

JOMSEC
BEGINNING OF TERM ONE ASSESSMENT
SENIOR FOUR MATHEMATICS 2024
SET THREE

Time: 2 hours.

Instructions:

- ✓ Attempt **any four** items including **item one**.
- ✓ All attempted items must be clearly numbered and working clearly shown

Item one

Musa is a farmer dealing mainly in cattle keeping, recently, he bought a bull and he is puzzled about how to feed it because all his neighbors have crops around his grazing area. The neighbors say that musa should be so careful with his bull. Musa decided to tether it on a tree stamp in the center of his triangular grazing area which measures 800m by 720m by 640m. the grazing area is surrounded by maize, beans and cassava crops.

- a) Draw a sketch illustrating the information above
- b) Using a scale of 1cm to represent 100m, find the:
 - i) distance from the tree stamp to the crops in danger of being eaten by the bull.
 - ii) maximum area of the grass eaten by the bull.
 - iii) maximum area of the grass not eaten.
- c) Advise musa on how to tether his bull so that he does not always quarrel with his neighbors.

Item Two

Jane has a triangular graduation photo with vertices ABC, with A(-1, -2), B(2, 1) and C(0, 4), and she wants to map it onto triangle $A'B'C'$ by the

transformation matrices $T = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$ followed by $M = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$

- a) Find the coordinates of $A'B'C'$
- b) If photo ABC is mapped onto $A''B''C''$ by M followed by T, find the vertices of $A''B''C''$
- c) Plot photos ABC, $A'B'C'$, $A''B''C''$ on the same graph paper.
- d) Describe fully how Jane will map $A'B'C'$ onto $A''B''C''$.

Item three

The table below shows the income tax rates of a certain country.

Taxable income(UGX)	Tax rate(%)
1 - 90,000	6
90,001 - 200,000	14
200,001 - 320,000	20
320,001 - 440,000	30
440,001 - 520,000	42
520,001 and above	47

An employee has a gross monthly income of UGX 943,500. He is entitled to the following monthly allowances:

- Housing and transport allowances of 10% of the gross income
- Marriage and child allowance of UGX. 126,500
- Insurance premium of UGX. 36,500
- Medical care of UGX. 92,400

Calculate the

- Taxable income
- Income tax
- Net income

Item Four

The weights of S.3 students of a certain school, each to the nearest Kg are given in the table below:

Weight in kg	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69
Frequency	2	5	7	10	12	6	4

Construct a distribution table and use it to:

- State the;
 - Modal class
 - Median class
- Calculate;
 - Mean weight
 - Median weight

iii) Draw a histogram of the distribution and use it to estimate the modal weight.

Item Five

Four students namely; Annet, Betty, Carol and Dorah went for shopping and bought items as given below:

Annet bought 2 kg of sugar, 5 counter books, 2 loaves of bread and 1 box of chocolate, Betty bought 3 kg of sugar and 9 counter books, Carol bought 2 boxes of chocolate, 3 kg of sugar and 3 loaves of bread and Dorah bought 1 kg of sugar, 2 boxes of chocolate, 3 loaves of bread and 8 counter books.

In the supermarket where they went, the cost of a box of chocolate is

UGX 35,000, a dozen of counter books costs UGX60,000, a loaf of bread costs UGX4,000 and a kilogram of sugar costs UGX4,500.

a) Assist the students summarize in a single matrix

i) the items bought

ii) the unit costs of the items bought.

b) They want to compute the total money spent by each of them using matrix multiplication

i) help them with the correct order of matrix multiplication and the order of the resultant matrix.

ii) compute the total expenditure of each

Item Six

A basket contains 3 oranges, 4 apples and 2 lemons. Kasumba picked two fruits at random;

a) with replacement

b) without replacement

Draw probability tree diagrams to show the possible outcomes. Find the probability, in **each case**, that the two fruits selected are of;

i) the same type

ii) different types.

CONTACT US +256758081658

Joakimu Mutumba Science Education Consult (JOMSEC)