

Holy Cross Lake View S.S.S.



NEW LOWER SECONDARY CURRICULUM MATHEMATICS SEMINAR ITEMS AND SOLUTIONS

**THE SEMINAR HELD ON SATURDAY 21st /06/2025
AT HOLY CROSS LAKE VIEW SS**

EXAMINATION FORMAT 456/1

Section A is comprised of two compulsory items and section B is comprised of two parts i.e Part 1 and part 2 each with two items from which a learner attempts only one item from each part.

Item	Element of construct	Topics
SECTION:A(COMPULSORY)		
Item one	Numbers	Number bases
		Working with integers
		Fractions, percentages and decimals
		Rectangular Cartesian plane
		Numerical concepts 1 and 2
		Ratios and proportions
Item two	Patterns and Algebra	Sequences and patterns
		Algebra 1 and 2
		Mapping and relations
		Inequalities and regions
		Equation of a straight line
		Simultaneous equations
		Linear programming
		loci
		Functions
SECTION: B		
PART 1 (Select one item)		
Item 3 and 4	Data and probability	Data collection, display and presentation
		Graphs
		Set theory
		Matrices
		Probability
SECTION: B		
PART 2(Select one item)		
Item 5 and 6	Geometry and measures	Geometrical construction
		Bearings
		General and angle properties of geometric figures
		Reflection
		Business arithmetic
		Time and time tables
		Similarities and enlargement
		Circle
		Rotation
		Length and area properties of two dimensional geometrical figures
		Nets, areas and volumes of solids
		Trigonometry 1 and 2
		Vectors
		Business mathematics
		Matrix transformation
Circle properties		
Lines and planes in 3-dimensions		

LEARNING AREA; ELEMENT OF CONSTRUCT ONE(NUMBERS)

ITEM ONE

Mukyawe and Gladys bought an acre of land in Jinja district at shs 7,000,000 on 01/06/2025 where they contributed 4,000,000 and 3,000,000 respectively. They portioned it into 8 plots and sold each plot at shs. 1,500,000. On each plot, the dealer (A person who brings the buyer) is given shs. 90,000, the LC1 chairperson is given 10% of the selling price and each witness is given 20,000. They only allow five witnesses to sign on the land agreement. Mukyawe and Gladys shared 7% of the actual excess money after selling all the plots in the ratio of their money contribution. They agreed to buy land again on the day they will both be off duty. Mr. Mukyawe is always off duty after every 4 days and Madam Gladys is off duty after every 7 days.

Task;

- (a) How much did Mukyawe and Gladys get from the excess money?
- (b) How much money will they use to buy land on the day they will meet again?
- (c) When will they buy land?

ITEM TWO

Your guardian had shs. 4,500,000 on his bank account. At the start of the term, he instructed your elder brother to withdraw 70% of the amount to cater for your school fees and cover other school needs. He gave him a PIN as 9,7 in base ten but each digit corresponds to some digits in base five which your brother couldn't identify correctly.

The ATM machine allows a maximum of 2,000,000 per transaction and it charges shs. 1,200 per withdrawal irrespective of the amount. Your brother ensured that he minimizes the withdraw charges as he withdraws. Later, after bringing the money, your guardian called your brother again to go and withdraw the remaining amount from the account. From that, he was to keep shs. 500,000 at home and then share the rest among himself, your sister and young brother in the ratio of 5:3:2 respectively.

The account's minimum balance (what must remain on the account) is shs. 10,000. Your guardian, used the money to buy pieces of clothes which measure 120cm^2 , 150cm^2 and 210cm^2 respectively and he wishes to cut them into small pieces of the same size to make table clothes.

Task:

- (a) Help your brother to determine the;
 - (i) actual PIN
 - (ii) amount to be received by him, your sister and your young brother.
- (b) Determine the size of each table cloth and the number of table clothes he can get from the pieces he bought.

ITEM THREE

Your guardian who is in Kampala would like to set up a farm in your village. However, he has no land but you have identified the land that he can buy but he so busy to the extent that he cannot come to see the available land. The area of the available land was indicated on the map which has a scale reading as 1: 1,500. The land occupies an area of 8.5cm^2 on that map. He said that if the actual area of land is less than 2000m^2 , he will plant Cocoa and if it is more than 2000m^2 , he will plant Coffee. In that village, each 50 square meters of land is sold at shs 8,000,000. Each plant requires 2.5m^2 of space for better yields. Each Coffee seedling is sold at shs. 600 and that of Cocoa is sold at shs.900 and he has shs. 750,000 to buy the seedlings to be planted. The remaining amount after buying the seedlings is $\frac{1}{8}$ of the required amount to plant all the seedlings.

Task;

- (a) Help your guardian do determine the actual area of the available land and hence determine the crop he is going to plant.
- (b) Determine the amount of money he will;
 - (i) spend to buy the whole land.
 - (ii) Save after buying the seedlings.
- (c) How much is needed to plant all the seedlings?

LEARNING AREA; ELEMENT OF CONSTRUCT THREE (PATTERNS & ALGEBRA)**ITEM FOUR**

In a certain farm, the manager recorded the produce for two consecutive weeks as follows. Week one, 12 cows produced 100 liters of milk and in the second week when 3 more cows were brought, they recorded 125 litres of milk. The management would like to add more cows on the farm such that the produce can be 250 litres in the 3rd week, but is not sure of how many cows to add and they seek for your advice.

In the same farm, they produce two types of crops beans and maize. In order to maximize produce, they need to plant at most 3 hectares of beans and a maximum of 2 more hectares of maize than that of beans. Each hectare of beans requires 12 men to monitor and produces 120 bags and each hectare of maize require 9 men and produces 200 bags. The number of men available exceeds 36.

Task:

- a) Determine how many more cows should be added to hit the target.
- b)
 - (i) Write down the mathematical constraints from the above information.
 - ii) Show the constraints on the feasible region.
 - (iii) Determine the optimal number of hectares for each crop and find the maximum produce.

ITEM FIVE

Your friend who owns a sugar factory in Busoga region wants to buy two types of used motor cycles namely Bajaj and Honda for his sugarcane plantations' supervisors to easy the process of supervising the different sugarcane plantations. A Bajaj costs shs. 2,000,000 and requires shs. 16,000 per month to maintain it. A Honda costs shs. 2,400,000 and requires shs. 10,000 per month to maintain it. The factory owner has shs. 18,000,000 to spend on the purchase of the motorcycles and shs. 120,000 per month for maintenance. He would like to buy at least 4 Bajaj motorcycles and at least 2 Honda motorcycles. However, your friend does not know the number of motor cycles of each type that he can buy in order to minimize the maintenance costs.

