

PRESIDENT’S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
KIBAHA TOWN COUNCIL
NYUMBU SECONDARY SCHOOL
FORM THREE MID - TERM EXAMINATION

CODE: 041

BASIC MATHEMATICS

Time: 3:00 Hours

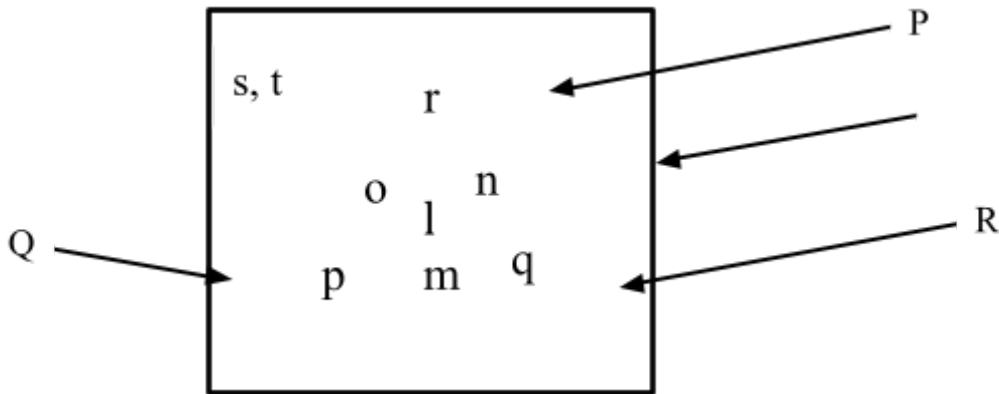
Monday, 28th August 2023 am

Instructions

1. This paper consists of section A and B with a total of **fourteen (14)** questions.
2. Answer **all** questions.
3. Section A carries **Sixty (60)** marks and section B carries **forty (40)** marks.
4. **All** writing must be in **black** or blue ink.
5. NECTA mathematical table and non – programmable scientific calculator may be used where necessary.
6. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
7. Write your **Examination Number** in every page.

Section A (60 Marks)

1. (a) How many seconds that are multiples of five are in a minute?
 (b) Express $1.\dot{8}\dot{6}$ as fraction in its simplest form.
2. (a) Given that $\log 2 = 0.3010$, $\log 3 = 0.4771$. Find the value of x if $12^x = 3$
 (b) Use the substitution $y = 2^x$ to solve the equation $2^{2x+1} - 2^{x+1} + 1 = 2^x$
3. From the Venn diagram below



- a) List the numbers of $(P \cup Q)'$
- b) Find $n(P \cup Q \cup R)'$
- c) Find $n(Q \cup R) - n(P \cap R)$
4. (a) Find the solution set of the following inequality and show on separate number lines the solution of each inequality.
 $2 < |x - 3| < 5$
 (b) Both line P and Q pass through point $(k, 9)$. Line P has a gradient of $-\frac{4}{3}$ and passes through point $(5, -3)$.
 Find;
 i) The value of k
 ii) The equation of line S if it crosses the x - axis at $(-14, 0)$
5. (a) A square is inscribed in a circle of radius r , find the area of the square in terms of r .
 (b) If $\triangle ABC$ is such that $\overline{AB} = \overline{AC}$ and $\overline{AB} : \overline{BC}$ is equal to 3: 4 if the perimeter of the triangle is 60cm. calculate the value of \overline{BC}
6. (a) Shekh Shabani Mahmood from Oman visited Tanzania. He had 5000/= Oman Rial and wanted to change into us Dolar. If 1US Dolar was equivalent to 24,000/= Tanzania shillings. 1 Oman Rial is equivalent to 20/= Tshs. How much US Dolar did he get?
 (b) If x is directly proportional to the square of y and inversely proportional to z , if

$x = 10$ when $y = 2$ and $z = 2$. Find the value of x when $y = 6$ and $z = 9$.

