THE UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

LAKE ZONE FORM FOUR MOCK EXAMINATION
(GEITA, KAGERA, MARA, SIMIYU, SHINYANGA AND MWANZA)

041 BASIC MATHEMATICS

(For Both School and Private Candidates)

Time: 3Hours **Year: 2025**

INSTRUCTIONS

1. This paper consists of sections **A** and **B** with a total of **fourteen (14)** questions
2. Answer **all** questions in sections **A** and **B**
3. Each question in section A carries **six (06)** marks while each question in section B carries **ten (10)** marks.
4. All necessary working and answers for each question must be shown clearly.
5. NECTA Mathematical tables and Non- Programmable calculators may be used.
6. All communication devices and any unauthorized material **are not allowed** in the Examination room.
7. Write your **Examination Number** on every page of your answer booklet(s).

This paper consists of **4** printed pages

SECTION A: (60 MARKS)

Answer **all** questions in this section.

1. (a) Peter, Janeth and Isack walked 20, 44 and 56 paces respectively from home to the city centre. If they started walking at the same time and used the same speed, find how many times they will step together?

   (b) (i) Mponi's bag contains 5 books weighing $\frac{3}{7}$ kilograms each. If Mponi removes 3 books from the bag, what is the mass of the remaining books?

   (ii) A shopkeeper sold 192 T-shirt at a price of 5950 Tanzania Shillings each. How much money did the shopkeeper get by estimation?

2. (a) (i) Find the value of x and y that satisfy the equation $\begin{cases} 5^{(x-2y)} = 25 \\ 3^{2x} \div 3^{y} = 81 \end{cases}$

   (ii) Given that $\log 2 = 0.30103, \log 3 = 0.47712$ and $\log 5 = 0.69897$, Find the value of $\log 90$.

   (b) Rationalize the denominator of the following expression $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{5}+\sqrt{2}}$

3. (a) A city has two types of newspapers, Habari Leo and Mwananchi newspapers. The following information was obtained from a survey of 100 residents of the city, 35 people subscribe to the Habari Leo, 60 subscribe to the Mwananchi newspaper and 20 subscribe to both newspapers.

   (i) Organize the information in Venn diagram.

   (ii) How many people in the survey subscribe to the Habari Leo but not to the Mwananchi.

   (iii) How many did not subscribe to either paper?

   (b) In a class of 50 students, 35 are boys, and 15 are girls. If students is chosen at random, what is the probability that he is a boy?

4. (a) Both lines $\boldsymbol{r}$ and $\boldsymbol{s}$ passes through the point (k, 9) line $\boldsymbol{r}$ has a slope of $\frac{-4}{3}$ and passes through the point $(5, -3)$. Determine: -

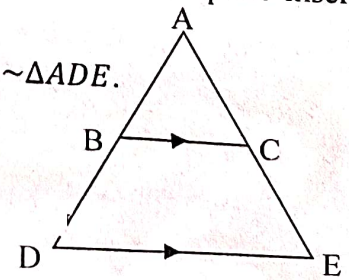
   (i) The value of k.

   (ii) Equation of $\boldsymbol{s}$ in standard form of $ax + by + c = 0$ if its x −intercept is 4.

   (b) A boat crosses a river at a velocity of 20 km/hr Southwards. The liver has a current of 5km/hr due East. Calculate the resultant velocity of the boat.

5. (a) Prove that the area A of a square inscribed in a circle with radius r is given by $A = 2r^2$. Use this formula to find the area of a square inscribed in a circle with radius $4cm$.

   (b) In the following figure, $\Delta ABC \sim \Delta ADE$.



If $\overline{AB} = 8dm, \overline{AC} = 9dm, \overline{BC} = 6dm$ and $\overline{AD} = 12dm$. Calculate the value of $\overline{AE}$ = and $\overline{DE}$.

6. (a) The number of the square tiles needed to surface the floor of a hall varies inversely as the square of the length of a side of the tiles used. If 2016 tiles of side 0.4m would be needed to surface the floor of the hall. How many tiles of sides 0.3m would be required?

