item 1(b)

Let the number of people be x

Let the cost be y

Using $(x_1, y_1) = (4, 17000)$ and $(x_2, y_2) = (3, 14,000)$

$$\frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{Gradient} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{14,000 - 17000}{3 - 4} \quad \text{I = 1 - Numerator}$$

$$\text{I = 1 - Denominator}$$

$$m = 3000. \quad \text{M = 1}$$

Using $y = mx + c$.

For $(4, 17000)$ and $m = 3000$.

$$17,000 = (3000 \times 4) + c \quad \text{I = 1}$$

$$c = 17,000 - 12,000 \quad \text{I = 1}$$

$$c = 5000. \quad \text{M = 1.}$$

$\therefore$ the equation connecting x and y is.

$$y = 3000x + 5000. \quad \text{M = 1}$$

Total number of people = 7 $\therefore x = 7$

$$y = (3000 \times 7) + 5000 \quad \text{I = 1}$$

$$y = 21,000 + 5000 \quad \text{I = 1.}$$

$$y = 26,000. \quad \text{M = 1}$$

Ap = 1

$\therefore$ She will be charged Ugx 26000 for her ticket.

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Item 2 (a)

Let the number of trips made by the bus be x

Let the number of trips made by the mini bus be y. F=1

$64x + 16y \leq 400$

$4x + y \leq 25$ .... (i). F=1

$90,000x + 40,000y \geq 360,000$

$9x + 4y \geq 36$ --- (ii). F=1

$x \geq 2$ --- (iii) F=1

$y \leq 6$ --- (iv) F=1

$y > x$ --- (v) F=1.

Expense = $90,000x + 40,000y$

Inequality	Boundary line	coordinates.
$4x + y \leq 25$	~~$4x+y = 25$ (solid) $(0,25), (6,1)$~~	$(0,25), (6,1)$.
$9x + 4y \geq 36$	$9x + 4y = 36$ (solid)	$(0,9), (4,0)$
$x \geq 2$	$x = 2$ (solid)	
$y \leq 6$	$y = 6$ (solid)	
$y > x$	$y = x$ (dotted)	

M=1 M=1.

M=1

(x, y)	Expense = $90,000x + 40,000y$	Number = $64x + 16y$
$(2, 6)$	$90,000(2) + 40,000(6) = 420,000$	$64(2) + 16(6) = 224$ M=1
$(3, 4)$	$90,000(3) + 40,000(4) = 430,000$	
$(4, 5)$	$90,000(4) + 40,000(5) = 560,000$	

The teacher should use 2 trips of the bus and 6 trips of the mini bus to minimise the expenses to Ugx 420,000 A=1.

(b)

The maximum number of students the teacher will take is 224. A=1.

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(To be fastened together with other answers to paper)