Task

- (a)
 - (i) write down all the mathematical constraints representing the above information.
 - (ii) Show the constraints on the feasible region.
- (b) Determine the possible number of motorcycles of each type that the factory owner should buy in order to achieve his target and hence find the amount saved.

ITEM SIX

Your friend owns a rectangular piece of land of which he wants to construct a house with a rectangular cross section leaving a path 2m around the house base. The path occupies an area of 76 m² and he also wants the dimensions of his house floor to differ by 3m.

He also owns a soft drink depot where he sells Crates of soda and boxes of juice. Tom bought 4 crates of soda and three boxes of juice and paid Shs 110,700. Tom's brother bought 3 crates of soda and 4 boxes of juice and paid Shs 122,400 but he is not contented about the money he paid claiming that he bought almost similar items as Tom but he has paid much money.

Task:

- a) (i) Determine the size of the floor base of your friend's house.
(ii) How big is your friend's piece of land?
- b) (i) Help Tom's brother to be contented with the payment he made.
(ii) How much would Ann pay if she buys 2 crates of soda and 2 boxes of water from the same depot?

LEARNING AREA; ELEMENT OF CONSTRUCT THREE (DATA & PROBABILITY)**ITEM SEVEN**

Your mathematics teacher has introduced a new rewarding system based on students' performance in the mathematics assessments. Your teacher has asked you to analyze the scores (in %) of the S2 students which were obtained in the recent mathematics assessment and recorded as given below in order to identify and submit the number of students who qualify for various awards.

28	94	35	78	70	56	57
58	76	60	77	62	84	66
67	61	98	70	96	64	73
74	41	75	62	54	80	83
88	69	90	47	64	70	75

Basing on the new rewarding system, students who score above 85% will receive shs 20,000 each, those who score between 80% and 85% inclusive will receive UGX 10,000 as a contribution towards their pocket. Those who score below 40% will receive written warnings. Additionally, the school administration has also decided to award those subject teachers whose subject average score is above 70% and if above 50% of your students in the class have scores below 60, you will be requested to be having mandatory weekly tests in order to better the grades.

Task.

- a) Will your mathematics teacher qualify for an award or not? Justify your answer.
- b) How many students qualify for each category of awards?
- c) Will your mathematics teacher be requested to have mandatory weekly tests or not? Justify your answer.

ITEM EIGHT

A city's transport department is working on improving traffic and public transport for a busy industrial area where 129 factory workers commute daily. They have conducted a survey to understand the preferred modes of transport used by the workers. The findings have revealed that 32 workers use buses, 50 use motorcycles, and 72 walk to work. Some workers use more than one mode of transport: 15 use both buses and walk, 18 use both buses and motorcycles, and 7 use both motorcycles and walk. 4 workers use only buses, while the number of workers who use none of the three transport modes (they might work remotely or use personal cars) exceeds those who use both motorcycles and walk by 3. The transport planners claim that they will put traffic lights only if the chance of those who only walk exceeds 40%. The transport planners want to analyze this data to optimize road usage and reduce congestion, especially during peak hours.

Task:

- a) Determine the number of workers who use all the three modes of transport.
- b) Calculate the probability that a randomly selected worker uses at least two of the three modes of transport.
- c) Advise the transport department, based on your calculations, whether to put traffic lights.

ITEM NINE

During your school holidays, you help your aunt manage her retail shop. She restocks goods every two weeks from two major markets: Lugala Market and Busiro Market.

In the first week she bought 250 kg of sugar, 180 kg of maize flour, and 140 kg of salt from Lugala Market. She then bought 100 kg of sugar, and 260 kg of salt from Busiro Market. In the second week she bought 150 kg of sugar and 200 kg of maize flour from Lugala Market and then bought 180 kg of sugar, and 150 kg of salt from Busiro Market. The price per kg of sugar, maize flour and salt in Lugala Market was Shs. 4500, Shs. 2200 and Shs 2000 respectively and the price of sugar, maize flour and salt in Busiro Market was Shs. 5500, Shs. 2000 and Shs 1800 respectively.

From, the market, your aunt returned with 12 mangoes in a bag. 5 mangoes are yellow and the rest are green. Your sister was told to pick two mangoes at random, one at a time, without replacement.

Task:

Help you Aunt

- a) Organize the goods purchased by your guardian in each week.
- b) Determine the total amount spent in buying all the items for the two weeks in the two markets?
- c) Determine the chance she has to pick;
 - i) At least one mango that is yellow
 - ii) Exactly one mango is yellow and the other is green.

LEARNING AREA; ELEMENT OF CONSTRUCT FOUR (GEOMETRY AND MEASURES)

ITEM TEN

Mr. Gimadu owns a hotel in Mbale and it is seated on a rectangular plot of 100m by 60m. The plot is fully fenced by concrete walls for security purposes. The hotel building occupies a sixth of the plot and she intends to put up a circular swimming pool for the children in one of the triangular corners of the plot so that the circular pool's circumference touches the walls of triangular section. The two sides of the triangular section of the plot measures 40m by 50m and the angle between the two sides is a right angle.

The remaining portion of the triangular section surrounding the pool is to be covered by pavers. Each paver covers an area of 160 square centimeters and costs UGX 2850.

Tasks.

A mathematics scholar, you are tasked to;

- a) find the amount of area covered by the hotel building
- b) generate a visual scale plan for the swimming pool
- c) help Mr. Gimadu to determine the amount of money required for the pavers
- d) determine the percentage of the plot area covered by the green if the green area covers 500 square meters.

ITEM ELEVEN

A new district doctor in town A has been sent to collect essential drugs from a distant town C which is 155km from A through town B. He begins driving at 8:00am with an average speed of 70kmh^{-1} but plans to rest for an hour in town B after the first 30 minutes. He must reach the supplier in town C by 11:00am or risk a delay in treating several patients. Town B is due east of town A and town C is on bearing of 120° from A. The new doctor has trouble locating the towns.

Task.

- a) Make a scaled guide showing the location of the towns A, B and C

- b) What is the shortest distance between towns A and C?
- c) Advise the doctor on the minimum speed he should drive at to reach town C in time.

