MENGO SENIOR SCHOOL
END OF TERM ONE ASSESSMENT 2025
SENIOR FIVE PRINCIPAL MATHEMATICS
TIME 3HOURS

NAME …… **STREAM 5**……..

INSTRUCTIONS

Answer all items in this paper

Item 1

Mutesi sells plots of land. The prices of these plots depend on their different locations. The prices of the plots at Senge, Mende and Lusaze are 10 million, 15 million and 40 million shillings respectively. In March this year, the total amount of money collected from the sales of the plots in the different locations is 300 million shillings. The total number of plots sold in March was 18 plots and the number of plots sold in Senge was equal to the total number of those sold in Mende and Lusaze.

Due to high demand of the plots at Lusaze, it was discovered that the number of plots sold in this location keeps on doubling every after one month and those sold from other locations remain at same number each month.

She wants to know the number of plots sold at each of the three locations in March this year and also to estimate the total amount of money she will collect in December this year.

Task

Help Mutesi to determine the:

a. Number of plots sold at each location in March
b. Total amount of money she will collect in December from the sales of the plots

Item 2

On his return from Japan, Moses came with a special and beautiful design of a rectangular foundation of a building known as $golden\ design$ using a special ratio known as the $golden\ ratio.\ The\ golden\ ratio = Perimeter\ divided\ by\ twice\ the\ length$

He wishes to design his rectangular foundation of width $24m$ using this design and is to cover it with smaller golden rectangular tiles each of width $\frac{\sqrt{12}}{4}m$. He never got the ratio, but he was given a sample golden rectangle of dimensions $\left(\frac{\sqrt{5}+1}{2}\right)cm$ by $1cm$ to calculate the ratio

Task

As an architect help Moses to determine the

a. Golden ratio in its simplest form
b. Exact length of (**i**) the foundation (**ii**) each tile, in the simplest forms
c. Number of tiles to be used to cover the foundation

Item 3

A wheel chair ramp is to be constructed on a storeyed building. Mrs. Dibya the owner of the building wishes that, the outer view of one side of the ramp is a right-angled triangle of base $x\ metres$, height $y\ metres$ and area $84m^2$ and of angle of inclination θ for safety.

Task

Help Mrs. Dibya to

a. Prove that if $x = 18(sec\theta + tan\theta)$ and $y = \frac{28}{3}(sec\theta - tan\theta)$, then the area required for the side view of the ramp will be achieved.
b. Determine the base and height of the triangular side view, if $x + y = 31$
c. Determine the length and angle of the ramp

Item 4

In January, Monkey See furniture dealers sold off fifty furniture pieces and the selling price of each piece was recorded in $millions\ of\ shillings$ as shown below

01	**07**	30	28	**13**	**16**	29	25	**15**	**24**
30	**13**	11	22	**21**	**12**	02	08	**26**	**18**
17	**12**	18	20	**14**	**15**	19	16	**03**	**17**
24	**27**	13	10	**11**	**24**	16	12	**18**	**13**
08	**18**	23	28	**14**	**04**	08	14	**30**	**14**

The sales manager wants

(i) the data to be presented in a frequency table of equal intervals of $sh\ 5{,}000{,}000$ starting from $sh\ 1{,}000{,}000$, for easy analysis
(ii) to determine graphically the price that was most frequent so as to trade more in that type of furniture in February.
(iii) to determine the price of furniture which were sold on average

Task

Help the sales manager to

a. represent the data on a frequency table
b. determine the most frequent furniture price using a suitable graph
c. determine the average price of furniture sold
d. determine the number of furniture pieces whose price is above $sh\ 1{,}900{,}000$

Item 5

In order to improve on the performance of mathematics, the head of department laid down strategies, which included a test that was administered and the marks were distributed as shown in the table below

Marks	< 20	< 26	< 35	< 45	< 55	< 60	< 68	< 80	< 95
Cumulative number of learners	0	6	24	66	110	130	154	174	180

Other strategies included

A reward from the administration to be given to a learner who scores not less than 85 marks

Remedial lessons are to be organized for those who score below average

Those to get a distinction were limited to only 16 learners

The performance is inconsistent if the measure of dispersion of all the marks away from the average mark is more than 10 marks.

Task

a. Help the Head of Department to determine
   (i) the number of learners who are to be rewarded
   (ii) the number of learners who are to attend the remedial classes
   (iii) the minimum mark of a distinction
b. Were the learners consistent in their performance?

Item 6

Amy's heavy luggage which is at point O is under the action of four forces $1N, 6N, 2\sqrt{3}N \text{ and } 3N$ acting in the directions given by the bearings 030^0, 270^0, 060^0 and 090^0 respectively. She wants the luggage to be moved in the bearing 120^0 at a constant rate provided by the net force of magnitude $2\sqrt{3}N$, but the four forces could not achieve her aim.

Task

By writing each of the forces into vector form, help Amy achieve her aim by determining the magnitude and direction of the fifth force that can be applied onto the luggage.

END