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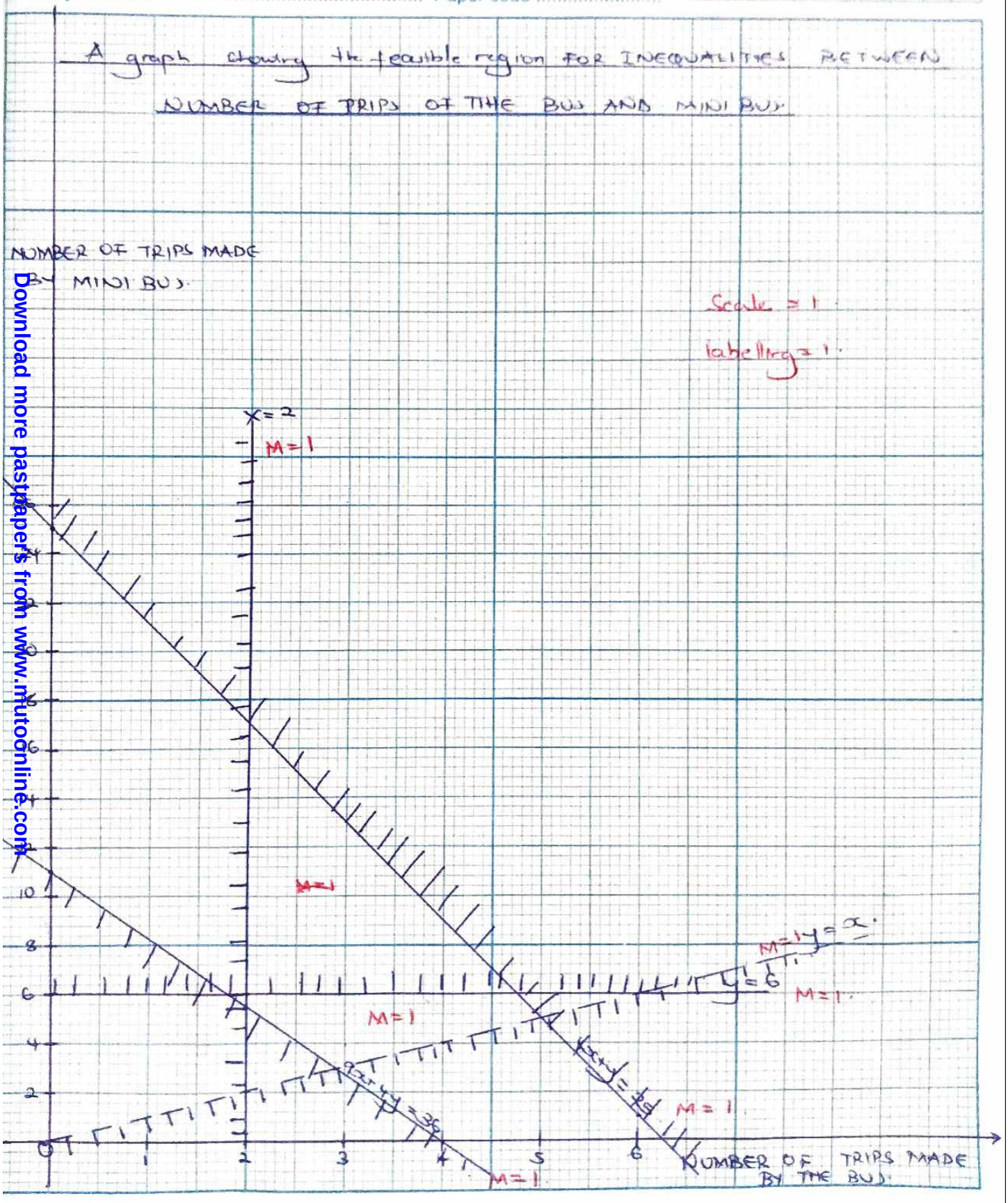
A graph showing the feasible region for inequalities between number of trips of the bus and mini bus.



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Alternatively (b)

(x, y)	Number = 64x + 16y
(2, 6)	64(2) + 16(16) = 224 M = 1
(3, 6)	64(3) + 16(6) = 288
(4, 6)	64(4) + 16(6) = 352

The teacher will transport 352 students by. A = 1

Correct if part (b) is independent of (a)

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Item 3.

A frequency distribution table showing the weights of cabbages. P=1

Weight	tally	f	x	fx	c.f	class boundaries	P=1
60-69	////	4 P=1	64.5	258	4	59.5 - 69.5	
70-79	////	4	74.5	298 P=1	8	69.5 - 79.5	
80-89	///// //	7	84.5	591.5	15	79.5 - 89.5	
90-99	///// ///// ///	13	94.5	1228.5	28	89.5 - 99.5	
100-109	///// ///// ///// ///	18	104.5	1881	46	99.5 - 109.5	
110-119	////	4	114.5	458	50	109.5 - 119.5	
		$\Sigma f = 50$	P=1	$\Sigma fx = 4715$	P=1	P=1	

