

Candidate's Index Number



**THE UNITED REPUBLIC OF TANZANIA
THE PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL
GOVERNMENT
TANGANYIKA DISTRICT COUNCIL
FORM FOUR MOCK EXAMINATIONS**



BASIC MATHEMATICS

O41

Time: 3:00 Hours

April, 2023

INSTRUCTIONS

1. This paper consists of sections A and B with a total of fourteen (14) questions.
2. Answer all questions.
3. Each question in Section A carries six (06) marks while each question in Section B carries ten (10) marks.
4. Show all necessary workings and answers 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 sheet(s).

FOR EXAMINERS' USE ONLY

QUESTION NUMBER	SCORE	EXAMINER'S INITIALS
01		
02		
03		
04		
05		
06		
07		
08		
09		
10		
11		
12		
13		
14		
TOTAL		
CHECKER'S INITIALS		

SECTION A

Answer all questions in this section

1. (a) Find the lowest common multiples of the numbers 15, 35 and 40.
 (b) Find the appropriate value of the expression by rounding of each number in the expression

$$\frac{0.0695 \times 19812}{6.8125}$$
 to one significant figure.
2. (a) Express the equation $3^{(2y-1)} + 2 \times 3^{(y-1)} = 1$ in terms of P given that $P=3^y$
 (b) Determine the value of y in the equation
 $\log_{10}^{(3y+2)+} - 1 = \log_{10}^{(y-4)}$
3. (a) In a certain school of 120 students, 40 learn English, 60 learn French, and 30 learn both English and French. How many students learn:
 (i) English only
 (ii) Neither English nor French
 (b) Two dice are rolled together. Find the probability that both show prime numbers.
4. (a) Given two equations of two straight lines: $kx+2y-1=0$ and $3x-y+5=0$. Find the value of k if the lines are:
 (i) Parallel
 (ii) perpendicular
 (b) Given that $p=16i+7j$ and $q=-4i-2j$. Find:
 (i) $p+q$ (ii) $|p+q|$
5. (a) The length of two similar rectangles are 6cm and 8cm. if the area of small rectangle is 73.8 square centimeter. Find the area of large rectangle.
 (b) The exterior angel and interior angle of a regular polygon are in ration 2:4 respectively. Find the number of sides of the polygon.
6. (a) A piece of length 7.42M is to be cut off from a string that is 13.5M long. If the remaining part of the string is to be divided into equal pieces of length 32cm, how many pieces are there?
 (b) The mass (M) which can be supported by a beam varies directly with the breadth (b) and inversely with the length (l). If a beam of breadth 2M and length 15M can support a mass of 200kg, what mass can be supported by a beam which is 3M broad and 20M long?
7. (a) What do the following terms mean as they are used in accounts?
 (i) Trading account
 (ii) Profit and loss account
 (iii) Balance sheet
 (iv) Cash account
 (b) A car which its buying price was sh.12, 500,000 was sold at a loss of 20 percent. Find the loss made and the selling price.

8. (a) The arithmetic mean and geometric mean of two numbers m and n are 15 and 9 respectively. Find the possible values of m and n .
 (b) The second term and fourth of a G.P are 6 and 54 respectively. Find the first term and common ratio of a geometric progression.
9. (a) A tree casts a 60M shadow when the angle of elevation of a Sun is 30° . How tall is the tree?
 (b) Given that $\sin Q=0.6$. If Q is an acute angle, Find (i) $\tan Q$ (ii) $\cos Q$.
10. (a) A trapezium has the area of $2x^2 - 8x + 6$ square units. If the parallel sides are $(2x+3)$ units and $(2x-7)$ units long, Find its height.
 (b) The difference between two positive numbers is 7. If their product is 30, Find the numbers.

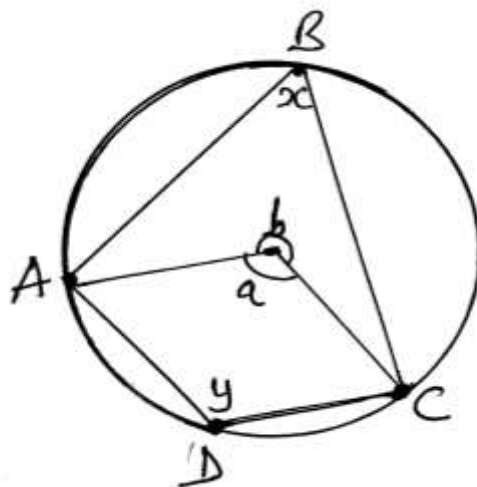
SECTION B (40 Marks)

Answer all questions in this section

11. The mass in kilograms of 40 footballers were recorded as shown below:

Mass (kg)	40 – 44	45 – 49	50 – 54	55 – 59	60 - 64
Frequency	5	8	10	11	M - 4

- (a) Find the value of 'M'
 (b) Use assumed mean $A = 52$ to calculate the mean Mass
 (c) Find the mode
 (d) Draw a cumulative frequency curve and use it to estimate median.
12. (a) A ship sails from point A (10°S , 30°W) to point B (11°N , 30°W) at a speed of 900km/h. If it leaves point A at 10:00am, at what time will it arrive at B? (Radius of the Earth $R = 6400\text{km}$)
 (b) In the following figure, prove that angles x and y are supplementary given that \mathbf{a} and \mathbf{b} are the angles at the centre of the circle.



13. (a) Solve the following system of simultaneous equations by using the Matrix method:

$$\begin{cases} 2x - y = 5 \\ 3x + 2y = 4 \end{cases}$$

(b) Triangle ABC has a vertices A (1,1) B(2,4) and C(5,3). Find the vertices of its image under the transformation matrix:

$$T = \begin{pmatrix} 2 & 1 \\ 1 & 3 \end{pmatrix}$$

(c) Find the image of the point A (4,2) after a rotation about the origin through 120° anticlockwise.

14. (a) A nutritionist prescribes a special diet for patients containing the following number of units of vitamins A and B per kilogram of two food types F1 and F2 as follows:

Food type	Vitamin A	Vitamin B
F1	20	7
F2	15	14

If the minimum daily intake required is 120 units of A and 70 units of B, what is the least total mass of food a patient must have enough of these vitamins?

(b) Find the inverse of the relation $R = \{y:y \leq 1+2x\}$ and hence state the domain and range of R^{-1}

