

KOLOLO SENIOR SECONDARY SCHOOL

END OF TERM II ASSESSEMENT

MATHEMATICS

SENIOR THREE

TIME: 2 hours 30 minutes

Year: 2024

Instructions: Attempt **ALL** items in **section A** and any **TWO** items in **section B**.

SECTION A (score 30)

Attempt **ALL** items in this **section**.

Item 1

Kakembo is planning for a small birthday party for his son and wishes to spend shs. 98,000 to buy 5 kg of meat and 7 kgs of rice. However, some guests that he had invited communicated that they would not make it for the party. Therefore, he had to reduce both quantities by 2 kgs hence leading to a reduction in his expenditure by shs. 32,000.

When Kakembo went to the market, there was an 80% increase in the price of each kilogram of meat and an offer given to him on rice as 25% discount on each kilogram of rice.

Tasks:

- Help Kakembo to estimate the price of meat and the rice per kilogram.
- What amount does he pay in order for the party to be a success. (15)

Item 2

Musa is a businessman who deals in an agricultural produce business. He visited three markets in a certain week.

In market A, he bought 3 bags of beans, 5 bags of maize and 10 bags millet,

In market B, he bought 1 bag of beans, 4 bags of maize and 2 bags of millet,

In market C, he bought 5 bags of beans and 1 bag of millet.

He bought each bag of beans at shs. 55,000, a bag of maize at shs. 30,000 and a bag of millet at shs. 15,000. Musa later sold all the produce he had bought at shs. 60,000 per bag of beans; shs. 38,000 per bag of maize; shs. 19,000 per bag of millet.

Musa wanted to gain more profits, he decided to borrow shs. 380,000 from a bank that offers a simple interest at a rate of 6% per month.

Tasks:

- a) Organize the information in rows and columns and hence find Musa's profits by the end of the week.
 - b) Help Musa to determine the amount of money he will be able to pay back at the end of 5 months.
- (15)

SECTION B (score 30)

Attempt only **TWO** items in this section.

Item 3

The Department of Environmental Conservation in Uganda is conducting a survey about the presence of air pollution in three industrial zones: X, Y, and Z. The department will then implement control measures if the chance of a person experiencing health issues after visiting **at least one** of the zones is above **50%**. The department has intentionally selected a sample of people who visited the three industrial zones and monitored their health conditions. The survey results have shown that 55 people who visited zone X, 65 people who visited zone Y, and 45 people who visited zone Z reported health issues due to air pollution. Additionally, 25 people who visited both zones X and Y, 15 people who visited zones X and Z, and 20 people who visited zones Y and Z reported health issues. The department has also discovered that 25 people who **only** visited zone Z reported health issues, and 50 people who visited the three zones **did not** report any health issues.

Tasks:

- a) Determine the number of people that were surveyed by the Department of Environmental Conservation.
- b) Calculate the probability of a person experiencing health issues after visiting **at least one** of the three industrial zones.

- c) Advise the Department of Environmental Conservation, with a reason based on calculation, whether to implement control measures or not. (15)

Item 4

Your friend works in a certain company that pays Ugx. 875,000 as the gross monthly income. The company gives out monthly allowances if and only if your eligible to them as in the table below.

Children	Ugx. 15,000 for each child aged 12 and below. Ugx. 12,000 for each child between age of 13 and 18 inclusive.
Lunch	Ugx. 60,000
Transport	Ugx. 110,000
Medical	$\frac{1}{10}^{th}$ of gross monthly income.
Marriage	$\frac{1}{25}^{th}$ of gross monthly income.
Housing	$\frac{3}{25}^{th}$ of gross monthly income.

The man is married with five children of whom two are aged 12 and below, the other two aged 21 and 24 years and the other 17 years.

The following is a government tax structure that is applicable on the taxable income in excess of Ugx. 30,000.

Taxable income (Ugx)	Rate (%)
00001 – 30,000	<i>Free</i>
30,001 – 130,000	8.0
130,001 – 260,000	14.5
260,001 – 380,000	23.0
380,001 – 490,000	28
490,001 – 590,000	35.0
590,001 and above	42.5

Your friend wishes to buy a plot of land worth Ugx. 5,796,072 and starts to save 20% of his net monthly income.

