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

Code 041 **MAY 2024**
TIME: 3 Hours **8:00 - 11:00Am**
Tuesday 14th May 2024

INSTRUCTIONS:

1. This paper consists of section A and B with a total of fourteen (14) questions.
2. Answer all questions in sections A and B.
3. Calculators and mathematical table may be used.
4. Phones and any authorized material are not allowed
5. Write your examination number on every page of your answer sheet (s).

SECTION A: (60 Marks)

1. (a) Ali and John completed around in 30 minutes and 36 respectively. If they started together in the same direction, after how many minutes will they meet again of the starting point?

(b) Write the number 0.09963 correct to :-

(i) 3 decimal places
(ii) Hundredth

2. (a) If $9^{3n} = 5$, Find the value of $4a^{12n} - 8$

(b) Evaluate without using table.

$$\log(3x + 8) - 3\log 2 = \log(x - 4).$$

3. (a) In a class of 105 students, 25 study mathematics but not History, 50 study History but not mathematics, if each student study at least one subject. Find the number of student who study History.

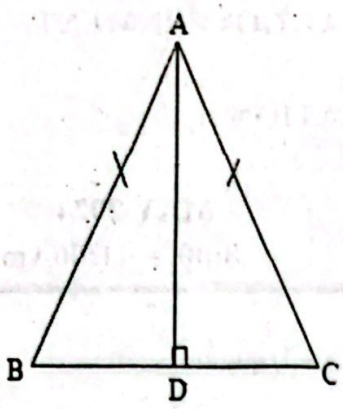
(b) A family has three children. Find the probability that:-

(i) All are boys
(ii) At most two are girls.

(a) Given vector $\underline{a} = \frac{1}{2}i + \frac{1}{3}j$, $\underline{b} = \frac{2}{3}i + \frac{1}{3}j$ and $\underline{c} = i + 6j$. Find the direction of cosine of $\underline{d} = 6\underline{a} + 3\underline{b} - \underline{c}$.

(b) The area of the triangle $ABC = 140cm^2$, $AB = 20cm, AC = 14cm$. Find the angle BAC.

5. (a) In a triangle ABC, AB = AC. D is the midpoint on BC such that AD is perpendicular to BC.



Show Δ ACDis segment to ΔABD.

(b) Monica and her daughter use $5m^2$ and $3.2m^2$ of cloth when making similar cloth. Monica is 165cm tall. How tall is the daughter?

6. (a) If v varies directly proportional to the square of x and inversely proportional to y when v = 18, x = 3 and y = 4. Find the value of v when x =5 and y ÷ 2.

(b)How many bottles of 400 milliliters each will be filled from a bucket of water capacity 20 litres?

7. (a) A man bought a car for Tshs. 8,000,000/= and sold it for a loss of 20%. Find the selling price.

(b) From the following trial balance prepare the trading, profit and loss account for the year ending 31st 2008.

A TRIAL BALANCE AT 31st JULY 2008

Account name	Dr	Cr
Cash	450,000	
Capital		1,000,000
Purchases	900,000	
Sales		700,000
Rent	1,500,000	
Wages	200,000	
Total	1,700,000	1,700,000

8. (a) The 4th and the 11th term of an Arithmetic Progression (AP) are 17 and 52 respectively. Find

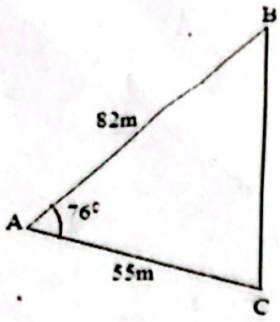
(i) The first term

(ii) Common difference

(iii)n^{th} term of the sequence.

(b) Mr. Severua deposited an amount of Tsh. 5,000/= into a saving account at an annually interest rate of 5% compound monthly. What will be the value of the investment in 10years?

9. (a) The diagr n below shows field ABC



(i) Calculate the length of Segment BC.

(ii) Calculate angle $A\hat{C}B$.

(b) A rectangular frame is made by wooden bars. The diagonal of the frame is 25M long and its width is 15M. Find the length of the frame.