ITEM TWELVE

A new employee of a company has just learnt that the monthly income tax is UGX 1,102,000. He wants to buy a used car priced at USD 8,900. One option is to pay cash and get a 5% discount, while the other involves paying a deposit of UGX 10,000,000 and covering the balance over six months with monthly equal instalments of UGX 4,500,000. He is also not sure of how to arrive at his actual take-home pay due to PAYE.

Assume the exchange rate is. 1 USD = UGX 3,850

PAYE Taxation Schedule

<i>Monthly taxable income</i>	<i>Tax rate</i>
UGX 0 – 235,000	0%
UGX 235,001 – 335,000	10%
UGX 335,001 – 410,000	20%
UGX 410,001 and above	30%

Task.

- a) Compare the payment options clearly showing the financial difference.
- b) Estimate the teacher's monthly net pay.
- c) If he is to save 60% of his monthly net income, how many months would it take in order to purchase the car.

END

SUCCESS IN ALL YOUR ALL YOUR STRUGGLES

ITEM NO.	RESPONSES												
1(a)	Cost price for land = shs 7,000,000 Amount received from each plot = shs 1,500,000 Actual amount received from each plot = shs 1,500,000 – (5(20000) + 10% of 1,500,000 + 90,000) = shs1,500,000 – (100,000 + $\frac{10}{100} \times 1,500,000$ + 90,000) = shs 1,500,000 – (100,000 + 150,000 + 90,000) = shs 1,160,000 Actual Amount received from the 8 plots = 8 × 1,160,000 = shs 9,280,000 Excess amount from the 8 plots = 9,280,000 – 7,000,000 = shs 2,280,000 Amount shared from the excess money = $\frac{7}{100} \times 2,280,000$ = shs 159,600 Amount received by Mukyawwe from the excess money = $\frac{4,000,000}{7,000,000} \times 159,600$ = shs 91,200 Amount received by Gladys = 159,600 – 91,200 = shs 68,400 ∴ Mukyawwe and Gladys received shs 91,200 and shs 68,400 respectively												
(b)	Amount to be used to buy land = shs9,280,000 – 159600 = shs 9,120,400 ∴ They will use shs 9,120,400 to buy land												
(c)	Finding LCM of 4 and 7 <table><tr><td>2</td><td>4</td><td>7</td></tr><tr><td>2</td><td>2</td><td>7</td></tr><tr><td>7</td><td>1</td><td>7</td></tr><tr><td></td><td>1</td><td>1</td></tr></table> LCM of 4 and 7 is 2 × 2 × 7 = 28 days ∴ They will buy land on 29th, June , 2025	2	4	7	2	2	7	7	1	7		1	1
2	4	7											
2	2	7											
7	1	7											
	1	1											
2(a)													
(i)	<table><tr><td>5</td><td>9</td><td>4</td></tr><tr><td></td><td>1</td><td></td></tr></table> 9 = 14_{five} ∴ The actual PIN is 1412 <table><tr><td>5</td><td>7</td><td>2</td></tr><tr><td></td><td>1</td><td></td></tr></table> 7 = 12_{five}	5	9	4		1		5	7	2		1	
5	9	4											
	1												
5	7	2											
	1												
(ii)	Amount withdrawn at first = $\frac{70}{100} \times 4,500,000$ = shs3,150,000 withdraw charges = 1200 × 2 = shs 2400												

$$\text{Remaining amount on the account} = 4,500,000 - 3,150,000 - 2,400 \\ = \text{shs } 1,347,600$$

Note: In order to minimize the withdraw charges, he should withdraw the 70% in two times since the machine does not accept to withdraw any amount beyond shs 2,000,000 each withdraw. Eg. Shs 2000,000 in the 1st withdraw and then 1,150,000 in the second attempt.

Amount to be withdrawn when he goes back again

$$= 1347600 - (10000 + 1200)$$

$$= \text{shs } 1,336,400$$

Amount to be shared = shs 1336400 – 500,000

$$= \text{shs } 836,400$$

$$\text{Amount received by your elder brother} = \frac{5}{10} \times 836,400$$

$$= \text{shs } 418,200$$

$$\text{Amount received by your young brother} = \frac{3}{10} \times 836,400$$

$$= \text{shs } 250,920$$

$$\text{Amount received by your young brother} = \frac{2}{10} \times 836,400$$

$$= \text{shs } 167,280$$

∴ Your elder brother, sister and your young brother received shs 418,200, shs 250,920 and shs 167,280 respectively.

(b)

Finding HCF of 120, 150 and 210.

2	120	150	210
3	60	75	105
5	20	25	35
	4	5	7

$$\text{HCF of 120, 150 and 210} = 2 \times 3 \times 5$$

$$= 30$$

∴ Each piece is of size 30cm^2

$$\text{Number of pieces} = \frac{120}{30} + \frac{150}{30} + \frac{210}{30}$$

$$= 4 + 5 + 7$$

$$= 16 \text{ table clothes}$$

∴ The number of table clothes is 16

3(a)