Tasks:

Help your friend to determine the;

- a) amount he is to save per month.
- b) time it will take him to raise the money in order to secure the plot of land. (15)

Item 5

A corporate office holds a weekly meeting every Tuesday starting at 9:00 AM. The manager has noticed a trend of employees arriving late for the meeting. Since the office opens at **8:30 AM**, he decided to collect data from a sample of employees on their arrival times in minutes past 8:30 AM to make an informed decision about the meeting's start time. The collected data was as follows:

12	15	17	19	14	22	20	25	23	18
27	30	32	29	33	36	39	34	37	25
42	45	26	28	23	24	27	30	31	28
25	32	38	39	34	36	33	35	26	40
43	44	27	29	28	42	24	41	43	46
48	49	51	47	45	52	53	54	55	47

Task:

- a) Using the first interval as 10 – 19, calculate the **average** arrival time based on the collected data and suggest the time the when the meeting should start.
- b) Use a graph to find the time at which **majority** of the employees arrive and recommend whether the meeting start time should be adjusted based on this value. (15)

END

ALWAYS STAY DETERMINED

MATHEMATICS SCORING GUIDE

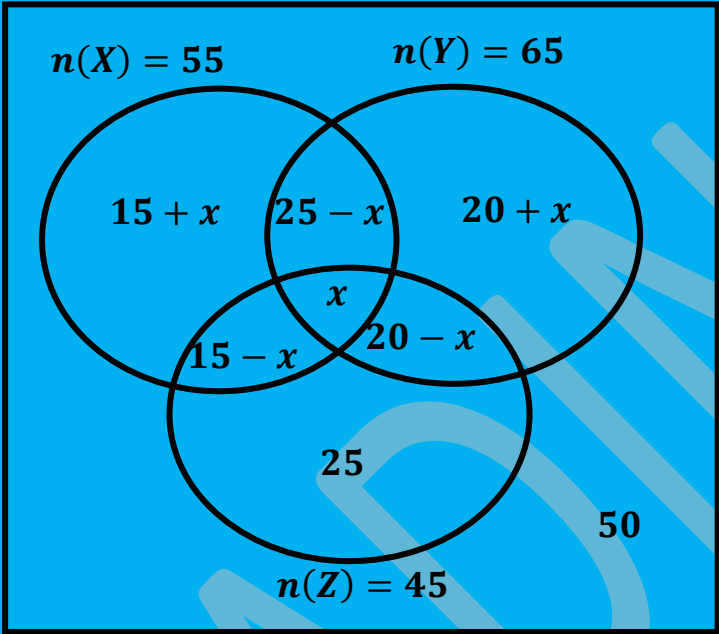
SENIOR THREE

TERM 2

YEAR: 2024/25

ITEM	ANTICIPATED/EXPECTED RESPONSES	SCORE
1.(a)	<p>Let x be the price per kg of rice and y be the price per kg of meat.</p> $5x + 7y = 98,000 \dots\dots\dots (i)$ <p>Decrease of 2kg causes $98,000 - 32,000 = 66,000$</p> $3x + 5y = 66,000 \dots\dots\dots (ii)$ <p>Solving equation (i) and (ii) by any correct method.</p> $\begin{array}{r} 3 \llbracket 5x + 7y = 98,000 \rrbracket \\ 5 \llbracket 3x + 5y = 66,000 \rrbracket \\ \hline 15x + 21y = 294,000 \\ - 15x + 25y = 330,000 \\ \hline \hline 0 - 4y = 36,000 \\ -36,000 \\ y = \frac{-36,000}{-4} \\ y = \underline{\underline{shs. 9,000}} \end{array}$ <p>Using equation (i)</p> $\begin{array}{r} 5x + 7(9,000) = 98,000 \\ 5x = 98,000 - 63,000 \\ 5x = 35,000 \\ x = \frac{35,000}{5} \\ x = \underline{\underline{shs. 7,000}} \end{array}$ <p>Note: Award all scores for any other correct method used in finding the price per kg for both rice and meat.</p>	09
1.(b)	<p>Percentage Increase = $100 + 80 = 180\%$</p> <p>New price of meat = $\frac{180}{100} \times 7,000 = shs. 12,600$</p>	

