

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



FORM FOUR JOINT MOCK EXAMINATION
(TANGA, IRINGA, SINGIDA, MOROGORO, DODOMA,
TABORA, LINDI AND MTWARA)

041

BASIC MATHEMATICS

(For Both School and Private Candidates)

Time: 3 Hours

Year: 2025

INSTRUCTIONS

1. This paper consists of sections A and B with a total of **fourteen (14)** questions.
2. Answer **ALL** questions in all sections.
3. Each question in section A carries **six (6)** 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. Mathematical tables and non-programmable calculators may be used.
6. All communication devices and any unauthorized materials are **not** allowed in the examination room.
7. Write your **Examination Number** on every page of your answer booklet(s).

SECTION A: (60 MARKS)

Answer **all** questions in this section.

1. (a) There are 150 people at a cricket match, 20% are children, one half are men and the rest are women. How many women are at the cricket match?
(b) Equal squares which are as large as possible are drawn on a rectangular board measuring 54 cm by 78 cm. Find the size of each square.
2. (a) Determine the value of x if $\left(\frac{1}{1024}\right)^{x+3} = 32^{(x+3)}$
(b) Rationalize denominator in $\frac{\sqrt{5}}{7-2\sqrt{5}}$

3. (a) If $n(A) = 17$, $n(A \cap B) = 8$ and $n(A \cup B) = 31$, by using a Venn diagram, find:

(i) $n(A \cap B)$

(ii) $n(B)$

- (b) In a class of 30 students, 17 participate in English debate, 12 participate in English and sports. If every student is required to participate in at least one of these two events, find the probability that a student selected randomly from this class participated in:

(i) English debate only

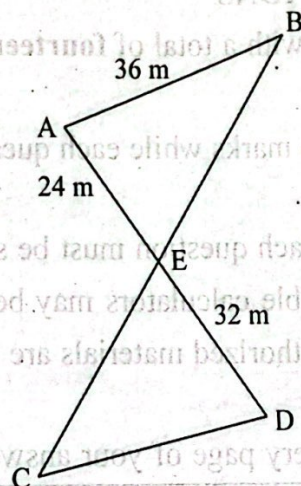
(ii) Sports only

4. (a) What is the value of P which makes a line passing through the points $A(-5, p)$ and $(1, 2)$ having equal slope to another line whose equation is $x = 2y + 3$?

- (b) Find the resultant of two forces $F_1 = 3N$ and $F_2 = 4N$ acting on a body such that the angle between them is 60° .

5. (a) Two similar rectangles have areas 80cm^2 and 60cm^2 . The length of the smaller rectangle is 12cm , what is the length of the larger rectangle?

- (b) An organization has a plot for construction of more offices as shown in the following diagram:



- (i) Prove that the triangles AEB and CDE are similar if AB and CD are parallel.

- (ii) Calculate the length of CD in meters.

6. (a) A boy has a pile of four books on his desk. The thicknesses of the books are 22 millimeters, 13 millimeters, 39 millimeters, and 18 millimeters, respectively. Can the pile fit in a shelf of a height of 10 centimeters? If so, calculate the length of the space left.

- (b) The mass (m) which can be supported by a beam varies as the square of the breadth and inversely with length (L). If the breadth of the beam is increased by 30% and the length is decreased by 9%, what is the percentage change in mass supported by the beam?