Area on the map is 8.5cm^2

From the scale 1: 1500,

1 cm on the map represents 1500cm on ground

1cm represents 1500cm

1cm^2 on a map represents 1500^2cm^2 on ground

8.5cm^2 represents on $8.5 \times 1500^2\text{cm}^2$

$$1\text{m} = 100\text{cm}$$

$$1\text{cm} = \frac{1}{100}\text{m}$$

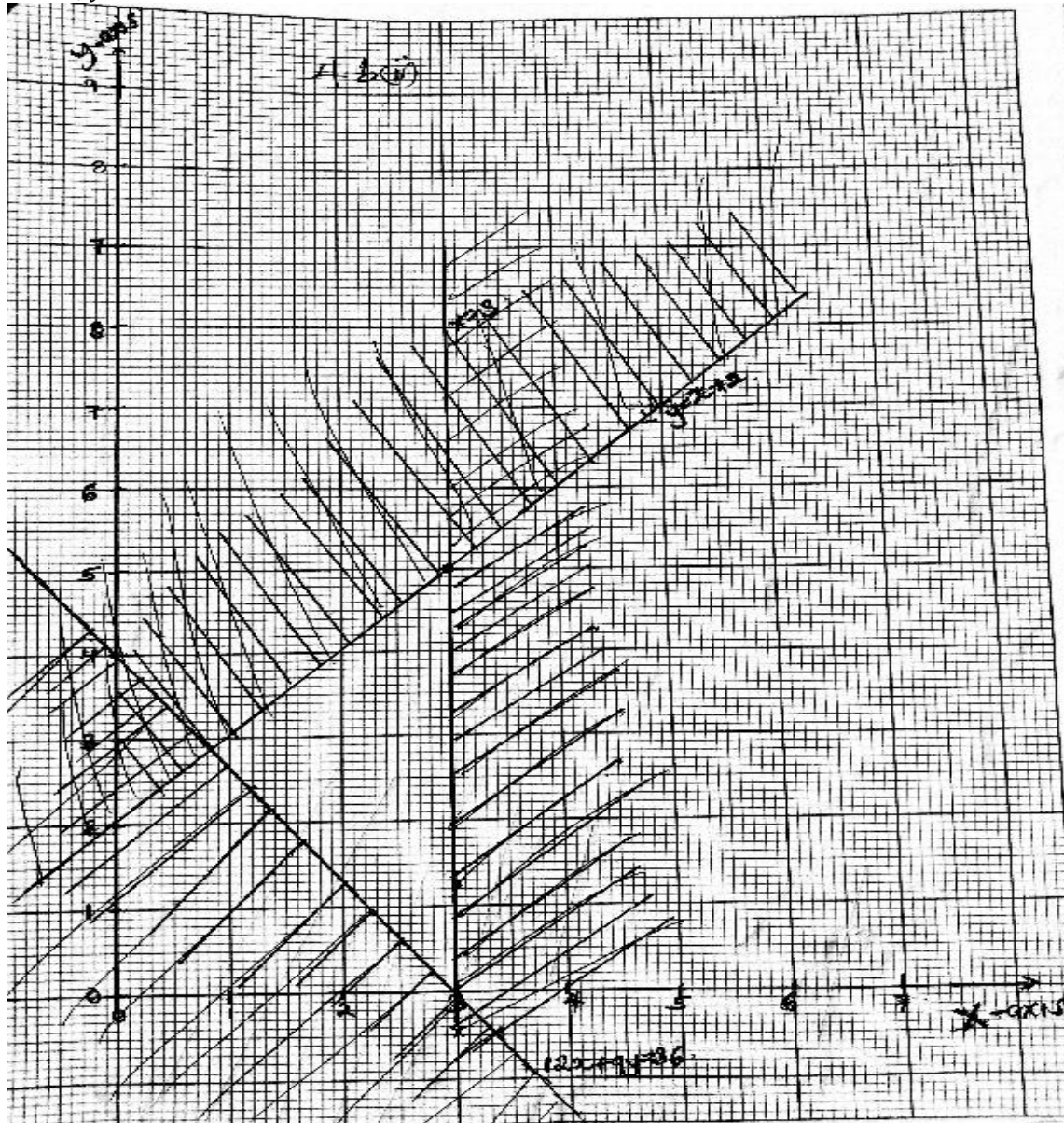
$$1\text{cm}^2 = \frac{1}{100^2}\text{m}^2$$

$$8.5 \times 1500^2\text{cm}^2 = \frac{8.5 \times 1500^2}{100^2}\text{m}^2$$

	$= 1912.5m^2$ $\therefore$ The actual area is $1912.5m^2$ Since the actual area is less than $2000m^2$, then he is going to plant cocoa. (b)(i) $Number\ of\ 50m^2\ in\ 1912.5m^2 = \frac{1912.5}{50}$ $= 38.25$ $Amount\ spent\ to\ buy\ the\ whole\ land = 8,000,000 \times 38.25$ $= shs\ 306,000,000$ $\therefore$ He spent to buy the whole land = shs 306,000,000 (ii) $Number\ of\ seedlings\ needed = \frac{1912.5}{2.5}$ $= 765$ $Amount\ spent\ to\ buy\ seedlings = 765 \times 900$ $= shs\ 688,500$ $Amount\ saved = 750,000 - 688,500$ $= shs\ 61,500$ (c) $\therefore$ The amount saved after buying seedlings is shs 61,500 Let the amount required to plant the seedling be x $Amount\ needed\ to\ plant\ the\ seedling\ is$ $\frac{1}{8}x = 61,500$ $x = 8 \times 61500$ $x = 492,000$ $\therefore$ The amount needed to plant the seedlings is shs 492,000						
4(a)	week 1, (12,100) week 2, (15, 125) week 3, (x, 250) Let x represent the number of cows and y be the produce in litres $Gradiet: \frac{125 - 100}{15 - 12} = \frac{250 - 125}{x - 15}$ $\frac{25}{3} = \frac{125}{x - 15}$ $\frac{1}{3} = \frac{5}{x - 15}$ $x - 15 = 15$ $x = 30$ $30 - 15 = 15$ $\therefore$ More fifteen cows should be added in the third week to get 250 litres of milk						
(b)	Let the number hectares of beans be x and the number of hectares for maize be y . $x \leq 3$ $y \leq x + 2$ $12x + 9y \leq 36$ $120x + 200y$ $x \geq 0$ $y \geq 0$ $x = 3$ $y = x + 2$ <table><tr><td>X</td><td>0</td><td>3</td></tr><tr><td>y</td><td>2</td><td>5</td></tr></table> $12x + 9y = 36$	X	0	3	y	2	5
X	0	3					
y	2	5					

X	0	3
y	4	0

$x = 0, y = 0$



x	y	120x+200y
3	4	1160
3	5	1360
2	4	1040

∴ The optimal number of hectares to use is 3 for beans and 5 for maize to produce maximum of 1360 bags.

5(a)

Let x and y denote the number of Bajaj and Honda motorcycles to be bought
 $2,000,000x + 2,400,000y \leq 18,000,000$ (i)

Reduced to $5x + 6y \leq 45$

$16000x + 10000y \leq 120000$ (ii)

