

PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
ARUSHA REGIONAL
FORM FOUR MOCK EXAMINATION
BASIC MATHEMATICS

CODE: 041

TIME: 3:00HRS

MAY 2025

INSTRUCTIONS:

- (i) This paper consists of sections A and B with total of fourteen (14) questions.
- (ii) Answer All questions in section A and B
- (iii) Calculators and Mathematical table may be used
- (iv) Phones and any authorized material are not allowed
- (v) Write your examination number on every page of your answer sheet(s)

SECTION A (60 MARKS)

Answer All questions

1. (a) A local club is open every day of the week Neema, John and William visit the club together one Saturday. After that, Neema visit it every second day, John visits it every third day and William visit it every fifth day.
 - (i) After how many days will they be at the club together again?
 - (ii) What day of the week will be at the club?
- (b) In peeling potatoes 8% of mass of potatoes is lost as peel. How much left for use from a bag containing 67kg?
2. (a) Solve for y if $(\frac{1}{9})^{2y} (\frac{1}{3})^y \div \frac{1}{27} = 3^{-5y}$
- (b) Solve the Equation $4 + 3\log_3^x = \log_3^{24}$
3. (a) In a class of 42 pupils studying History or physics 31 study History and 26 study physics.
Find the number of pupils who study physics only. Use Venn diagram
- (b) Given $P = \{\text{Multiples of 5}\}$ and
 $Q = \{\text{Even numbers between 10 and 22}\}$
Find All the subset of set $P \cap Q$
4. (a) The lines with equation $2x + 3y - 3 = 0$ and $2y = 4 - 3x$ meet at point A. Find the equation of the line through A whose x - intercept is -2 in the form of $y = mx + c$.
- (b) Given three vectors $a = 6i - 2j$, $b = 2i + j$ and $C = 3i - 5j$. Find the magnitude in the direction of the vector d if $d = \frac{1}{2}a + 3b \cdot c$

5. (a) The sides of a triangle are 4cm, 5cm and 6cm. If the longest side of a similar triangle is 30cm. Find the length of the other side.
 (b) The areas of Two similar polygons are 25cm^2 and 64cm^2 . If the length of the small polygon is 10cm. what is the length of the corresponding side?
6. The value V of the diamond is proportional to the square of its weight W . it is known that a diamond Weight 10gms is Worth sh. 200,000/=
- (a) Write the equation which relate V and W
 (b) Find the value of diamond Weight 30gm
 (c) Find the weight of the diamond Worth 5,000,000/=
7. (a) Josephine bought a television set for 76,000/= and then spent Tsh 16,000/= on mirror repairs. Then she sold the television set for Tsh. 110,400/=. Find the percentage profit.
 (b) The following information relates to Mr. Samwel a trader as at 30th June 2021
 Sales Tsh. 1,700,000
 Cost of sales 75% of sales
 Opening stock Tsh 450,000/=
 Net profit 20% of sales
 Closing stock 20% of cost of goods sold.
 Calculate (a) Purchases
 (b) Cost of sales
 (c) Closing stock
 (d) Net profit
8. The third, fourth and Eight terms of an A.P. forms the first three consecutive terms of G.P. If the sum of the first 10 terms of the AP is 85. Find
- (a) The first terms of the Arithmetic progression
 (b) The common ratio of G.P.
 (c) The sum of the first 7 terms of the G.P.
9. (a) A building has an angle of elevation of 35° from point A and angle of elevation of 45° from point B. If the distance between A and B is 30M, What is the height of the building?
 (b) If P and q are complementary angles such that $5 \sin q = 3$, find

$$\frac{\sin P - \sin q}{\tan P}$$
10. (a) Richard is three years older than her brother John. Three years to come. The product of their ages will be 130 years formulate a quadratic equation representing this information. Hence by using quadratic formulas. Find their present ages?
 (b) Solve by completing the square $\frac{1}{x} + \frac{1}{x+1} = \frac{9}{20}$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$S_n = \frac{a}{1-r} \left(\frac{1-r^n}{1-r} \right)$$

SECTION B (40 MARKS)

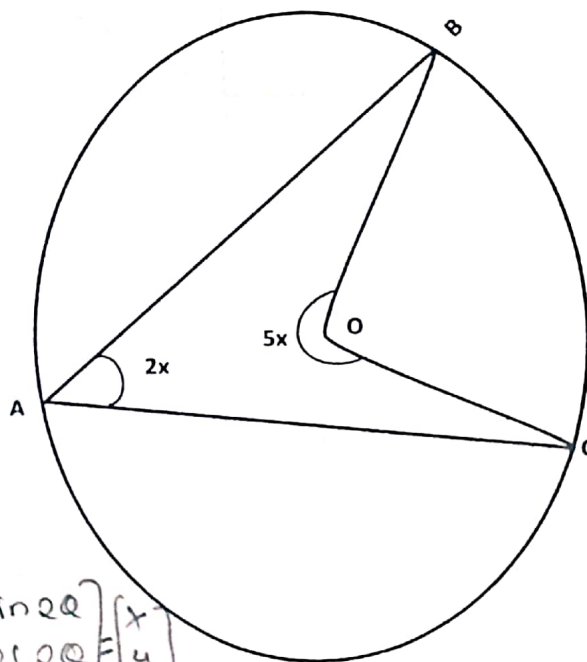
11 (a) The scores of 30 students in Civics test were recorded as shown in the table below.