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f}$$

$$= \frac{4715}{50} \quad A=1$$

$$= 94.3 \quad A=1$$

(b) Number of cabbages in Group A = 20 Cabbages A=1

Number of cabbages in Group B: 50-20

= 30 Cabbages A=1

Amount from sales in Group A: 20 × 1350

= Ugx 27,000 A=1

Amount from sales in Group B: 30 × 1650

: Ugx 49,500 A=1

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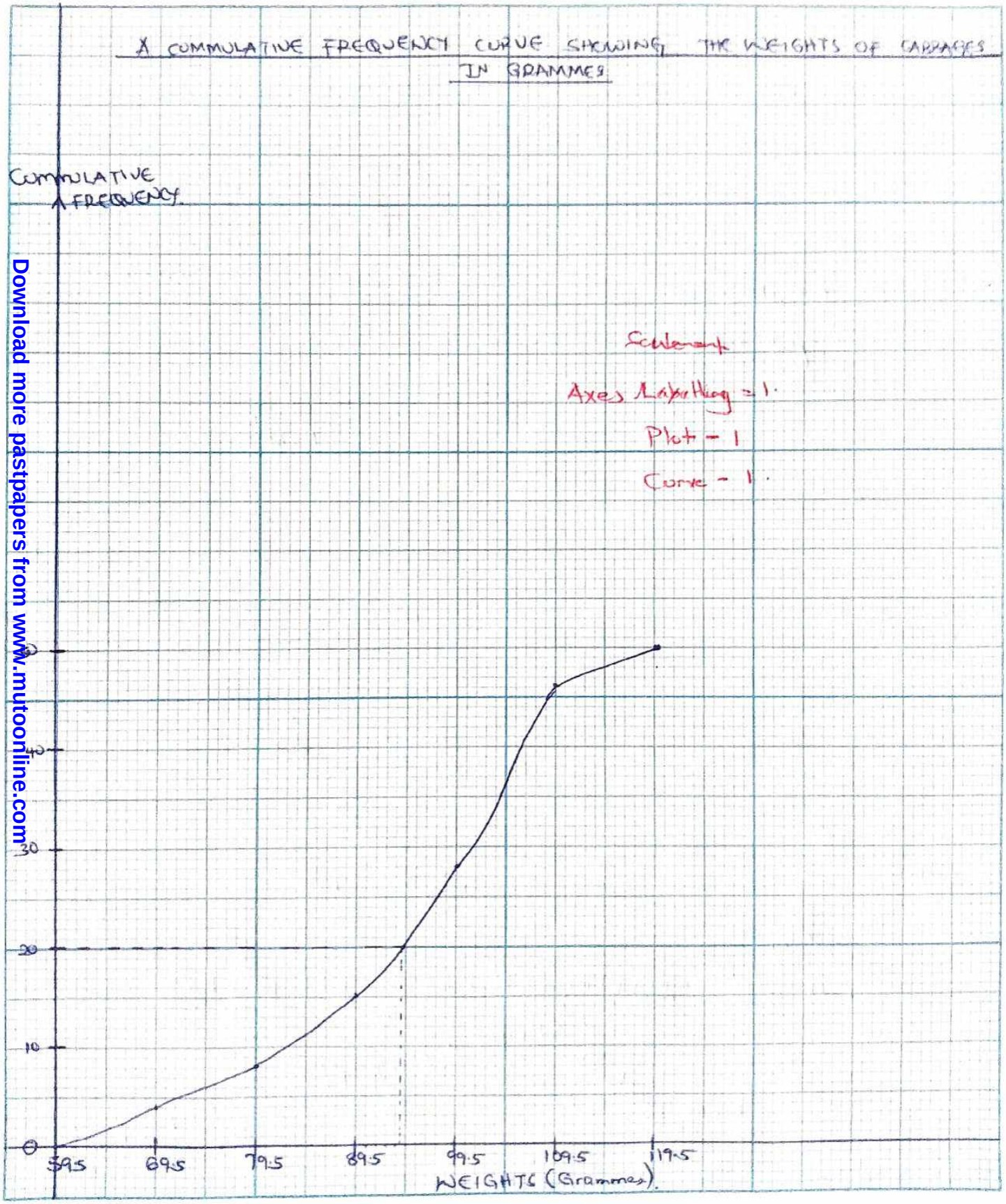

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Total Sales = 27,000 + 49,500 A = 1

= Ugx 76,500

Total Cost on buying the cabbages

= 50 x 800

= Ugx 40,000. A = 1

Profit = Selling Price - Buying Price

= 76,500 - 40,000 A = 1

= Ugx 36,500.

The guardian will not be able to meet his goal because the profit is less than the cost of the uniform by Ap = 1.

38,000 - 36,500 = Ugx 1500.

