

**REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT  
SHINYANGA MUNICIPAL COUNCIL  
FORM FOUR MUNICIPALITY MOCK EXAMINATION – MAY 2023  
BASIC MATHEMATICS**

**041**

**Time: 3:00 Hours**

***Monday, 22<sup>nd</sup> May, 2023 A.M***

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**Instructions**

1. This paper consists of fourteen (14) compulsory questions.
2. Show clearly all working and answers in the space provided.
3. All writings must be in blue or black ink except drawings which must be in pencil.
4. NECTA mathematics table, geometric instrument and graph papers maybe used where necessary.
5. All communication devices and calculators are not allowed in the examination room.
6. Write your examination number on top right of every page.

## SECTION A (60 Marks)

Answer all questions in this section

1. (a) The LCM and GCF of the three numbers are respectively 360 and 3. If two of the numbers are 18 and 24. Find the third number.

(b) Express 0.05473

- Correct to three significant figure
- Correct to three decimal place
- In the standard form

2. (a) If  $(x - 65)^\circ$  and  $(4x + 10)^\circ$  are complementary angles. What is the value of  $x$ ?

(b)  $(\log_2 x) (-3 + \log_2 x) = 4$  Find  $x$

3. (a) Given that  $A = \left\{ x : -2 \leq x \leq 7 \right\}$   
and  
 $B = \left\{ X : -6 \leq x \leq 3 \right\}$

Where  $X \in \mathbb{R}$  Find

- $A \cap B$
- $A \cup B$

(b) Given two lines  $5x + 6y = 5$  and  $kx - 3y = 10$

Find the value of  $k$  if the lines

- Perpendicular
- Parallel

4. (a) If  $P * q = P + 4q$ , Find the value of  $x$  given that  $3 * \left( X * 1 \right) = 27$

(b) If  $A$  and  $B$  are two vectors such that  $A = 2i + 5j$  and  $B = 4i + j$ . Find the position vector  $OM$  Where  $M$  is the midpoint of  $AB$ .

5. Given that  $\triangle PQR \sim \triangle MNL$  if  $PQ = 3\text{cm}$ ,  $MN = 2\text{cm}$ . and the area of  $\triangle MNL$  is  $6\text{cm}^2$ , Find the area of  $\triangle PQR$ .

(b) The sides of the rectangle are in the ratio 2:3. If the perimeter of the rectangle is 74.5cm, find its area in two significant figure.

6. (a) The middle angle of a triangle exceeds the smallest angle by  $20^\circ$ , and the largest angle is twice the middle angle. Find the measure of each angle.

(b) i). Change  $5600\text{cm}^3$  in litres.

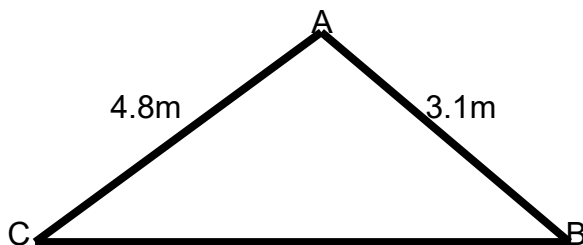
ii). The volume of the two tank in the ratio of 2:5. If the volume of the first tank is  $450\text{cm}^3$ , find the total volume of the two tank.

7. (a) A student loses 12% by selling a book for 3410/=, Find the cost of the book.  
 (b) Use the following trial balance to prepare trading, Profit and loss account of Mr.Rwaichi as at 31<sup>st</sup> December 2022.

Account	Dr	Cr
Cash	1,750,000/=	
Capital		250,000/=
Purchase	2,300,000/=	
Rent	200,000/=	
Furniture	550,000/=	
Shelves	350,000/=	
Sale		3,000,000/=
Salary	250,000/=	
Wages	100,000/=	
	5,500,000/=	5,500,000/=

8. (a) The sum of the first  $n$  terms of a certain progression is  $n^2$ . Write the first four terms of this progression and the formula of  $n^{\text{th}}$  term.  
 (b) How long would take a sum of money to double itself at 5% per annum compound interest?
9. (a) Prove that the four points  $(4, 0)$   $(7,-3)$ ,  $(-2, 2)$  and  $(-5, 1)$  are the vertices of a parallelogram and find the equation of the diagonals.

(b) Find  $\angle BCA$  in the following



- 10.(a) By Completing the square solve the equation  $2x^2 + 8x + 6 = 0$

(b) A trapezium has area of  $2x^2 - 8x + 6$  square units. If the parallel sides are  $(2x + 3)$  unit and  $(2x - 7)$  unit long, what is its length.

**SECTION B (40 marks)**

**Answer all questions in this section**

11.  $V ABCD$  is a pyramid whose base  $ABCD$  is a square with length 6cm. The vertex  $V$  is vertically above  $N$  (The centre of the base) and  $VN = 3$ cm.

Calculate

- i. The length of  $VA$
- ii. The angle between the line  $VA$  and the plane  $ABCD$ .
- iii. The volume of the pyramid.

12.(a) Given that  $f(a) = \begin{cases} -4 & \text{when } a < -1 \\ a^2 + 1 & \text{when } a \geq 2 \\ 5 & \text{when } -1 \leq a < 2 \end{cases}$

- i. Sketch the graph of  $f(a)$
- ii. State the domain and range
- iii. Find  $f(-5)$  and  $f(3)$

(b) Give the type of the function.

13. (a) Find the Image of triangle  $ABC$  after reflection in the line  $y - x = 0$   
Where  $A(1, 2)$  ,  $B(2, 4)$  and  $C(3, 2)$

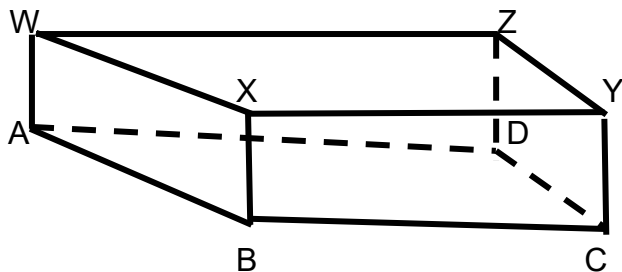
b) A translation  $T$  takes point  $(2, -3)$  to  $(-1, 2)$ . Find where it will take the point  $(0, 4)$ .

14. A rectangular box with the top  $WXYZ$  and base  $ABCD$  has

$AB = 9$ cm

$BC = 12$ CM

$WA = 3$ cm



Find

- I. Length of  $AC$
- II. The angle between  $WC$  and  $AC$ .