MULATSI SECONDARY SCHOOL

END OF TERM TWO EXAMS 2024

MATHEMATICS S.3

DURATION: 2HRS AND 30 MINS

Instructions to candidates:

- ✓ Attempt all the items in section A and choose one item from every part in section B
- ✓ Show all the necessary workings clearly
- ✓ Untidy work will lead to loss of marks
- ✓ Extra number of items attempted will not be marked

SECTION A

Item one

The population of a certain town has a choice of three daily newspapers, the new vision (V), the monitor (M) and the bukedde (B), 40 people read new vision 35 read monitor and 60 read bukedde, 7 read new vision and monitor, 10 read monitor and bukedde and 4 read new vision and bukedde, 34 read no paper at all. In that town there are 150 people altogether the ~~three types~~ of newspapers

TASK: Find a)

(i) The number of people who are able to access and read all the three types of newspapers.

(ii) The number of people who read one type of newspaper

(iii) The number of people who read monitor and new vision only

b) If a person is selected at random from those who read the newspaper:

i) What are the chances that the person selected reads exactly two newspapers

ii) What are the chances that the person selected reads almost two types of newspapers.

c) As a senior three learner, what advice can you give to people who read the newspapers to continue reading? Give three reasons.

Item two

When the term was starting, the master on duty noticed a challenge and compiled it in the weekly report book. He realized that the assembly normally starts at 8:10AM as planned by the school administrators. He realized that the students reached at school at different time intervals. As the master on duty, he decided to sit at the gate and recorded the arrival time of students in minutes from the time the assembly began. The time was recorded as follows.

86 85 56 59 67 62 63 50 91
50 71 60 54 61 52 52 16 80
66 46 53 55 56 77 26 52 42
35 45 68 68 49 40 93 40 79
52 53 25 93 27 71 66 84 30

TASK.

a) Construct a frequency distribution table starting with the class 10-19 and using classes of equal class width
b) With reasons, perform the calculations and explain what time should the school start the assembly.
c) What advice can you give the students who may arrive at school late continuously

SECTION B

PART ONE

Attempt one item from this part

Item three

Your uncle has offered to drive you to your friend's party. He normally drives his car at an average speed of $50kmh^{-1}$ so he asks you to get directions to the party reception and the time you are supposed to be there so that you decide on when you can leave home to reach on time.

You are informed that the party will start at 2:00PM and the directions are;

- From your home, take north eastern direction and reach the supermarket 20km away
- Then take the road that is south of the supermarket and it will take you 45mins to reach the junction
- From the junction, take the south western road and drive 25km to reach the party

On reaching the party reception, using the given directions, you realize that there was a direct route that you could have used from your home to the reception. Hint: use scale drawing and appropriate scale

Task

a) (i) describe the direction of your home from the party reception
(ii) How far is the party reception from the home using the direct route?
b) What time would you have to leave home for you to reach the party reception on time if you used the direct route?

Item four

Peter wants to buy a solar system for his home because they do not have light at home during night.

He discovers the money he has was enough to help in buying the solar system. His wife advised him to save the money in the bank because the bank had promised to give them an interest at a compound interest rate. He agreed and deposited 1,050,000shs at a rate of 10% per annum for 3years. He now plans to buy the solar after three years.

However, when he shared with a friend, he was told that was a long process. His friend told him that there was a new brand of solar that had been brought on market by my sole (a company that sales solar panel systems). He told him that he could only deposit shs, 150,000. Then pay the balance in 16equal monthly installments of shs, 25000 each. He explained to him that but for a customer who defaults payment of any installment, my sole charges him 10% extra for that installment payable the following month, Peter discovered that the advice his friend had given him was good.

Task

If Peter decided to use the advice of the wife and deposited the money in the bank, help him to calculate how much he would get after the three years at the given compound interest rate.

b). If Peter decided to use the advice of his friend, but during the process of payment he defaults for two months. How much more money does he pay as charges for the two months.

c). How much money does he pay all together with the penalty charges?

d). Express the extra money he paid as charges as a percentage of the amount of money he could pay on hire purchase without defaulting.