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Item 4 (a)

A matrix showing the consumables in Week One P=1

$$\begin{pmatrix} 2 & 3 & 2 \\ 0 & 4 & 3 \end{pmatrix}$$ P=1

A matrix showing the consumables in Week Two P=1

$$\begin{pmatrix} 3 & 4 & 2 \\ 1 & 2 & 5 \end{pmatrix}$$ P=1.

A matrix showing the consumables picked all together P=1

$$\begin{pmatrix} 2 & 3 & 2 \\ 0 & 4 & 3 \end{pmatrix} + \begin{pmatrix} 3 & 4 & 2 \\ 1 & 2 & 5 \end{pmatrix} = \begin{pmatrix} 2+3 & 3+4 & 2+2 \\ 0+1 & 4+2 & 3+5 \end{pmatrix}$$ A=1 A=1.

$$= \begin{pmatrix} 5 & 7 & 4 \\ 1 & 6 & 8 \end{pmatrix}$$ A=1.

40b).

A Matrix showing the cost of the consumables from the shop P=1.

$$\begin{pmatrix} 5500 \\ 2400 \\ 4000 \end{pmatrix} \quad P=1$$

Total cost of the items in the two weeks

$$\begin{pmatrix} 5 & 7 & 4 \\ 1 & 6 & 8 \end{pmatrix}_{A=1} \begin{pmatrix} 5500 \\ 2400 \\ 4000 \end{pmatrix} = \begin{pmatrix} (5\times5500)+(7\times2400)+(4\times4000) \\ (1\times5500)+(6\times2400)+(8\times4000) \end{pmatrix}_{A=1}$$

$$= \begin{pmatrix} 27,500+16,800+16,000 \\ 5,500+14,400+32,000 \end{pmatrix} \quad A=1$$

$$= \begin{pmatrix} 60,300 \\ 51,900 \end{pmatrix} \quad A=1.$$

∴ the consumables cost Ugx 60,300 in week One Ap=1

the consumables cost Ugx 51,900 in week Two. Ap=1

Total Cost in the two weeks = 60,300 + 51,900 A=1.

= Ugx 112,200

∴ the Aunt will pay Ugx 112,200 for the consumables. Ap=1.

(c)

No ; district fit in the planned expenditure of Ugx 100,000.

This is because the money exceed Ugx 100,000 by Ap=2

112,200 - 100000 = Ugx 12,200.

Item 5

The two opposite walls.

1 feet = 0.305 meters.

6 feet = 0.305 × 6 A = 1

= 1.83 meters. M = 1

Area of one wall = L×W / S×S

= 1.83 × 1.83 A = 1

= 3.3489 square meters.

For the two walls; Area = 3.3489 × 2 A = 1

= 6.6978 square meters

Number of boxes = $\frac{6.6978}{1.5}$ A = 1

= 4.4652 '

∴ the walls will require 5 boxes A_p = 1

1 box Cao

For the floor and the other remaining wall.

1 feet = 0.305 meters

5 feet = 5 × 0.305 A = 1

= 1.525 meters.

Area of the floor = L×W

= 1.83 × 1.525 A = 1

= 2.79075 square meters.

Also area of the opp remaining wall

= 2.79075 square meters.

Total area for both = 2.79075 × 2 A = 1

= 5.5815 square meters.

Number of boxes of tiles = $\frac{5.5815}{1.5}$ X=1

$= 3.721$

∴ the floor and remaing walls will require 4 boxes Ap=1

Total number of boxes = 4+5

= 9 boxes of tiles Ap=1

1 box costs Ugx 32,000

9 boxes cost Ugx 9x 32,000 A=1

= Ugx 288,000.

Total area to tile = 5.5815 + 6.6978 A=1

= 12.2793 square meters.

1 Square meter Costs Ugx 9000

12.2793 square meters Cost Ugx 9000x 12.2793 A=1

= Ugx 110, 513.7 M=1

Total amount to borrow from the siblings

= 288,000 + 110,513.7 A=1

= Ugx 398,513.7 M=1

Amount he will pay back to his/her siblings.

$A = P\left(1 + \frac{r}{100}\right)^n$

$= 398,513.7\left(1 + \frac{5}{100}\right)^{1.5}$ A=1

$= 398,513.7\,(1.05)^{1.5}$

$= 428,772.7778$

∴ he will pay back Ugx 428,772.8 to his siblings. Ap=1

All concerns please connect me on 0787-762458