7. (a) Esther and Kapanda company get a loss of 20% by selling their products at 25,000/=. At what price the company must sell its products so that can get a profit of 52%
- (b) The ratio of the English periods in a general class time table is 1:5, and 2: 16 is given to mathematics. What ratio is left for the other subjects.
8. Use mathematical table to evaluate $(3.25)^{10} + \left(\frac{40.9}{6.692}\right)^3$. Express your answer in the form of $A \times 10^n$ where $1 \leq A < 10$ and A is an integer, correct to two significant figures.
9. a) A kite is flying directly over a straight path 100cm long. The angle of elevation of a kite from one end of the path is 30° . From the other end of the path, the angle of elevation of the kite is 60° .
- i) How high is the kite (Leave your answer in surd form)
- ii) Calculate distance from one end 30° to the base of a vertical height of the kite over the path.
- (b) Given that $\tan A \cos A = 0.6$ where A is an acute angle. Find the exact value of $-\cos A + 1$
10. a) Solve the following pair of system of simultaneous equation by using substitution method.
- $$\left\{ \frac{1}{x} + \frac{1}{y} = 7 \quad \frac{2}{x} + \frac{3}{y} = 16 \right.$$
- b) If $m * n = m^n$. Find the value of $9 * -\frac{1}{2}$

Section B (40 Marks)

Answer all questions from this section

11. A random sample of 100 students was chosen from Nyumbu Secondary School. Each student's mass in kg was recorded as shown below.

Mass in kg	Number of students
55 – 59	1
60 – 64	3
65 – 69	8

70 – 74	17
75 – 79	30
80 – 84	25
85 – 89	16

(a) Calculate the mean by assumed mean taking $62kg$ as assumed mean

(b) Construct a histogram. From it estimate

i) The mode masses

ii) The percentage of students with mass between $67kg$ and $76kg$.

12. (a) Define the following term as used in Earth's as a sphere

i) Equator

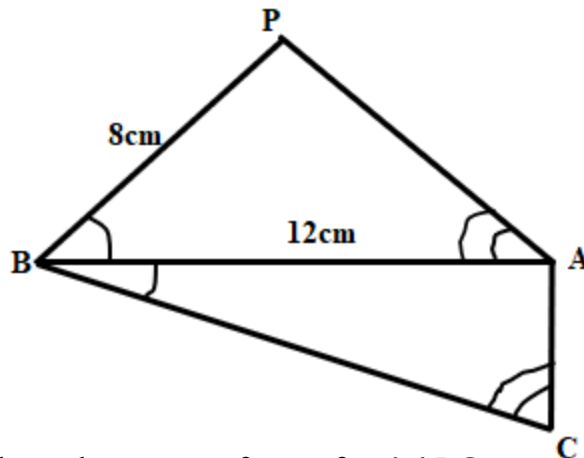
ii) Knot

iii) Meridian

(b) Calculate the length of diameter (in kilometers) of the parallel of latitude $64^\circ N$.

(c) A speed boat travels from Zanzibar ($6^\circ S$, $45^\circ E$) to Lindi ($9^\circ S$, $45^\circ E$) using speed of $30Nm/hour$. If it left Zanzibar at $06:30pm$, at what time did it reach Lindi?

13. a) If $\overline{BP} = 8cm$, $\overline{BA} = 12cm$ and area of $\Delta PBA = 10cm^2$



Find

i) The enlargement factor for ΔABC

ii) Scale factor for its area

iii) The area of ΔABC

b) The coordinate of the image of the object at point $B(x, y)$ under reflection through the line $y - x = 0$ is $B'(4, 2)$. What its image after being rotated through 90° positive direction about the origin.

14. a) If $f(x) = \frac{3}{4x-2}$ and $f^{-1}(x) = \frac{ax+3}{4x}$, find the value of a

b) Consider the function $f(x) = 2x^2 - 5x + 1$ ranging from $x = -2$ to $x = 4$

i. Sketch the graph of $f(x)$

- ii. From the graph find the value of x for which $f(x) = 10$
- iii. Find the value of x for which $f(x)$ is positive