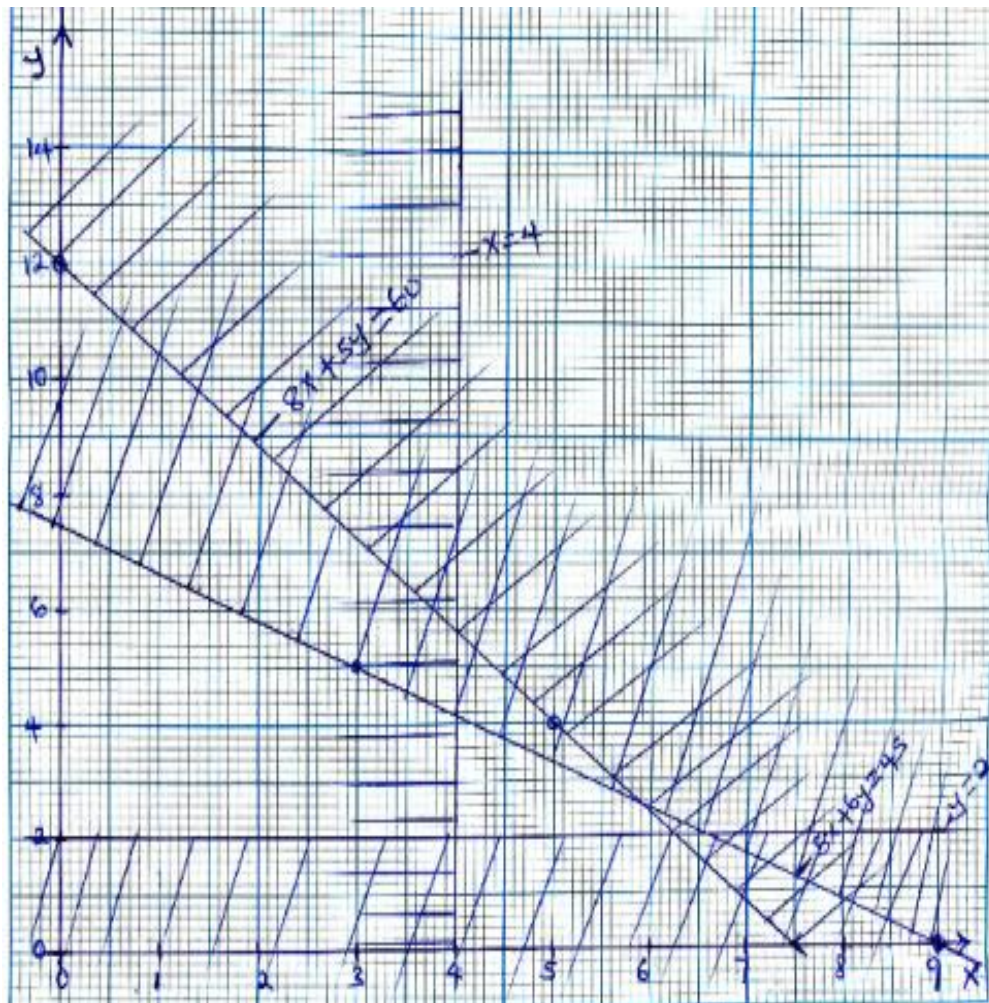
Reduced to $8x + 5y \leq 60$

$x \geq 4$(iii)

$y \geq 2$ (iv)

Inequality	Boundary line	Coordinates	Testing regions
$5x + 6y \leq 45$	$5x + 6y = 45$	(9,0), (3,5)	Using(0,0) True
$8x + 5y \leq 60$	$8x + 5y = 60$	(0,12), (5,4)	Using(0,0) True

$x \geq 4$	$x = 4$	$(4,0), (4,2)$	Using(0,0) False
$y \geq 2$	$y = 2$	$(0,2), (2,2)$	Using(0,0) False

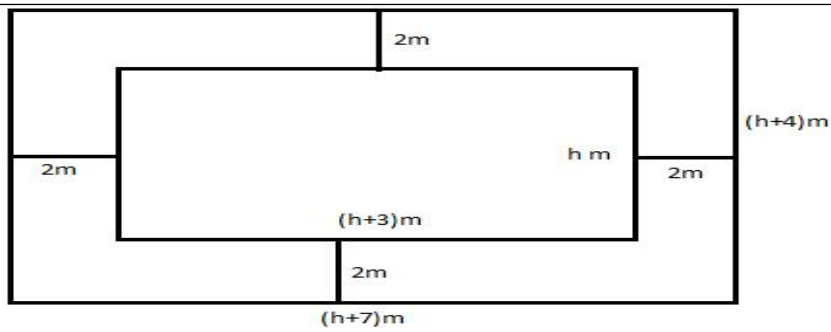


Combinations (x, y)	Maintenance costs $C = 16000x + 10000y$
(4,4)	104,000
(4,2)	84,000
(6,2)	116,000
(5,3)	110,000

- (b) He should buy 4 Bajaj motorcycles and 2 Honda motorcycles.
He saves = 120,000 – 84,000
= shs. 36000
 $\therefore$ *He saves shs. 36,000 per month*

- 6(a) Let the width of the house floor be h
Width of the land = $(h + 4)m$
Length of land = $(h + 7)m$
Length of the house = $(h + 3)m$
Area of the path = $76m^2$

(i)



(ii)

Area of the path = Area of land – Area occupied by the house

$$76 = (h + 7)(h + 4) - h(h + 3)$$

$$76 = h^2 + 7h + 4h + 28 - h^2 - 3h$$

$$76 - 28 = 11h - 3h$$

$$\frac{48}{8} = \frac{8h}{8}$$

$$6m = h$$

(b)

∴ The house's base = 6×9

$$= 54m^2$$

(i)

∴ The land is $(6 + 7) \times (6 + 4) = 13 \times 10$

$$= 130m^2$$

(ii)

Let the price x and y be the prices of a crate of soda and a box of juice respectively

$$4x + 3y = 110,700$$

$$3x + 4y = 122,400$$

Solving simultaneously by either matrix method, elimination, substitution, graphical method.

$$x = 10,800, \quad y = 22,500$$

Each crate of soda costs shs 10,800 and each box of Juice costs shs 22,500

Ann wants to buy $2x + 2y$

$$= 2(10800) + 2(22500)$$

$$= \text{shs } 66,600$$

∴ Ann should pay shs 66,600 for the 2 crates of soda and 2 boxes of Juice

7(a)

A frequency distribution table

Score	Tally	f	x	fx	cf	CB
20-29	I	1	24.5	24.5	1	19.5-29.5
30-39	I	1	34.5	34.5	2	29.5-39.5
40-49	II	2	44.5	89	4	39.5-49.5
50-59	IIII	4	54.5	218	8	49.5-59.5
60-69	HHH-III	9	64.5	580.5	17	59.5-69.5
70-79	HHH HHH	10	74.5	745	27	69.5-79.5
80-89	IIII	4	84.5	338	31	79.5-89.5
90-99	IIII	4	94.5	378	35	89.5-99.5
		35		2407.5		