   (b) The price of radio in USA is US dollar 650 and in London the same radio costs Euro 450. If the exchange rate of one Euro is equivalent to 2.45 dollars. Work out the difference between the cost of radio in USA and in London. Give your answer in Euros.

7. (a) A machine costing 180,000 Tanzania shillings is sold at a profit of 40%. Find its selling price.

   (b) The following information is related to Johnson a trader 12/12/2024

   Opening stock ..... 90,000/=

   Costs of sales ..... 75% of sales

   Closing stock ..... 20% of cost of goods sold.

   Net profit ..... 20% of sales.

   Sales ..... 340,000/=

   Calculate:

   (i) Purchases (ii) Costs of sales (iii) Closing Stock (iv) Expenses.

8. (a) A car whose original value was US dollar 25600 decreases in value by US dollar 90 per month. How long will it take for the car's value falls up to US dollar 14980?

   (b) Beatrice deposited Tsh. 2,000,000/= in a bank at the rate of 8% compounded annually for 2 years.

   (i) Find how much does she receive as a compound interest at the end of the second year.

   (ii) Calculate the interest after 2 years.

9. (a) A painter placed a 20m ladder against the wall of a house so that the base of the ladder is 4m away from the wall. How high does the ladder touch the wall?

   (b) Evaluate $\frac{\sin 135° + \cos 300°}{\cos 120° - \sin 45°}$ without using tables or calculator.

10. (a) The sum of the squares of two consecutive natural numbers is five. Find the numbers

    (b) Factorize the quadratic expression $3x^2 - 11x - 20$ by splitting the middle term.

SECTION B: (40 MARKS)

11. (a) A group of students did a mathematics test. The marks obtained out of 50 marks were recorded as follows:

34 40 30 43 33 41 25 32 30 33 15 23 43 42

34 23 28 47 20 33 23 39 24 36 21 33 16 23

(i) Prepare a frequency distribution tables by using class interval 15- 19, 20 – 24,

(ii) Calculate the mode score

(iii) Calculate the mean score.

(b) Find the central angle (in degrees) made by an arc of length 22cm in a circle whose Radius is 63cm. (Use $= \frac{22}{7}$)

12. (a) VABCD is a pyramid whose base ABCD is a square with sides 7cm. The vertex V is vertically above O. (the center of the base) and VO = 4cm.

Calculate:-

(i) Length VA

(ii) Angle between the line VA and the plane ABC

(iii) Lateral surface area of pyramid.

(b) A and B are two towns on latitude $40°N$. If town A is on longitude $25°E$. And town B is on longitude $55°E$. Find the arc length AB (use $\pi = 3.14$ and Radius of the Earth 6370 km) (leave the answer to 2 decimal place).

13. (a) Calculate x, y, w *and* z so that $\begin{pmatrix} 4 & x \\ y & 0 \end{pmatrix} + \begin{pmatrix} w & -2 \\ -3 & z \end{pmatrix} = \begin{pmatrix} 2 & -3 \\ 0 & 5 \end{pmatrix}$

(b) Jesca and Ally went to the market to buy tomatoes and onions. Jesca had 160,000 shillings and Ally had 208,000 shillings. Jesca bought 400 tomatoes and 600 onions. Ally bought 480 tomatoes and 800 onions. By using the inverse matrix method, find how much did they spend for each item.

(c) Find the image of the point Q(5, 2) when reflected on the number line $y = -x$

14. (a) Given a function f defined as

$$f(x) = \begin{cases} -3 & if\ x \leq 1 \\ 1 & if\ 1 < x \leq 2 \\ 4 & if\ 2 < x \end{cases}$$

Draw the graph of f and hence state its domain and range.

(b) A choirmaster has 10 acres of land on which he can grow either mangoes or oranges. He has 59 working days available during cultivation season. Mangoes requires 5 days per acre of labour while orange requires 8 days of labour per acre. Net profit from mangoes per acres is 30,000/= shillings and that of oranges is 45,000/= shillings. How many acres of each crop should be plant to maximize his profit?