10. (a)If the solution of the quadratic expression is $x = 5$ *and* $x = -\frac{4}{5}$. Find the quadratic expression.

(b)Solve $2x^2 + 3x - 5 = 0$ by completing square.

SECTION B (40 Marks)

11. (a) The table below shows the marks of 50 students in a basic mathematics test.

Marks	30-39	40-49	50-59	60-69	70-79
Frequency	2	8	16	20	4

(i) Find mean by using Assumed mean (A) = 64.5.

(ii) Draw a commulative frequency curve and use it to estimate median.

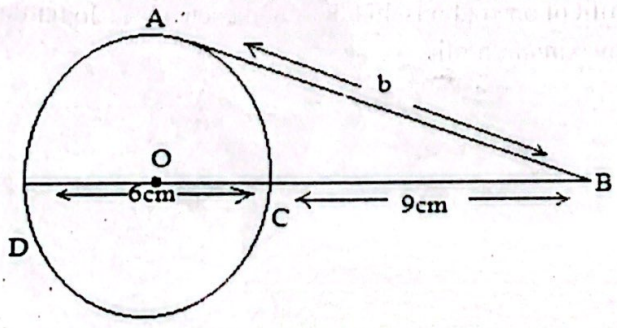
(iii)Interprete the result in (ii) above.

(b) Describe the following terms as applied in a circle;

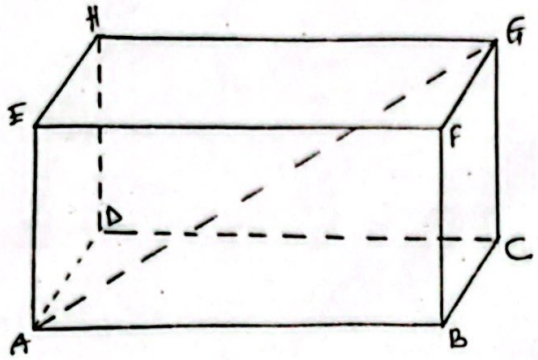
a) Central angle

b) Inscribed angle

c) Find the value of b in the given figure below.



12. (a) The diagram below shows a cuboid ABCDEFGH, given that CG = 6cm, AG= 24cm and AB = 2BC.



(i) Calculate the length AB

(ii) Calculate the angle between AG and base ABCD.

(b) An Aeroplane flies north ward to Tanga $(5°S, 39°E)$ at an average speed of 12knots. If it starts from Pwani $(7°s, 39°E)$ at 12:00 noon. When will aeroplane arrive to Tanga?

13. (a) (i) Given that matrix $P = \begin{pmatrix} 2 & -2 \\ 5 & 6 \end{pmatrix}, Q = \begin{pmatrix} 8 & 4 \\ 12 & 6 \end{pmatrix}$, Find $2P - \begin{pmatrix} Q \\ 2 \end{pmatrix}$.

(ii) Solve $\begin{cases} 2x + y - 7 = 0 \\ 4x + 3y = 17 \end{cases}$ by inverse method.

(b) The vertices of a ΔPQR are P(1,1), Q(4,1)and R(5,4). A transformation represented by a matrix $T = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$ Maps ΔPQR onto $\Delta P'Q'R'$. A second transformation represent by $U = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ maps $\Delta P'Q'R'$ onto $\Delta P''\ Q''\ R''$. On the same axes draw the three triangle $\Delta PQR, \Delta P'Q'R'$ and $\Delta P''\ Q''\ R''$.

14. (a)Given $f(x) = x^2 + 6$ if g(x) is another function such that; $g(x) = \frac{f(x)-f(4)}{x-4}$, find

(i) g(0)

(ii) g(-→)

(iii)$g^{-1}(8)$

(b)A company sells radio and TV. Each radio take up to $1.8m^2$ of space and costs TSH 300,000/= when each TV takes up o $1.5m^2$ of space and cost 500,000/=. The owner of the shop has 6,000, 000/= to spend and has $18m^2$ of space. If the profit of one radio is 40,000/= and each TV is 30,000/=. Find how many radio and TV should he sell for maximum profit.