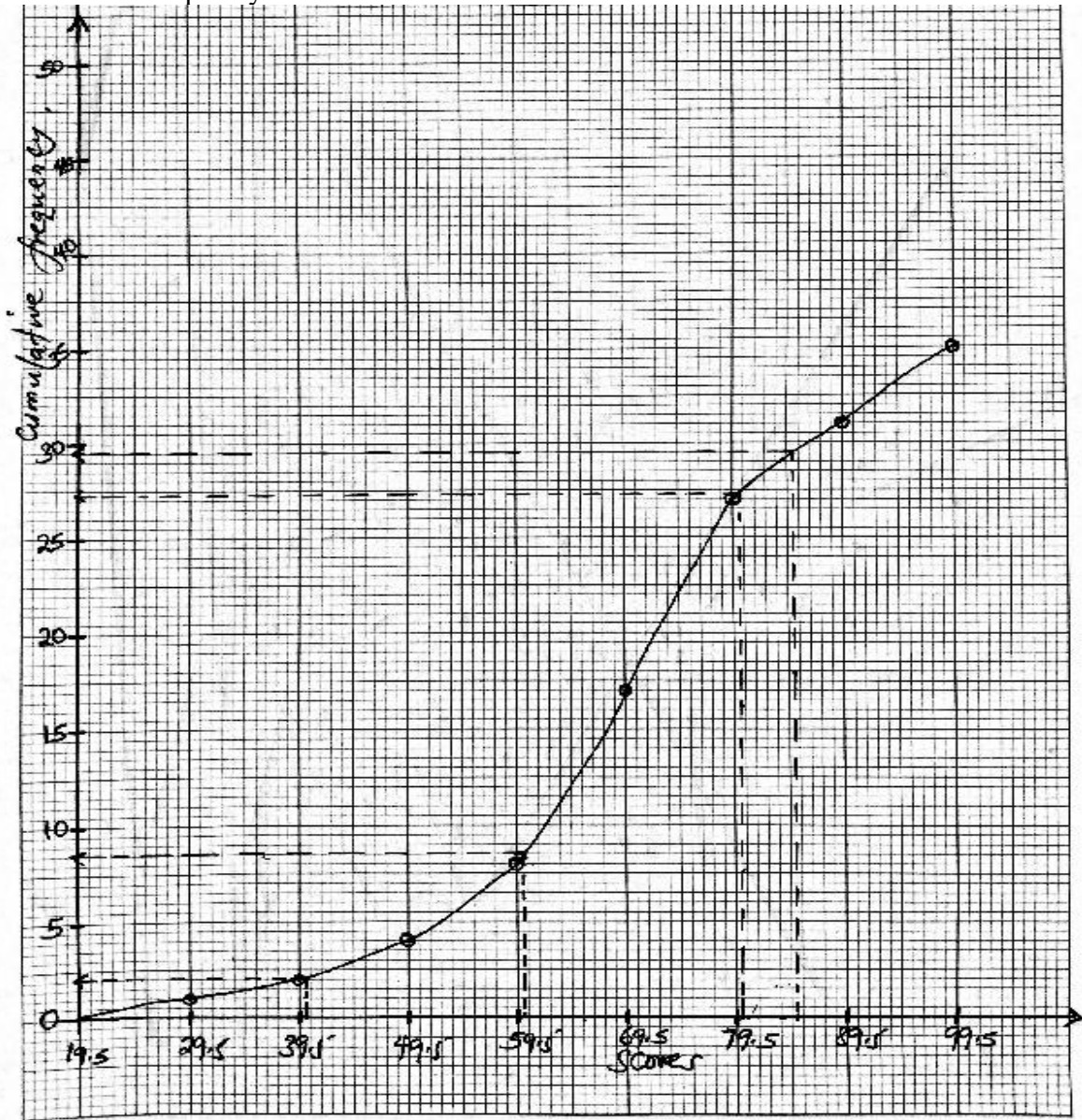
$$\text{Mean score} = \frac{2407.5}{35}$$

$$= 68.7857$$

∴ The mathematics teacher will not get the award since the average score is less than 7

(b)

A cumulative frequency curve



(c)

From the graph above,

Number of students who scored above 85% = $35 - 30$
= 5 students

Number of students who scored between 80% and 85% = $30 - 28$
= 2 students

Number of students who scored below 40% is 2

Number of students who scored below 60% is 9

$\therefore$ 5 students qualified for shs 20,000 each, 2 students qualified for shs 10,000 and 2 students should get written warnings.

Percentage of those who scored below 60%

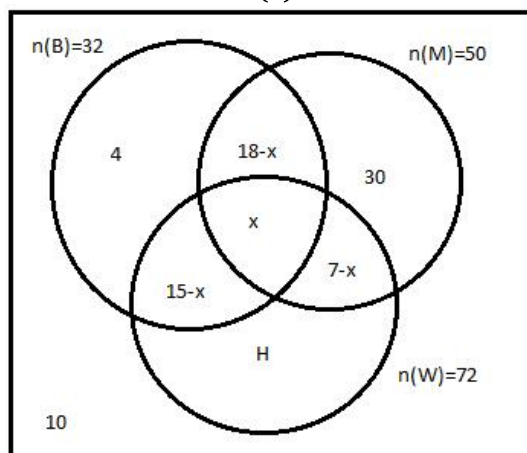
$$\begin{aligned} &= \frac{9}{35} \times 100 \\ &= 25.7143\% \end{aligned}$$

$\therefore$ The teacher will not be requested to have mandatory weekly test since less 50% scored below 60%

8.(a)

A venn diagram

$$n(\varepsilon) = 129$$



$$4 + 18 - x + x + 15 - x = 32$$

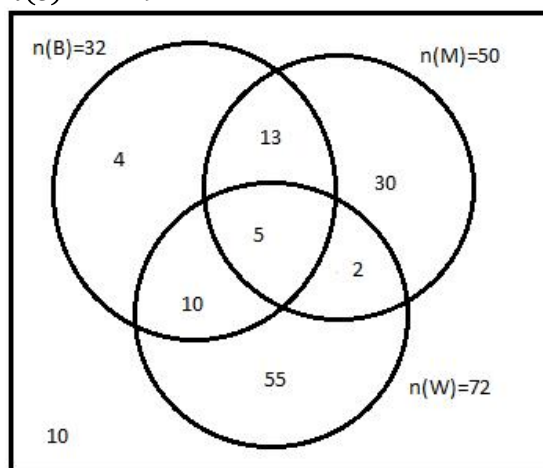
$$37 - x = 32$$

$$x = 37 - 32$$

$$x = 5$$

∴ 5 students use the three modes of transport

$$n(\varepsilon) = 129$$



(b) Probability of at least two modes = $\frac{10 + 13 + 5 + 2}{129}$

∴ The probability of at least two modes is $\frac{30}{129}$

(c) $P(\text{only walk}) = \frac{55}{129} \times 100$

$$= 42.6357\%$$

∴ They should put the traffic lights since the chance of those walk exceeds 40%

9(a)

