THE UNITED REPUBLIC OF TANZANIA

THE PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

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

041

BASIC MATHEMATICS

(For both School and Private Candidates)

TIME: 3 Hours **July 2024**

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) Four bells are set to ring at the interval 6, 8, 10, and 15 minutes. If they ring together at 8:00 am, at what time will they ring together again?

   (b) During the construction of the community market, a constructor set aside 27,000,020 Tanzania Shillings for paying 200 workers a day equally.

   (i) How much money did each day worker get?

   (ii) How much money did the constructor remained with?

2. (a) Simplify $\frac{\sqrt{5}+3}{\sqrt{5}-2}$. Give the answer in form of $a + b\sqrt{c}$ and hence determine the value of a, b and c.

   (b) Solve for x from $\log(7x + 3) + 2\log 5 = 2 + \log(x + 3)$.

3. In a certain school, 40 students were asked about whether they like Tennis or Football or both. It was found that, the number of students who like both Tennis and Football was three times the number of students who like Tennis only. Furthermore, the number of students who like Football only was six more than twice the number of students who like Tennis only. However, 4 students like neither Tennis nor Football.

   (a) (i) Represent this information in a Venn diagram.

   (ii) Use the results obtained from part (a) (i) above to determine the number of students who like both Football and Tennis.

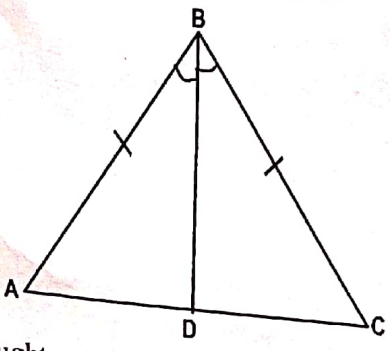
   (b) Use the information obtained above to find the probability that, students like Football only.

4. (a) $P(5,-4)$ and $Q(-1,-2)$ are two points on a straight line. Find the equation of a perpendicular bisector of $\overline{PQ}$. Give your answer in the form of $y = mx + c$.

   (b) A Boat sails due north at a speed of $120\ {}^{\text{km}}/_{\text{hr}}$ and a wind blows a speed of $40\ {}^{\text{km}}/_{\text{hr}}$ due east. Find actual speed of the Boat.

5. (a) Given the triangle ABC in which, $\overline{AB} = 8\text{cm}$, $\overline{BC} = 22.6\text{cm}$ and angle $ABC = 30°$. Find the area of this triangle.

   (c) Use the following figure to prove that, $\overline{AD} = \overline{CD}$.



6. (a) A salesman bought goods from South Africa for 30,000 rands. When he arrived Tanzania was charged a tax of 30%. How much Tanzanian shillings did he pay as tax? (Assume that, 1 South Rands = 100 Tanzanian shillings)

   (b) In a school food store, there is enough food to feed 300 students for 17 days. For how long will food last if 40 more students join the group?

7. (a) A school has 2,000 students, of whom 1,500 are boys. What is the ratio of girls to boys in the school?

(b) Halima started a business on 1st September 2018 with a capital Tshs 25,000/= in cash.

September 2. Bought goods for cash 15,000/=

3. Sold goods for cash 3,000/=

5. Sold goods for cash 5,000/=

6. Paid carriage on goods 500/=

9. Sold goods for cash 14,000/=

15. Bought goods for cash 1,000/=

19. Paid rent 2,000/=

20. Purchased goods 6,000/=

27. Paid wages 5,000/=

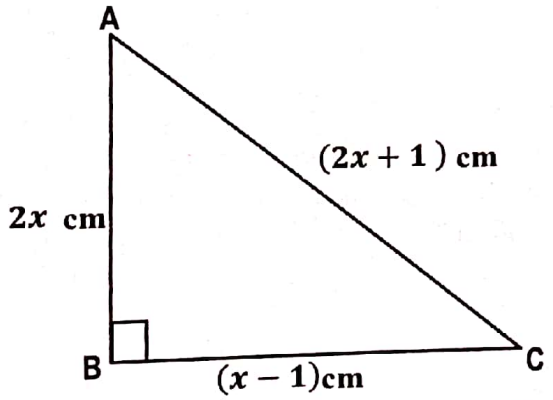
28. Sold goods on credit 1,000/=

By using these transactions, prepare Cash Account.

8. (a) Write down the first four terms of a sequence whose general term is $n(2n-1)$. Briefly explain whether it is an Arithmetic Progression or Geometric Progression.

(b) The sum of first eleven terms of an Arithmetic Progression is 517. If its first term is 7, find the sum of the fourth and ninth terms.

9. (a) Given the right angled triangle ABC below. Calculate the length of the longest side of this triangle.



(b) Without using tables, simplify $\frac{\cos 135° + \tan 60° \sin 45°}{\sin 135° \cos 60°}$

10. (a) The sum of two numbers is 30. The difference between the larger number and three times the smaller number is 2, find the numbers.

(b) Rachel is six years older than her brother John. Six years to come, the product of their ages will be 160 years. Formulate a quadratic equation representing this information. Hence, by using completing the square method to find their present ages.

SECTION B: (40 MARKS)

Answer **all** questions in this section.

11. The following data represent the marks scored by 36 students of a certain school in Mathematics examination.

72 76 90 89 74 82 63 74 70 73 58 71
55 62 65 74 71 64 71 85 70 61 64 75
51 84 50 61 83 68 70 80 50 60 66 68

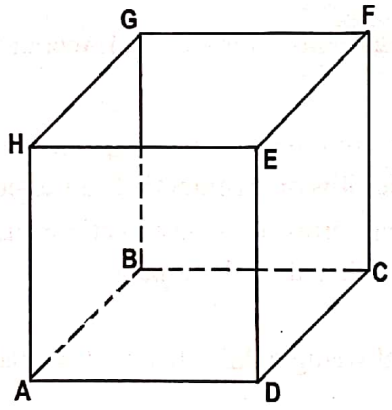
(a) Prepare a frequency distribution table representing the give data by using the class intervals: $50-54,\ 55-59,\ 60-64, \ldots$

(b) Calculate the mean and median score correct to 2 decimal places.

(c) Draw a histogram and use it to estimate the mode.

12. (a) Calculate the distance between Tanga$(50°N, 12°W)$ and Arusha$(50°N, 26°E)$ in nautical miles.

(b) The following figure represents a square box ABCDEFGH whose side are 8cm each.



Calculate the angle between the line segment $\overline{AF}$ and the plane $ABCD$, give your answer to the nearest degree.

13. (a) Amani and Asha bought Coca-cola and Pepsi drinks for a farewell party. Amani spent Tsh 9950 to buy 12 bottles of coca-cola and 5 bottles Pepsi drinks. Asha spent Tsh 8150 to buy 9 bottles of Coca-Cola and 5 bottles Pepsi drinks. Formulate a system of linear equations and hence apply matrix method to find the price of one bottle of each type of the drinks.

(b) Find the equation of the image of the line $y = 2x - 2$ after reflection in the line $y = -x$.

14. (a) Suppose a function f is defined by $f(x) = x^2 + 3$

(i) Find $f^{-1}(x)$

(ii) Write down the domain and Range of $f(x)$.

(b) A businessman plans to buy at most 210 sacks of Irish and Sweet potatoes. Irish potatoes cost 30,000 Shillings per sack and Sweet potatoes costs 5,000 Shillings per sack. He can spend up to 2,500,000 Shillings from his business. The profit on single sack of Irish potatoes is 12,000 Shillings and for sweet potatoes is 10,000 Shillings. How many sacks of each type of potatoes the businessman will buy in order to realize the maximum profit?