PART TWO(Attempt one item from this part).

Item five

Kapere wants to make a rectangular compartment at the back of his house in order to be in content with the existing brick wall at exit door of his house. He aims at using the place to view the stars in the outer space using his movable telescope in the night. Since he wants to put the compartment against the brick wall of his house. He wants to purchase the fencing material that is 60m long which can enable him cover the three sides completely such of fencing materials. Material A costs shs, 6000000, and B, costs shs, 6400,000.

However, the company he wants to buy from gives 10% discount on material A and 20% discount on martial B. In Kapere's plan, the total area of his compartment is $450m^2$

Task.

a). Basing on mathematical calculations, advice Kapere on how to choose the length and width of his compartment.

b) (i) Find how much he is likely giving to spend on each type of fencing material.

ii) Which type of material do you advise him to buy and why.

c). Supposing Mr., Kapere does not have enough money is there any other way he can get the fencing materials. Explain.

END

No 1

$n(V) = 40$

$n(M) = 35$

$n(B) = 60$

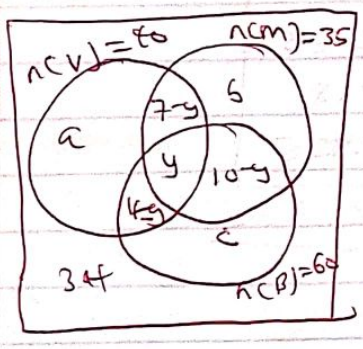
$n(V \cap M) = 7$

$n(M \cap B) = 10$

$n(V \cap B) = 4$

$n(M \cap V' \cap B') = 34$

$n(\varepsilon) = 150$



$a + 7 - y + 6 + 4 - y = 40$

$a + 17 - y = 40$

$a = 23 + y$

$7 - y + y + 6 + 10 - y + 35$

$17 - y + 6 = 35$ (collect like terms).

$6 = 18 + y$

$y + 4 - y + 10 - y + c = 60$

$-y + 14 + c = 60$

$c = 60 - 14 + y$

$c = 46 + y$

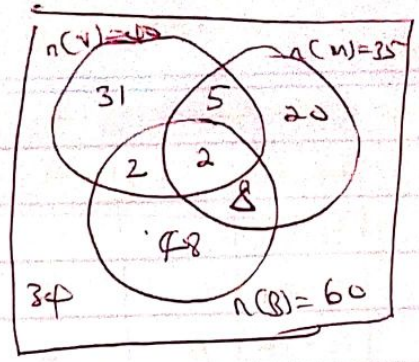
$40 + 18 + y + 10 - y + 46 + y + 34 = 150$

$40 + 18 + 10 + 46 + 34 + y - y + y = 150$

$148 + y = 150$

$y = 2$.

$n(\varepsilon) = 150$



(i) $n(V \cap M \cap B) = 2$

(ii) Only one type of news paper.

$= 31 + 20 + 48$

$= 99$ people

(iii) $n(M \cap V')$ only $= 5$

b) (i) probability $= \frac{2+5+8}{150}$

$= \frac{15}{150}$

$= \frac{1}{10}$

$= 0.1$

(ii) At most 2 types

≤ 2

$\frac{2+5+8+31+20+48+34}{150}$

$= \frac{148}{150}$

$= 0.9867$ (4dp)

c) Any three correct reasons.

No 2

a)

Starting time for the assembly: 8:00Am

Marks	Tally	frequency	X	fX
10-19	I	1	14.5	14.5
20-29	IIII	4	24.5	98
30-39	II	2	34.5	69
40-49	IIII I	6	44.5	267
50-59	IIII IIII IIII	14	54.5	763
60-69	IIII III	8	64.5	451.5
70-79	III	3	74.5	223.5
80-89	IIII	4	84.5	338
90-99	III	3	94.5	283.5
		Ef=45		Efx= 2,508

b) Mean = $\frac{Efx}{Ef}$

$= \frac{2508}{45}$

Mean = 55.733

≈ 56 minutes

08:10
+ 00 56
09:06 Am

The school should begin the assembly at 09:06 Am because on average, the students arrive after 56 minutes from 8:10Am.

