

THE UNITED REPUBLIC OF TANZANIA



**REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
THE CITY COUNCIL OF DODOMA
HOME PACKAGE FORM FOUR EXAMINATION, APRIL 2020
041 BASIC MATHEMATICS**

TIME: 3HOURS

Instructions

1. This paper consists of sections A and B with a total of sixteen(16) questions
2. Answer all questions in section A and four (04) questions from section B. Each question in section B carries ten (10) marks.
3. All necessary working and answers for each question done must be shown clearly.
4. Mathematical table and graph papers may be used.
5. Calculators, cellular phone and unauthorized materials are not allowed in the examination room.
6. Write your Examination Number on every page of your answer sheet(s)

SECTION A (60 marks)

Answer all questions in this section

1. (a) Round off

(i) 9.67 to ones

(ii) 0.205 to one decimal place

(iii) 0.0197 to one significant figure

Hence, estimate the value of $\frac{9.67 \times 0.0197}{0.205}$

0.205

(b) Express 0.54343..... in the form of $\frac{a}{b}$ where a and b are integers and $b \neq 0$

(c) Simplify the expression: $\sqrt{x-y} + \sqrt{9x-9y}$

2. (a) Simplify

(i) $27^{1/4} \times 3^{1/4} \times (\sqrt{3})^{-2}$

(ii) $\log 5 - \log 8 + 4\log 2$

(b) Solve for y from $2\log_a y = 4\log_a 5 - 2\log_a 2$

3. (a) Juma planted trees on each side of the road to his house. The road is $\frac{3}{4}$ km long and the trees are 5m apart. How many trees did he plant?

(b) (i) By using Venn diagram prove that;

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

(ii) Each of the 40 pupils in the class must take at least one of the subjects: commerce and History. If 24 take history and 28 take commerce, how many take both subjects?

4. (a) Given vectors $\underline{a} = 6\underline{i} + 12\underline{j}$ and $\underline{b} = 17\underline{i} + 18\underline{j}$

(i) Find vector $\underline{c} = 2\underline{a} - \underline{b}$ and its magnitude

(ii) Represent vector c in part (a) (i) above in the x-y Plane

(b) Find the equation of the line passing through the midpoint of A (-3,2) and B (1,-4) and which is perpendicular to the line joining points A and B

5. (a) In triangle ABC; X, Y and Z are the midpoints of sides \overline{AB} , \overline{AC} and \overline{BC} respectively. If

$$\overline{ZX} = \overline{ZY} \text{ and } \angle XBZ = \angle YCZ = 90^\circ$$

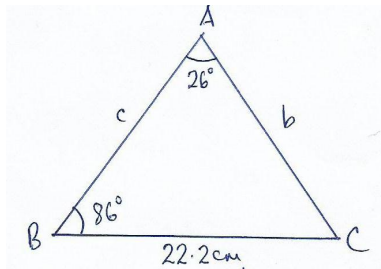
(i) Represent this information diagrammatically

(ii) Show that $\overline{AZ} = \overline{AZ}$

(b) The area of two similar polygons is 27 and 48 square meters. If the length of one side of smaller polygon is 4.5cm Find the length of the corresponding side of the larger polygon.

6. (a) An article is sold for a loss of 40%, calculate the selling price if the loss made is 2560/=

- (b) The number of tablets given to a patient was found to be directly proportional to the weight of the patient. If a patient with 36kg was given 9 tablets, find how many tablets would be given to a patient whose weight is 48kg.
7. (a) The interior angle of regular polygon is 4 times as large as its exterior angle. How many sides does the polygon have?
- (b) The sum of two numbers is 30. The difference between the larger number and three times the smaller number is 2, find the two numbers.
- (c) Write down the prime numbers between 90 and 97.
8. (a) In a certain geometric progression, the third term is 18 and the sixth term is 486. Find the first term and sum of the first ten terms of this G.P.
- (b) How many integers are there between 14 and 1,000 which are divisible by 17?
9. (a) Find the length AC from the figure below.



- (b) A ladder reaches the top of a wall 18m high when the other end on the ground is 8m from the wall. Find the length of the ladder.
10. (a) Solve for x if $6\frac{6}{x-4} = 1 + \frac{4}{x}$
- (b) If the sum of two numbers is 3 and the sum of their squares is 29, find the numbers.

SECTION B (40 marks)

Answer any four(4) questions from this section

11. A firm makes curtains which are either light or heavy. Each light curtain takes 3 hours to produce and uses 6m of materials and each heavy curtain takes 6 hours to produce and uses 7m of material. The workers of the firm can work for 60 hours and there are 90 material available. If the profit on light and heavy curtain is Tshs. 4000 and Tshs. 6000 respectively. Find how many of each should be made to maximize profit.
12. The height of some plants grown in a laboratory were recorded after 5 weeks. The results were shown as follows,

Height(cm)	11-15	16-20	21-25	26-30	31-35	36-40
Frequency	4	8	20	21	12	3

- (a) Calculate the mean by using Assumed mean of 23
 (b) Draw the cumulative frequency curve and estimate median from the graph.

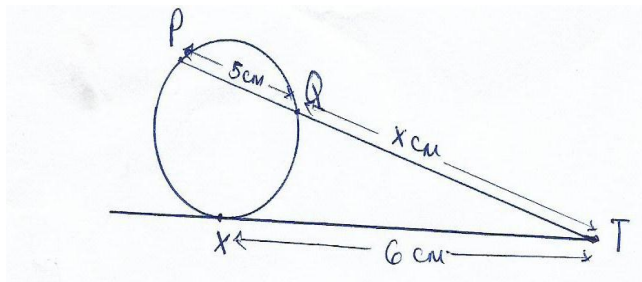
13. (a) (i) Define knot

- (ii) Find the distance between A (30°N , 139°E) and B(45°N , 139°E) in nautical miles.
 (Use radius of the earth, $R=6370\text{Km}$)

(b) Define the following terms

- (i) Circle
 (ii) Chord
 (iii) Tangent

(c) In the figure below, find the value of the length x



14. Study the given trial balance and answer the questions that follows

S/N	Details	Amount Tshs	Amount Tshs
01	Cash		
02	Capital		200,000
03	Purchases		
04	Sales		104,000
05	Water bills	3,000	
06	Advertising	2,000	
07	Telephone bills	1,000	

08	Salaries	3,000	
		304,000	304,000

15. (a) Use inverse matrix method to solve the following system of simultaneous equations

$$\begin{cases} 2X+3Y=12 \\ 3X=7+Y \end{cases}$$

(b) Determine the value of K for which matrix

$$\begin{Bmatrix} K+3 & 0 \\ 0 & 2 \end{Bmatrix} \text{ has no inverse}$$

(c) A lines transformation T maps (X,Y) onto (X',Y') where $X'=X-Y$ and $Y'=X+2Y$

(i) Write down the matrix of T

(ii) Find the image of (5,3) under T

(iii) Find the point (X, Y) whose image under T is (-5,16)

16. (a) A function f is defined by

$$f(x) = \begin{cases} x^2 & \text{for } x \leq 0 \\ x & \text{for } x > 0 \end{cases}$$

(i) Find f(-4)

(ii) Give the domain and range of f(x)

(iii) Sketch the graph of f(x)

16. (b) A bag contains 5 white balls and 3 black balls. A ball is chosen at random from the bag and replaced. Another draw is made

(i) Draw a tree diagram to show the results of the drawing.

(ii) Find probability that they are of the same color.