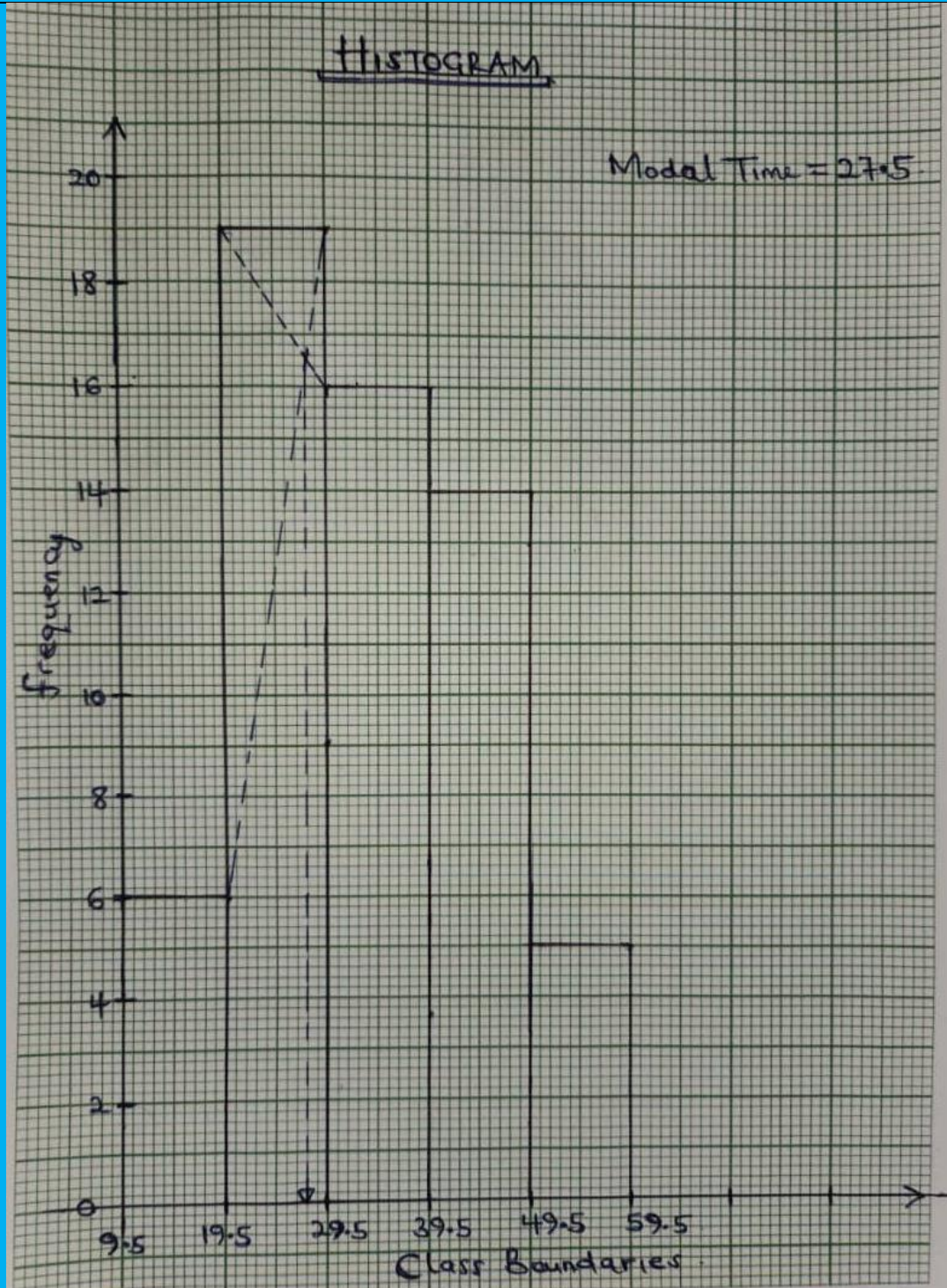
	<p>Percentage Discount= $100 - 25 = 75\%$</p> <p>New price of rice= $\frac{75}{100} \times 9,000 = shs. 6,750$</p> <p>Amount Spent= $3(12,600) + 5(6,750)$ $= shs. 71,550$</p>	06																												
2.(a)	<table border="1"><thead><tr><th>Items</th><th>Beans</th><th>Maize</th><th>Millet</th></tr></thead><tbody><tr><td>A</td><td>3</td><td>5</td><td>10</td></tr><tr><td>B</td><td>1</td><td>4</td><td>2</td></tr><tr><td>C</td><td>5</td><td>0</td><td>1</td></tr><tr><td>Selling price</td><td>Shs.60,000</td><td>Shs.38,000</td><td>Shs.19,000</td></tr><tr><td>Buying price</td><td>Shs.55,000</td><td>Shs.30,000</td><td>Shs.15,000</td></tr><tr><td>Profit</td><td>Shs.5,000</td><td>Shs.8,000</td><td>Shs.4,000</td></tr></tbody></table> <p>$\text{Profit} = \begin{bmatrix} 3 & 5 & 10 \\ 1 & 4 & 2 \\ 5 & 0 & 1 \end{bmatrix} \begin{pmatrix} 5,000 \\ 8,000 \\ 4,000 \end{pmatrix}$$= \begin{bmatrix} 3 \times 5000 + 5 \times 8000 + 10 \times 4000 \\ 1 \times 5000 + 4 \times 8000 + 2 \times 4000 \\ 5 \times 5000 + 0 \times 8000 + 1 \times 4000 \end{bmatrix}$$\begin{bmatrix} 95,000 \\ 45,000 \\ 29,000 \end{bmatrix}$<p>Total profit = $95,000 + 45,000 + 29,000$ $= shs. 169,000$</p><p>Note: Award all scores for any correct approach that incorporates use of matrix multiplication.</p></p>	Items	Beans	Maize	Millet	A	3	5	10	B	1	4	2	C	5	0	1	Selling price	Shs.60,000	Shs.38,000	Shs.19,000	Buying price	Shs.55,000	Shs.30,000	Shs.15,000	Profit	Shs.5,000	Shs.8,000	Shs.4,000	10
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2.(b)	<p>Simple Interest; $I = \frac{P \times R \times T}{100}$</p> $= \frac{380,000 \times 6 \times 5}{100}$ <p>$I = shs. 114,000$</p> <p>Amount Accumulated; $A = I + P$</p> $= 380,000 + 114,000$ <p>$A = shs. 494,000$</p>	05																												

