The United Republic Of Tanzania

President's Office

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

RUVUMA REGION

SONGEA MUNICIPAL COUNCIL

FORM THREE MIDTERM EXAMINATION MARCH 2024

041 BASIC MATHEMATICS

TIME: 3 Hours **March, 2024**

Instructions

1. This paper consists of two sections A and B with a total of **fourteen (14)** questions.
2. Answer all questions in section A and B. Each question in section A carries **six (6) marks** while each question in section B carries t**en (10) marks**.
3. All necessary working and answers for each question must be shown clearly. Falsifying any work or part of the work my receive little or no marks. **cheating is strictly prohibited**
4. Where necessary, **NECTA** mathematical tables and non-programmable calculators may be used.
5. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
6. Write your **name** on every page of your answer booklet(s)

This paper consists of 4 printed pages

SECTION A: (60 Marks)

Answer all questions from this section

1. (a) Evaluate 1954.511 + 45.489 and give your answer in standard form
   (b) Given the number: 0.683829
   (i) Write the number to nearest tenths
   (ii) Write the number to one significant figure
   (iii) Write the number to 3 decimal places.

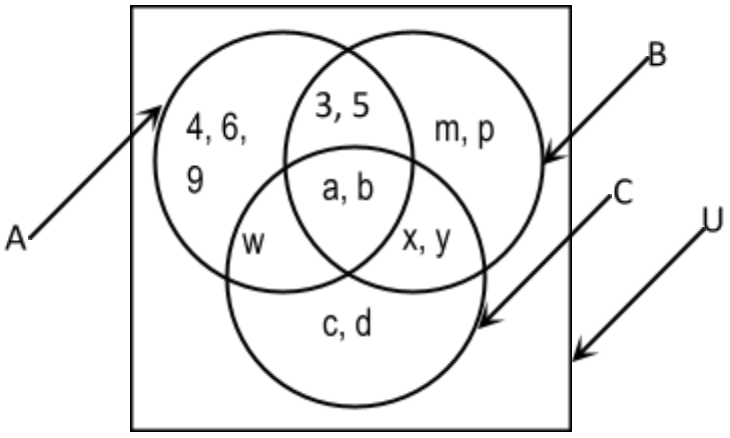
2. (a) Find x: $\left(\frac{5}{3}\right)^{x^2} \times \left(\frac{3}{5}\right)^{9} = 1$

3. (b) Rationalize the denominator: $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{5}+\sqrt{2}}$

   (c) Solve for x: $\log_3(X) - \log_9(2) = 1$.

4. (a) In a class of 47 students, 34 study Literature in English, 11 study Physics and 3 do not study of these subjects. How many students' studies both Literature and Physics?

   (b) Study the Venn diagram below and answer the questions that follows

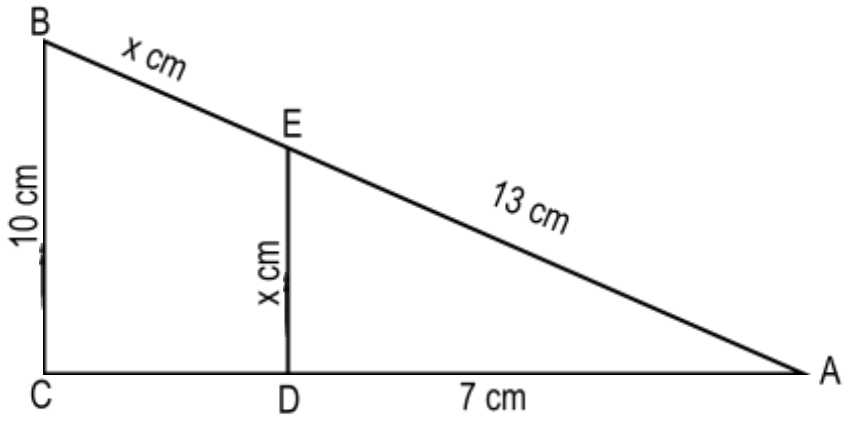


   (i) Write down the members of $A \cap B \cap C$

   (ii) Find $n((A \cup C) \cap B)$

   (iii) Write down the members of $(B \cap C) \cup (A \cap C)$

5. In the figure below, BE = DE = x cm, EA = 13 cm, DA = 7 cm, and BC = 10 cm. show that $x^2 + 13x - 130 = 0$



6. (a) Rehema's school is 6 km from their home. How many meters did she walk in one week of 5 school days, if she doesn't miss the school?
   (b) If 4 men can work for 5 days in the farm, how long will it take for 10 men to work in the same farm?

7. (a) A broken table was sold at loss of 25%, if the buying price is TZS. 40,000 find the selling price.
   (b) Happy want to buy a phone which is selling at TZS 140,000, the discount is 15%. How much did she pay?

8. (a) Determine the next three terms of the series: 7 + 12 + 17 + __ + ___ + ___
   (b) Determine the 10^{th} term of the series: 2 + 4 + 6 + …

9. (a) A string attached to the top of the flag post is also attached on the ground 15 meters from the foot of the flag post, the string is 25 meter long. Sketch and calculate the height flag post?
   (b) Evaluate $\frac{\cos(60°) + \sin(30°)}{\sin(90°) + \tan(45°)}$ without using mathematical table or calculator, leave your answer in surd form.

10. (a) Solve the quadratic $3x^2 + 11x + 8 = 0$ by general formula.
    (b) solve for y: $\frac{3y + 5}{y - 3} = 17$

SECTION B: (40 Marks)
Answer all questions from this section

11. The examination marks of 45 students were as follows:

65	58	71	62	64	35	72	32	64
46	59	82	73	76	54	63	63	75
71	61	36	64	80	61	64	76	64
60	68	48	35	92	73	46	24	35
43	30	50	70	40	46	64	27	28

(a) Construct a frequency distribution using class intervals 21 – 30, 31 – 40, 41 – 50, and so on.
(b) Calculate the median
(c) Calculate the mode
(d) Calculate mean using assumed mean, A = 55.5

12. (a) A relation is defined as R = {(x,y): y > x + 2 and y < 1}
(i) Sketch the graph of R
(ii) State the domain and range of R
(b) A relation is defined as R = {(x,y): $y = x^2 - 4$}
(i) Find R^{-1}
(ii) State the domain and range of R^{-1}

13. (a) Solve the system of simultaneous equations $\begin{cases} 8x + 5y = 14 \\ 10x = 2y + 1 \end{cases}$ by substitution method
(b) Find the image of A(3, -2) when translated by (1, 2) followed by reflection on line y = x and finally reflected on line x = 0.

14. A function is defined as $f(x) = \begin{cases} x^2 + 2 & \text{if} \quad x < 3 \\ x & \text{if} \quad x \geq 3 \end{cases}$
(a) Evaluate f(10) + 3f(4)
(b) Draw the graph of f(x)
(c) State the domain and range of f(x)
(d) Is f(x) a one-to-one function?