In week one

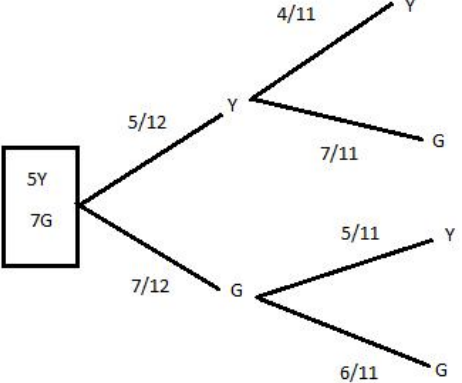
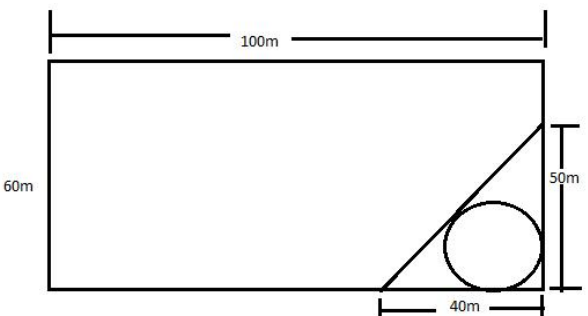
Market	Sugar	Maize flour	Salt
Lugala	250	180	140
Busiro	100	0	260

$$\begin{pmatrix} 250 & 180 & 140 \\ 100 & 0 & 260 \end{pmatrix}$$

In week two

Market	Sugar	Maize flour	Salt
Lugala	150	200	0
Busiro	180	0	150

$$\begin{pmatrix} 150 & 200 & 0 \\ 180 & 0 & 150 \end{pmatrix}$$

(b)	<i>Total quantities bought in the two markets in the two weeks</i> $= \begin{pmatrix} 250 & 180 & 140 \\ 100 & 0 & 260 \\ 400 & 380 & 140 \end{pmatrix} + \begin{pmatrix} 150 & 200 & 0 \\ 180 & 0 & 150 \end{pmatrix}$ $= \begin{pmatrix} 400 & 380 & 140 \\ 280 & 0 & 410 \end{pmatrix}$ <i>Amount spent in Lugala market</i> $= (400 \quad 380 \quad 140) \begin{pmatrix} 4500 \\ 2200 \\ 2000 \end{pmatrix}$ $= ((400 \times 4500) + (380 \times 2200) + (140 \times 2000))$ $= \text{shs } 2,916,000$ <i>Amount spent in Busiro market</i> $= (280 \quad 0 \quad 410) \begin{pmatrix} 5500 \\ 2000 \\ 1800 \end{pmatrix}$ $= ((280 \times 5500) + (0 \times 2000) + (410 \times 1800))$ $= \text{shs } 2,278,000$ <i>Total amount spent = 2,916,000 + 2,278,000</i> $\therefore$ She spent shs 5,194,000
(c)	 (i) $P(\text{at least one yellow mango}) = 1 - \left(\frac{7}{12} \times \frac{6}{11}\right)$ $= \frac{15}{22}$ $\therefore$ The probability of picking at least one yellow mango is $\frac{15}{22}$ (ii) $P(\text{exactly one yellow mango}) = \frac{5}{12} \times \frac{7}{11} + \frac{7}{12} \times \frac{5}{11}$ $= \frac{35}{66}$ $P(\text{one yellow and the other green is } \frac{35}{66}$
10. (a) (b)	<i>Area of the building = $100 \times 60 \times \frac{1}{6}$</i> <i>Area of the house = 1000m^2</i> 

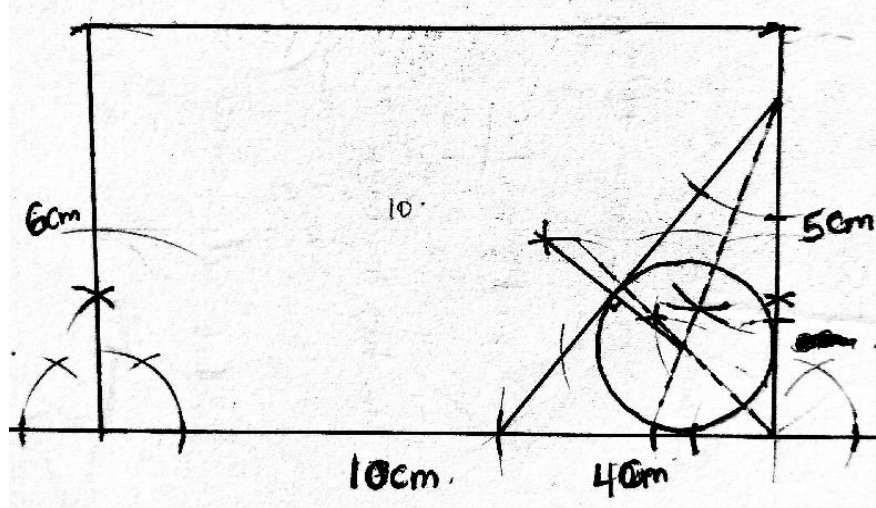
Let 1cm represent 10m

$$\rightarrow \frac{100}{10} = 10\text{cm}$$

$$\rightarrow \frac{60}{10} = 6\text{cm}$$

$$\frac{50}{10} = 5\text{cm}$$

$$\frac{40}{10} = 4\text{cm}$$



Radius = 1.3 cm

(c)

$$\text{Area of the triangle} = \frac{1}{2} \times b \times h$$

$$= \frac{1}{2} \times 40 \times 50$$

$$= 1000\text{m}^2$$

$$\text{Area of the circle} = \pi r^2$$

$$= \frac{22}{7} \times 13^2$$

$$= 531.1429$$

$$\text{Area to be covered by the pavers} = 1000 - 531.1429$$

$$= 468.8571\text{m}^2$$

$$\text{Area covered by each paver} = 160\text{cm}^2$$

$$= 0.0160\text{m}^2$$

$$\text{Number of pavers} = \frac{468.8571}{0.0160}$$

$$= 29303.5688$$

$$\text{Actual number of pavers} = 29304$$

$$\text{Amount required to buy pavers} = 29304 \times 2850$$

$$= \text{shs } 83,516,400$$

$$\therefore \text{He needs shs } 83,516,400 \text{ to buy the pavers}$$

(d)

