NTENUNGI SECONDARY SCHOOL
MID TERM TWO EXAM, 2025
S1 Mathematics
Duration: 2hrs

Instructions to students:

- Attempt any **three** items from this paper

Item one (20 scores)

In a village shop, a shopkeeper called Amina uses a calculator that only works in base 5 to record her sales. Each day, she receives deliveries from different suppliers and records the quantities using directed numbers to indicate shortages or excess items. On Monday last week, she sold 423 (in base 10) shillings worth of rice to each of 7 customers. On the same day, her delivery notes showed the following stock differences: milk: -3 packets, bread: +4 loaves, sugar: -2 kg, salt: +1 packet, and tea leaves: +1 packet. Amina's husband wants to know all the transactions she made on that day, but he is confused by the way Amina writes her records.

Task:
As a learner of mathematics, help Amina's husband to;
a) Convert 423 (base 10) into base 5 and present the answer on the abacus
b) Find the total amount collected from rice sold to the 7 customers in base 5.
c) Convert his answer in (b) back to base 10 and present the answer on the abacus
d) Use integers and find the net stock change for all delivered items.
e) Evaluate: $6 - 2 \times (3 - 5) + 4$, using the order of operations.
f) Determine if 423 is a prime number. Explain your answer.

Item two (20 scores)

The school compound of Ntenungi SS is enclosed by a garden whose corner points are at A(-2,-12), B(2,-12), C(6,-8), D(6,5), E(1,9), F(-2,9), G(-5,7) and H(-7,-4). The headteacher has hired an engineer to design the compound by making two quadrangles of short green-grass LMN with L(-4,1), M(3,2), N(1,6) and PQRS with P(-3,-7), Q(2,-7), R(4,-4), S(-1,-4) inside the compound and then decorate the remaining part of the compound with colored tiles each with dimensions 3m by 2m. The engineer wants to first make a paperwork plan of his task so that he can be guided by the plan when he start doing the real task given to him. In his plan, the engineer wants to know the following
-areas of the quadrangles to be covered by short green-grass
-area of the part of the compound to be decorated with tiles
-number of tiles that will be needed to complete his work
-amount of money that will be needed to buy the tiles
(**HINT: consider 1cm on a graph paper = 1m**)
Task:
As a learner of mathematics, help the engineer to;
a) Plot, and connect the corner points of the school compound on a Cartesian grid
b) Plot, shade, and identify the shapes of quadrangles LMN and PQRS, which will be designed inside the compound.
c) Determine areas of quadrangles LMN and PQRS
d) Determine area of the part of the compound that will be decorated with colored tiles.
e) Number of tiles that will be required to complete his task
f) Amount of money needed to buy the required tiles if each tile costs shs.180

Item three (20 scores)

During an education week at Bwera High School, different groups contributed money towards renovating the administration block. The following amounts were contributed:
- Parents: 1½ million shillings,
- Teachers: $\frac{3}{4}$ million shillings,
- Students: ⅖ million shillings,
- OBs and OGs: 25% of the parents' contribution.

The school administration wants to plan better for the next term and create a savings plan based on a specific pattern where it saves 0.3 million in the first week, 0.6 million in the second week, 0.9 million in the third week, and so on.

Task:
As a learner of mathematics, help the school administration to;
a) Convert all contributions into decimals and find the total amount collected.
b) Determine the percentage of the total, which students contributed. Give your answer to two decimal places.
c) Change ⅖ into a decimal and state if it is terminating or recurring.
d) How much extra money is needed if the school plans to increase the total contributions by 20% next term?
e) i) Determine the 4th, 5th, and 6th terms of the saving pattern and state its formula.
ii) Find the total savings after 15 weeks.

Item four (20 scores)
A designer is creating a triangular logo for Ntenungi Environment Management Association (NEMA), an environmental conservation club, at Ntenungi Secondary School. She wants to construct a triangle XYZ where with XY = 7 cm, YZ = 6 cm, and angle Y = 60°. She wants to place a circular badge exactly inside the triangle (an in-circle) and later draw this circle on a graph paper as a locus of points from the center of the cartesian pane.

Task:
As a learner of mathematics, help the designer to;
a) Construct triangle XYZ with the given dimensions.
b) Construct the in-circle of triangle XYZ.
c) Measure and state the radius of the in-circle.
d) Calculate the area of the in-circle (consider $\pi = 3.14$)
e) (i) copy and paste the in-circle above on a graph paper with a clear cartesian plane and draw it as a locus of points from the center of the cartesian grid.
(ii) List at least **four** points through which the circle passes

**********END**********