	Note: Award all scores for a combined approach in finding the amount Musa pays back to the bank.	
3.(a)	<p>Let x be the number of people who visited all the three industrial zones.</p>  <p>Consider set Z;</p> $25 + 15 - x + x + 20 - x = 45$ $60 - x = 45$ $x = 15$ <p>Total number = $15 + 15 + 25 - 15 + 20 + 15 + 15 - 15 + 15 + 20 - 15 + 25 + 50$ $= 170 \text{ people}$</p> <p>Note: Award all scores for any other correct method that obeys mathematics principles.</p>	10
3.(b)	<p>$P(\text{a person has health issues provided he visited atleast one of the three zones})$</p> $P = \frac{170 - 50}{170}$ $P = \frac{120}{170}$ $P = \frac{12}{17}$	03
3.(c)	Percentage of getting health issues having visited at least one of the zones.	

	<div>$= \frac{12}{17} \times 100$$70.59\%$</div> <div>Since the percentage is more than 50% therefore, the Department should implement control measures.</div>	02																												
4.(a)	<table><tr><td>Children</td><td>$15,000 \times 2 + 12,000 \times 1$</td><td>42,000</td></tr><tr><td>Lunch</td><td></td><td>60,000</td></tr><tr><td>Transport</td><td></td><td>110,000</td></tr><tr><td>Medical</td><td>$\frac{1}{10} \times 875,000$</td><td>87,500</td></tr><tr><td>Marriage</td><td>$\frac{1}{25} \times 875,000$</td><td>35,000</td></tr><tr><td>Housing</td><td>$\frac{3}{25} \times 875,000$</td><td>105,000</td></tr><tr><td colspan="2">TOTAL ALLOWANCES</td><td>Ugx. 439,500</td></tr></table> <div>Taxable income = Gross income - Allowances Taxable income = $875,000 - 439,500$ $= Ugx. 435,500$</div>	Children	$15,000 \times 2 + 12,000 \times 1$	42,000	Lunch		60,000	Transport		110,000	Medical	$\frac{1}{10} \times 875,000$	87,500	Marriage	$\frac{1}{25} \times 875,000$	35,000	Housing	$\frac{3}{25} \times 875,000$	105,000	TOTAL ALLOWANCES		Ugx. 439,500	04							
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	Note: Accept any other correct method that may not involve tabular analysis and award all scores if mathematics principles are literally obeyed.																																											
4.(b)	<p>Amount saved per month = $\frac{20}{100} \times 805,010$ $= \text{Ugx. } 161,002$ Let the number of months be n $161,002 \times n = 5,796,072$ $n = \frac{5,796,072}{161,002}$ $n = 36.$</p> <p>He has to save Ugx. 161, 002 every month for 3 years (36 months) in order to raise the money for the plot of land.</p>	03																																										
5.(a)	<table border="1"><thead><tr><th>Time</th><th>Tallies</th><th>f</th><th>x</th><th>fx</th><th>Class Boundaries</th></tr></thead><tbody><tr><td>10 – 19</td><td>### /</td><td>6</td><td>14.5</td><td>87</td><td>9.5 – 19.5</td></tr><tr><td>20 – 29</td><td>### ### ### IIII</td><td>19</td><td>24.5</td><td>465.5</td><td>19.5 – 29.5</td></tr><tr><td>30 – 39</td><td>### ### ### /</td><td>16</td><td>34.5</td><td>552</td><td>29.5 – 39.5</td></tr><tr><td>40 – 49</td><td>### ### IIII</td><td>14</td><td>44.5</td><td>623</td><td>39.5 – 49.5</td></tr><tr><td>50 – 59</td><td>###</td><td>5</td><td>54.5</td><td>272.5</td><td>49.5 – 59.5</td></tr><tr><td></td><td></td><td>$\sum f = 60$</td><td></td><td>$\sum fx = 2,000$</td><td></td></tr></tbody></table> <p>Average; $\bar{x} = \frac{\sum fx}{\sum f}$ $= \frac{2,000}{60}$ $= \frac{100}{3}$ or 33.33 minutes</p> <p>Average time in hours= 33 minutes 20 seconds 8: 30 a.m + 34 minutes = 9: 04 a.m</p> <p>I suggest that the meeting should begin at 9: 04 a.m</p> <p>Note: Ignore responses for students that approximated the average to 33 minutes. (score them fully).</p>	Time	Tallies	f	x	fx	Class Boundaries	10 – 19	### /	6	14.5	87	9.5 – 19.5	20 – 29	### ### ### IIII	19	24.5	465.5	19.5 – 29.5	30 – 39	### ### ### /	16	34.5	552	29.5 – 39.5	40 – 49	### ### IIII	14	44.5	623	39.5 – 49.5	50 – 59	###	5	54.5	272.5	49.5 – 59.5			$\sum f = 60$		$\sum fx = 2,000$		08
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5.(b)



Modal Time = 27.5 minutes
 = 27 minutes 30 seconds.

Time = 8:30 a.m + 28 minutes = 8:58 a.m

Therefore, the meeting should start at around 8:58 a.m

07

END

ABOUT THE AUTHOR



Meet Agaba Ashraf, not only a Teacher at Kololo Senior Secondary School but also a dynamic author with a Bachelor's Degree in Physics at Makerere University and Mathematics. Armed with a SESEM-AT certificate in item creation for competence-based curriculum, Agaba brings a wealth of knowledge and passion for mathematics education to this scenario-based practice book. Dive into his meticulously crafted items designed to engage and challenge learners, making mathematics an enjoyable journey of discovery. The major objective is Practice to Surplus"

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