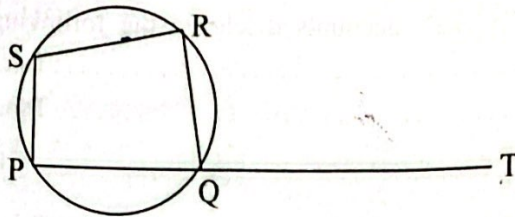
7. (a) A book is bought for Tsh. 15,000/= and sold at a percentage profit of 10%. Find the selling price.
- (b) On 31st December 2024, Kweka's accounts disclosed the following information:
 Purchase: Tsh. 200,000/=
 Sales: Tsh. 600,000/=
 Stock on 1st January 2024: Tsh. 90,000/=
 Stock on 31st December 2024: Tsh. 120,000/=
- Required:**
 Show the income statement for the year ended 31st December 2024.
8. Kabaka borrowed a loan from a CRDB bank under the condition that he is required to repay the loan on a monthly installment basis. He repaid 22,000, 24,000, and 26,000 shillings for the first, second, and third installments, respectively, until the loan was fully repaid.
- (a) If the final monthly installment was 116,000 shillings, how long did he take to repay the whole loan?
- (b) Calculate the total amount of loan borrowed.
9. (a) Given that $\sin A = \frac{3}{5}$ and $\cos B = \frac{4}{5}$ where A is an obtuse angle while B is an acute angle, find the value of $\cos(A+B)$.
- (b) A rectangular field is 42 m long and 40 m wide. The soldiers were arranged along the diagonal of the field at equal intervals of two meters. How many soldiers were arranged on the diagonal of the rectangular field?
10. (a) Solve the quadratic equation by completing the square: $2x^2 + 3x - 2 = 0$
- (b) You are asked to make a fence for a garden using a wire which is 56 m long. The fence should be rectangular in shape with an area of 171 m². What will be the dimensions of the fence enclosing the garden?

SECTION B: (40 MARKS)

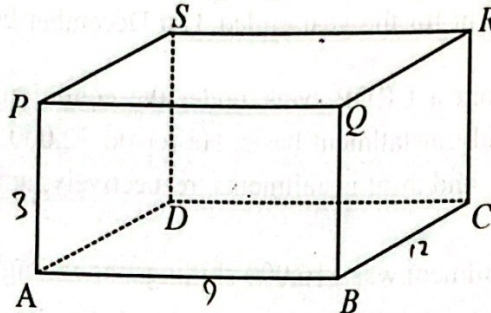
Answer all questions in this section

11. (a) The following marks were obtained by 50 students in a mathematical examination:
- 43 60 65 80 50 55 40 45 70 50 50 65 55 50 60 45 70 65 45 50
 65 48 45 80 56 65 80 43 55 50 65 50 82 60 40 43 55 45 50 50
 65 44 60 44 82 70 55 40 50 45
- (i) Construct a frequency distribution table with classes starting from 39 – 49, 50 – 60, 61 – 71, etc.
- (ii) Calculate the mean score.
- (iii) Calculate the median.
- (iv) Draw a histogram and use it to estimate the mode.

- (b) PQRS is a cyclic quadrilateral and is produced to T. Prove that $\angle RQT = \angle PSR$.



12. (a) A rectangular block with top PQRS and ABCD has $AB = 9$ m, $BC = 12$ m, and $AP = 3$ m.



- (i) Find the length AR.
 - (ii) Determine the angle between the plane ASRB and the base ABCD.
- (b) Given two points: $N(25^\circ N, 40^\circ E)$ and $M(70^\circ N, 40^\circ E)$.
- (i) Find the angle subtended by the arc NM and hence find its distance.
 - (ii) If 750 km/hr is used in order to travel from point N to M, what is the time taken?
13. (a) For what value of k will the matrix $\begin{pmatrix} 6k & 1 \\ k+3 & k-1 \end{pmatrix}$ be singular?
- (b) Find the inverse of matrix A, if $A = \begin{pmatrix} 2 & 6 \\ 4 & 8 \end{pmatrix}$ and use it to find the point of intersection of the following system of simultaneous equations:
- $$\begin{cases} 2x = 22 - 6y \\ 4x = 32 - 8y \end{cases}$$
- (c) Find the equation of the image line joining the points (1, 7) and (2, 9) after reflection in the line $y = x$.
14. (a) The function f is defined by:
- $$f(x) = \begin{cases} -2, & \text{if } x > -1 \\ 0, & \text{if } x = -1 \\ x + 2, & \text{if } x < -1 \end{cases}$$
- (i) Sketch the graph of $f(x)$.
 - (ii) State the domain and range of $f(x)$.
- (b) Mr. Mwanza Company Limited offers lower-class tickets and first-class tickets. For the company to be profitable: It must sell at least 25 first-class tickets and at least 40 lower-class tickets. The company makes a profit of 200,000/= shillings for each lower-class ticket and 225,000/= shillings for each first-class ticket. At most, the company has a capacity of 150 travelers. How many tickets of each type should be sold in order to maximize profit?