$$\% \text{ of the green area} = \frac{500}{6000} \times 100$$

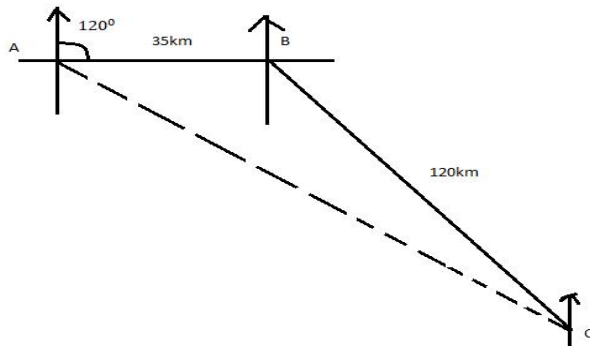
$$= 8.3333\% \text{ or } 8\frac{1}{3}\%$$

$$\therefore \text{The green area covers } 8\frac{1}{3}\% \text{ of the plot}$$

11

(a)

Sketch



$$\text{Distance from A to B} = \frac{70}{2}$$

$$= 35\text{km}$$

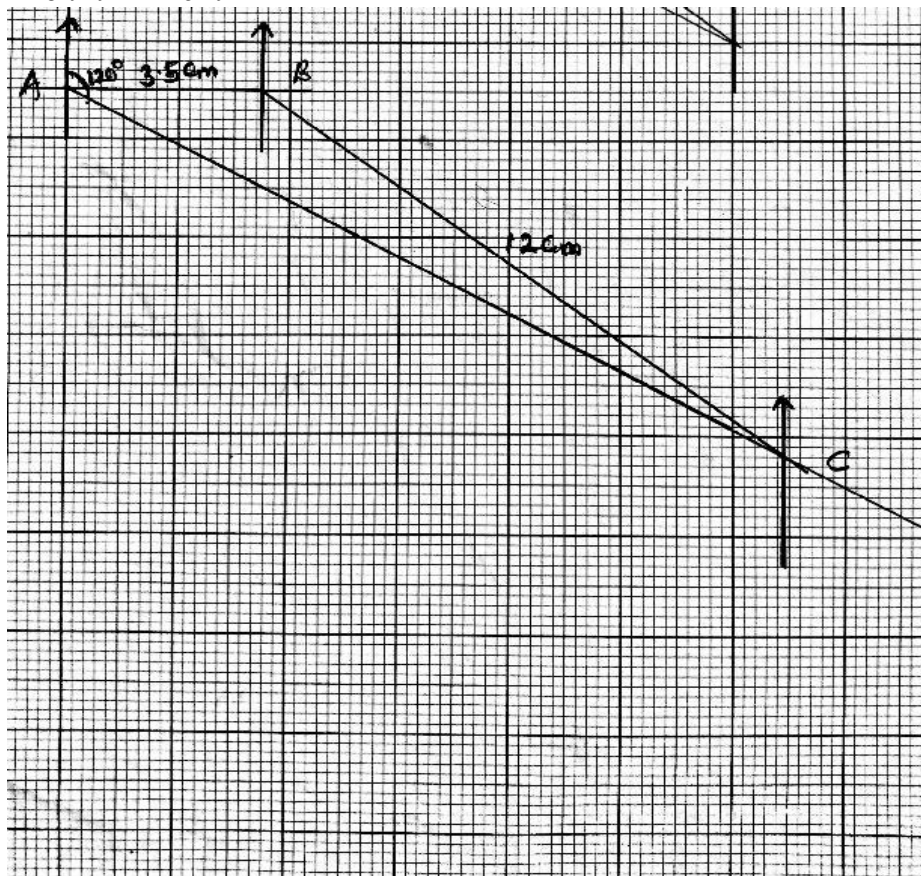
From A to C, the distance is 155km

Meaning that from B to C, the distance is 120km

Let 1cm represent 10 km

$$35\text{km} = 3.5\text{ cm}$$

$$120\text{km} = 12\text{cm}$$



(b)

Remaining time from B to C

$$= 3 - \left(1\frac{1}{2} \text{ hours}\right)$$

$$= 1.5 \text{ hours}$$

$$\text{Speed} = \frac{120}{1.5}$$

$$= 80\text{kmhr}^{-1}$$

$\therefore$ He has to drive at a speed of 80kmhr^{-1} in order to reach C at 11;00am

(c)

Shortest distance between A and C = $15\text{cm} \pm 0.1\text{ cm}$

$\therefore$ The shortest distance between A and C is 150km

12	<i>Monthly income tax = shs 1,102,000</i>
(a)	<i>Cash option = $\frac{95}{100} \times 8,900 \times 3,850$</i> <i>= shs 32,551,750</i> <i>Installment option = $10,000,000 + (4,500,000 \times 6)$</i> <i>= shs 37,000,000</i> <i>Difference between the two options = $37,000,000 - 32,551,750$</i> <i>= shs 4,448,250</i> <i>∴ Installment buying is more expensive than cash option by shs 4,448,250</i>
(b)	<i>$\frac{10}{100} \times 100,000 = \text{shs } 10,000$</i> <i>$\frac{20}{100} \times 75,000 = \text{shs } 15,000$ Let</i> <i>Let x denote the Taxable income = Gross income since there are no allowances</i> <i>$\frac{30}{100} \times (x - 410,000) = 1,102,000 - (10,000 + 15,000)$</i> <i>$x = \frac{1,077,000 \times 100}{30} + 410,000$</i> <i>$x = \text{shs } 4,000,000$</i> <i>Net pay = $4,000,000 - 1,102,000$</i> <i>= shs 2,898,000</i> <i>∴ The teacher's net monthly pay is shs. 2,898,000</i>
(c)	<i>Amount saved = $\frac{60}{100} \times 2,898,000$</i> <i>= shs 1,738,800</i> <i>Cost price for the car = $8,900 \times 3,850$</i> <i>shs 34,265,000</i> <i>Number of months needed to get this amount = $\frac{34,265,000}{1,738,800}$</i> <i>= 19.70612</i> <i>∴ He saves for ≈ 20 months</i>