Score %	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79
Frequency	2	6	9	6	3	4

Find:-

- (i) The mean score
- (ii) The median
- (iii) Draw Histogram use it to estimate to mode.

(b) Find the value of x hence determine the angle \hat{BOC}



$$\begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} \cos 2\theta & -\sin 2\theta \\ \sin 2\theta & \cos 2\theta \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix}$$

$$\begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} \cos 2 \times 120^\circ & -\sin 2 \times 120^\circ \\ \sin 2 \times 120^\circ & \cos 2 \times 120^\circ \end{bmatrix} \begin{bmatrix} 4 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} \cos 240^\circ & -\sin 240^\circ \\ \sin 240^\circ & \cos 240^\circ \end{bmatrix} \begin{bmatrix} 4 \\ 2 \end{bmatrix}$$

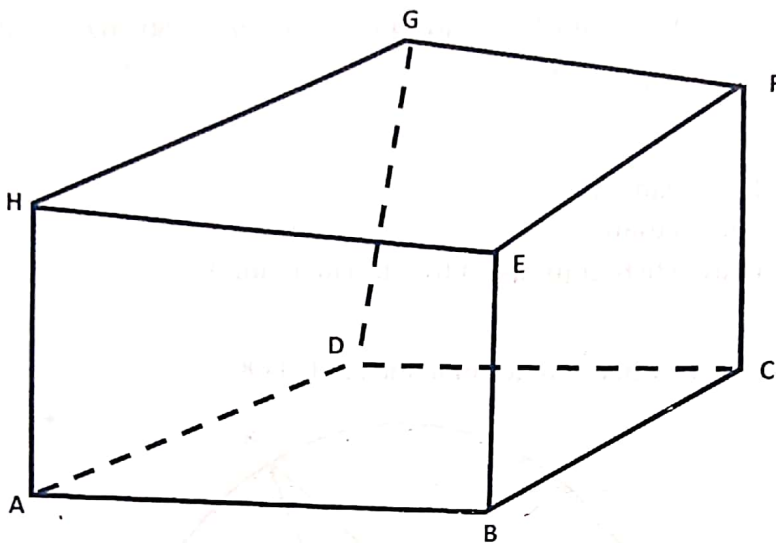
$$\begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} -\frac{1}{2} & \frac{\sqrt{3}}{2} \\ -\frac{\sqrt{3}}{2} & -\frac{1}{2} \end{bmatrix} \begin{bmatrix} 4 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} 4 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$$

?

12. (a) The following figure represent a square box ABCDEFGH Whose sides are 8m each



- (i) Determine the total surface area of the box
 (ii) Calculate the angle between the line segment \overline{AF} and the plane ABCD giving your answer to the nearest degree.
- (b) An airplane took off northward to Arusha ($7^{\circ}\text{S}, 39^{\circ}\text{E}$) at a speed of 24 Knots. If it starts from Dar -es salaam ($9^{\circ}\text{S}, 39^{\circ}\text{E}$) at 12:00 Noon When will the Airplane Arrive to Arusha?
13. (a) Given matrix $Q = \begin{pmatrix} a+4 & a+2 \\ a & a-4 \end{pmatrix}$

No inverse, Find the value of "a"

- (b) The cost of daily Newspaper are two Habari leo newspaper is 1100/= while the cost of two daily newspaper and three Habari leo newspaper is 1900/=
- (i) Represent this information in matrix form
 (ii) Use inverse method to obtain the cost of each newspaper
- (c) find the image of point A (4,2) after a rotation about the origin through 120° anticlockwise.

14. (a) Given function $f(x) = x^2 + 2x - 4$. State the domain and Range
 (b) A person requires 10 units, 12 units and 12 units of A, B and C respectively for his garden.

A liquid product contains 5 units, 2 units and 1 unit, of A, B and C per carton respectively and a Dry product contains 1 unit, 2 Units and 4 units of A, B and C per carton respectively. If a liquid product sells for Tsh 3000 per carton and dry product sells for Tsh 2000 per carton. How many of each should be produced to minimize the total cost to meet the requirements.

$$\begin{array}{r}
 x \quad 120 \\
 \hline
 240
 \end{array}
 \qquad
 \begin{array}{r}
 120 \\
 120 \\
 \hline
 240
 \end{array}$$