

456/2

MATHEMATICS

Paper Two

July / August 2022

2 ½ hours



KAMSSA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education MATHEMATICS

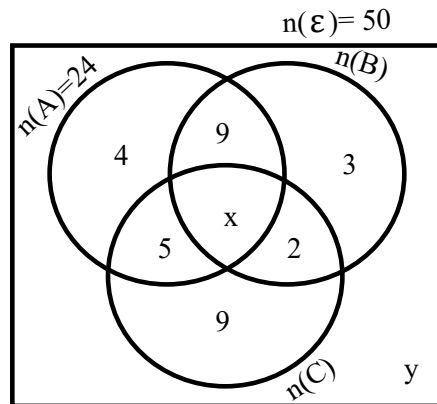
Paper Two
2 ½ HOURS

INSTRUCTIONS

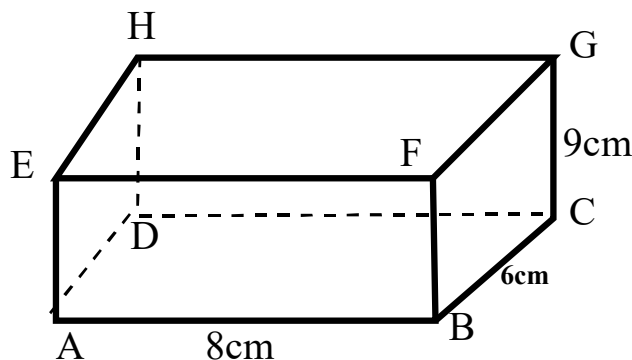
- Answer all questions in section A and any **five** from section B,
- Any additional questions answered will not be marked.
- All necessary calculations must be done on the same page as the rest of the answers.
- Only silent non – programmable scientific calculators may be used.

Section A

1. Given the function $f^{-1}(x) = \frac{4-x}{3x}$, find the $f(x)$. (4 marks)
2. Use logarithm table to evaluate. $\sqrt{94.5} \times 101.8$ (4 marks)
3. Find the equation of a line joining points P (7,-9) and Q (5, 1). (4 marks)
4. In school A its bell rings after 60 minutes, in school B after 40 minutes while that of C after 30 minutes. They last rang together at mid-day. At what time will they ring together again? (4 marks)
5. Use the venn diagram below to find
 - i. Values of x and y (3marks)
 - ii. $n(B)$ (1 mark)



6. OAB is a triangle such that $OA=a$, $OB=b$. T is a point on AB such that $AT: TB=2:3$. Find in terms of vectors **a** and **b** vector **TB**. (4 marks)
7. Given that m varies as the reciprocal of the square root of n and that $m = 5$ when $n = 4$ find n when $m = 3$. (4 marks)
8. A car left town A and moved at 40km/hr. for $1\frac{1}{4}$ hours and then covered the remaining 80km in 45 minutes to reach town B. find the average speed for the whole journey. (4 marks)
9. Below is a cuboid ABCDEFGH where $AB=8\text{cm}$, $BC=6\text{cm}$ and $CG=9\text{cm}$ (4 marks)



Calculate the length BH of the cuboid giving your answer to 2 decimal places. (4 marks)

10. Mr Okello sold a plot of land at 9,500,000 making a profit of 25%. Find how much Mr. Okello bought this plot of land. (4 marks)

SECTION B

11. Given that, $n(\mathcal{E}) = \{\text{All counting numbers less than } 13\}$

Where $\mathcal{E}$ is the universal set.

$n(C) = \{\text{All composite numbers}\}$

$n(T) = \{\text{All triangular numbers}\}$

a. List the elements of (3 marks)

i. Universal set ($\mathcal{E}$)

ii. C

iii. T

b. Represent the information in a Venn diagram and hence list (9 marks)

i. $T \cap C$

ii. $T' \cap C'$

iii. $T' \cup C'$

12. Simplify $\frac{5\frac{1}{4} \text{ of } 1\frac{3}{5}}{3\frac{1}{2} - 1\frac{3}{4}}$ (6 marks)

b. Two similar Tins A and B are 24m and 30m high each respectively. Given that the volume of Tin A is 128m^3 . Determine the volume of Tin B (6 marks)

13. In a certain company, Two employees A and B are such that Employee A earns a gross monthly income of 1,200,000 per month which includes the following allowances

- Water and electricity 60,000/=
- Housing $\frac{1}{10}$ th of his gross monthly income
- Medical and insurance of $\frac{1}{5}$ th of gross monthly income
- Transport and lunch 120,000/=

While employee B earns only a basic salary of 700,000 per month.

Given that employees are taxed as follows;

1st Shs 100,000 is tax free

Next Shs 200,000 tax is 15%

Next Shs 200,000 tax is 25%

Reminder tax is 30%

Who of the two employees pays more income tax than the other and by how much?

14. Without using tables or calculator, evaluate; $\frac{\left(\frac{1}{32}\right)^{2/5} \times \left(\frac{27}{64}\right)^{-1/3}}{\left(\frac{1}{81}\right)^4}$ (7 marks)

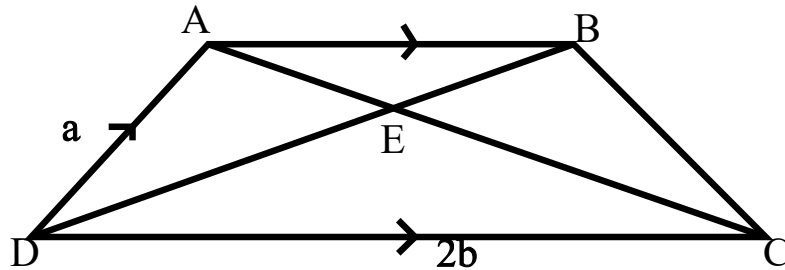
b. Given that $\frac{4\sqrt{5}}{3\sqrt{5}-2\sqrt{3}} = a + b\sqrt{c}$ what are the possible values of a, b and c

(5 marks)

15. The position vector $p = \begin{pmatrix} 3 \\ -7 \end{pmatrix}$ and $PQ = \begin{pmatrix} 1 \\ 4 \end{pmatrix}$ find the magnitude of vector Q.

(4 marks)

- b. The diagram below shows a quadrilateral ABCD with $DE = 2EB$, $AB = \mathbf{b}$, $DC = 2\mathbf{b}$ and $DA = \mathbf{a}$.



- i. Express in terms of vectors of $\mathbf{a}$ and $\mathbf{b}$ the vectors DB and BE (4 marks)
- ii. Show that points A, E and C are collinear. (4 marks)
16. Kampala and Busia are about 300Km apart. A Taxi left Kampala at 8:00am at an average speed of 60km/hr. It stopped in Iganga town after covering a distance of 150km for half an hour and continued at an increased speed of 15km/hr more than the original speed to reach Busia.
- A Bus leaves Busia town at 8:30 am at an average speed of 100km/hr nonstop to Kampala, rested for 30 minutes in Kampala and made a U-turn reaching Busia at 6 minutes before a taxi reaches.
- a. Using a scale of 2cm: 1hr and 1cm: 20km, show these journeys on the same graph. (8 marks)
- b. At what distances and times did the two vehicles meet? (4 marks)
17. A stretch of land is covered by a forest with an area of 360km^2 and represented on a map with an area of 25cm^2 . Determine the scale of this map, hence find the length of the footpath on this map which 5km on the ground. (7 marks)
- b. Given that $a:b=5:2$. Find in the simplest form the ratio $(2a+3b):(6a+b)$ and find the value of $\frac{a}{b} + \frac{2a+3b}{6a+b}$. (5 marks)

END