NB: Accept any other measure of central tendency with correct reasons.

c) Any correct explanation.

a) $P = 1{,}050{,}000$ Tsh $R = 10\%$ $t = 3$ yrs

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

$$A = 1{,}050{,}000\left(1 + \frac{10}{100}\right)^3$$

$$= 1{,}050{,}000\ (1.1)^3$$

$$A = 1{,}397{,}550 \text{ Tsh}$$

b) Deposit = 150,000 Tsh

Total installments = $6 \times 250{,}000 = 400{,}000$ Tsh

Charges = 10% (defaulting)

Charges = $\frac{10}{100} \times 250{,}000 \times 2$

$= 50{,}000$ Tsh

c) ~~For no defaulting~~

HP = D + TI

$= 150{,}000 + 400{,}000$

$= 550{,}000$ Tsh

But for defaulting

$550{,}000 + 5000$

555,000 Tsh (paid together with the penalty charge

d) $\frac{5000}{555{,}000} \times 100\%$

$= 0.9\%$

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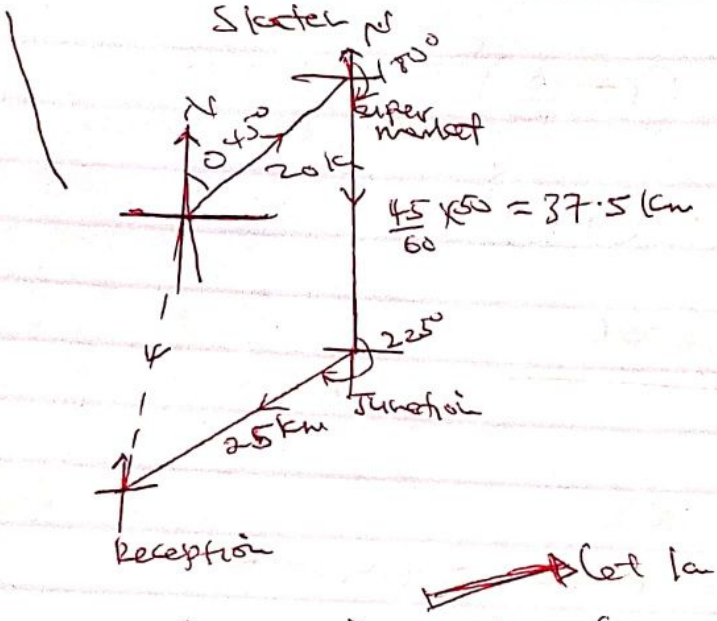
No 3

Sp = 50 Kmh^{-1}

starting time = 2:00 pm



For
25 km
25/5 = 5cm
20/5 = 4cm.
37.5/5 = 7.5cm

Let 1cm : 5km

Appropriate scale (Accurate diagram).

a) Direction of the party reception from home
= State the bearing.

b) Direct route = 8.7cm (km)
8.7 (X5) = 43.5km

c) D = sxt

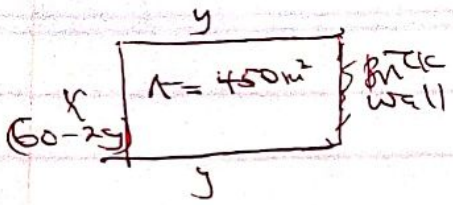
t = (D/s) where D is the direct distance, s = speed.

Get time and subtract from 2:00 pm

= 49 minutes

2:00
- 0:49
01:11 pm

No 5



$x + y + y = 60$

$x + 2y = 60$

$x = (60 - 2y)$

$(60 - 2y)y = 450$ (solve this quadratic equation)

$y = 15$

$x = 30$

Material A	Material B
cost - 6,000,000	6,400,000₦
Discount - 10%	20%
$\frac{90}{100} \times 6{,}000{,}000$	$\frac{80}{100} \times 6{,}400{,}000$
5,400,000₦	5,120,000₦

Let him buy material B

reason: its cheaper compared to A after giving a discount of 20%