



THE UNITED REPUBLIC OF TANZANIA
THE PRIME MINISTERS
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
MBEYA CITY COUNCIL
MBEYA CITY JOINT EXAMINATION
FORM THREE BASIC MATHEMATICS



TIME: 2:30 HOURS

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Instructions

1. This paper consists of **ten (10)** questions.
2. Answer **all** questions showing clearly all the working and answers in the space provided.
3. Each question carries **ten (10)** marks.
4. All writings must be in **blue** or **black** ink, **except** drawings which must be in pencil.
5. Non programmable calculators, geometrical instruments and graph papers may be used where necessary.
6. Communication devices and any unauthorized materials are not allowed in the assessment room.
7. Write your **Assessment Number** at the top right corner of every page.

Questions

1. (a) A Form one secondary Tanzanian student is practicing decimal operation in his class. They were asked to evaluate the expressions involving the repeating decimal numbers If $y = 0.222 \dots$, $x = 0.9599$ and $z = 0.333 \dots$, evaluate the following expression (i) $xz + z$ (ii) $x + y$ (iii) xyz
(b) Round off
(i) 0.000508719 to three significant figures.
(ii) 1434457445 to the nearest hundred thousand
2. (a) Express the expression $\frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$ in the form of $c + e\sqrt{d}$, and hence state the value of c, e and d
(b) Find the value of b if $1 = \log(2b + 12) - 2\log b$

3. (a) Give the universal set $E = \{a, b, c, d, e, f, g, h\}$ and $A = \{b, c, d, f\}$, $B = \{b, c, d, f, e, g\}$ represent the above information in a Venn diagram, and use it to show that $A \cup B = B$ and $A \cap B = A$ When $A \subset B$
- (b) In a class of 40 students 23 participate in English debate, 15 participate in English debate and music. If every student is required to participate in at least of the one subjects. Find the number of students who participate in
- (i) English debate only (ii) Music only
4. (a) A line whose gradient is $\frac{3}{2}$ has the x – intercept of 3, find the y intercept
- (b) Find the equation of the line passing through the point (6,2) and (-3,4).
5. (a) Two polygons are similar. A side of one is 5cm long, the corresponding side of the other is 1m long; the area of the first is 100cm^2 , find the ratio of their areas.
- (b) Given $\frac{LM}{DE} = \frac{LN}{DF} = \frac{MN}{EF} = 11$ where \overline{LM} , \overline{LN} and \overline{MN} are the sides of the triangle LMN and \overline{DE} , \overline{DF} and \overline{EF} are the sides of triangle DEF. what does this information imply?
6. (a)(i) If a water tank fills up with 200 litres of water in 5 minutes, what is the rate of flow of water
- (ii) If x varies directly as y and $x = 30$ when $y = 40$, find the value of x when $y = 16$.
- b) The surface area of a circular object varies directly as the square of its radius. If its surface area is 78.5cm^2 , when the radius is 5cm , find the surface area of circular object when the radius is 7cm

7. (a) An employer increases the salaries of his employees in the ratio 5:4. What will be the new salary of someone who was earning sh. 225000 per month?
- (b) A trader deposited Tshs 8,000,000 in a bank for 4 years simple interest rate of $6\frac{1}{2}\%$. Find the amount of money that a trader will receive in a bank.
8. (a) A bus company in Kigoma wants to divide its daily revenue between its drivers and the company in the ratio of 3:7. If the daily revenue is 1800,000 Tshs, how much will each driver receive?
- (b)(i) State the domain and range of the $f(x) = \frac{1}{2}x + 3$ for $x = 0, 2, 4, 6$
- (ii) Find the value of $f^{-1}(6) - f(18)$
9. (a) If $\sin q = \frac{3}{4}$, evaluate the value $\frac{\sin q + 2\cos q}{1 - \sin q}$
- (b) A man who is 172cm tall, notices that his shadow measures 158cm in length. Find the angle of elevation of the sun.
10. (a) Use the quadratic formula to solve the equation $(3x - 2)(2x - 5) = 5x(x - 2)$
- (b) A piece of wire 56cm long is bent to form a rectangle of area 171cm^2 . Find the dimensions of the rectangle.

SECTION B (40 marks)

Answer all questions in this section. Each question carries 10 marks

11. In the Mathematics test, the following results were listed below

43	32	39	47	50	61
52	29	28	43	51	48
41	58	51	47	32	35
60	42	34	37	58	42
57	62	63	37	42	51

- (a) Prepare frequency distribution table with class interval 25 – 29, 30 – 34, 35 – 39 etc includes class mark

- (b) Calculate the mean mark score
- (c) Draw a histogram to represent the information
- (d) State the median class and modal class

12 . Given the relation $R = \left\{ (x, y) : y = \frac{1}{x-2} \right\}$ Find the

- (i) Domain of R
- (ii) Range of R
- (iii) Inverse of R
- (iv) Domain of R^{-1}
- (v) Range of R^{-1}

(b) The function f is defined by $f(x) = ax^2 + b$ for $\{x \in Y\}$ Where a and b are constants. It is given that $f(2) = 1$ and $f(5) = 8$,

- (i) Find the value of a and b
- (ii) Find the domain and range of the function, $f(x)$ from part (i)

13. (a) Find the coordinate of intersection by graphical method, $\begin{cases} x + y = 6 \\ -3x + y = 2 \end{cases}$

(b) Find the image of point $(2, -3)$ when it is

- (i) Reflected in the line $y = 2$
- (ii) Reflected in the line $y - x = 0$
- (iii) Translated by the points $T(3,5)$

14. (a) A grocer sells apples and bananas; the cost of 30 apples and 40 bananas is 200 Tshs and the cost of 70 apples and 30 bananas is 270 Tshs. Find the cost of each item.

(b) Given $f(x) = \begin{cases} -4 & \text{when } x < -1 \\ x + 1 & \text{when } -1 \leq x \leq 2 \\ 5 & \text{when } x \geq 2 \end{cases}$

- (i) Sketch the graph
- (ii) Find the domain and range
- (iii) State whether the function is one to one or not, give reasons

