Examination Candidate number.....

PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT.
KIBAHA TC, BAGAMOYO DC, AND KINONDONI MC.
(KIBAKI)

FORM TWO JOINT PRE-NATIONAL EXAMINATION, 2023

041 ADDITIONAL MATHEMATICS

Time:2:30Hours **Year2023**

Instructions

1. This paper consists of **ten (10) compulsory** questions.
2. Answer **all** questions showing clearly all the working in the spaces provided
3. Mathematical tables, geometrical instruments and graph papers may be used where necessary
4. **All**writing should be in **blue** or **black** ink, except for graphs and diagrams that must be drawn in pencil.
5. Cellular phones and any unauthorized materials are **not** allowed in the examination room
6. Write your **Examination Number**at the top right corner of every pageWrite your **Examination number** on every page of your answer booklet (s).

FOR EXAMINER USE ONLY		
QUESTION NO.	SCORE	SIGNATURE
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		

1. Find the next three terms in the given sequence

(a) (i) $\frac{1}{2}, \frac{4}{5}, \frac{9}{10}, \frac{16}{17}$, _____,_____,_____.

(ii) $-4,\ 2,\ -2,\ 0,\ -2,$ _____, _____,_____.

(b) With one example for each below to support your answer, define the following

(i) Number pattern

(ii) Pascal triangle

(c) Use divisibility rule to show **933840** that is divisible to 3, 8 and not divisible to 7.

2. (a) Simplify $\frac{3y+4p}{4}-\frac{3p+2y}{6}-\frac{y-p}{12}$ completely to the simplest expression

(b) Solve for the value of x in $3-\left|\frac{3x}{6}-7\right|\leq -1$ and present its value on the number line

(c) If $3r^3\sqrt{\frac{e^2-b^2}{d}}=\frac{12r^3}{d}$, express b in other terms of the formula.

3. (a) Solve for the value of x and y from $\begin{cases} x^2-4=y \\ x-y=-2 \end{cases}$ by graphical method under the interval of $-3 < x \leq 4$

(b) Each interior angle of a regular polygon is fourteen times the exterior angle. How many triangles are in that polygon?

(c) Draw a line segment $XY = 14$cm. Construct a point P on XY such that $XP : PY = 5:7$. Hence measure XP and PY

4. (a) If L is a line $y = 4$ and T is the point $(1, -3)$. Find the equation of the point R such that LR is three quarter of RT

(b) A point is moving in a plane such that its distance from a fixed $(3,4)$ is always 5 units. Draw a sketch diagram to illustrate its path and state its nature.

(c) A point moving in a plane intersects the equation formed with a locus of a circle $(x-3)^2+(y-4)^2=25$ and the equation formed with a locus of a straight line as $y+x=12.$ Draw a sketch of the locus and state the point of intersection.

5. (a) Find the equation of the line passing through $\left(2,\frac{1}{2}\right)$ and $\left(\frac{3}{4},-4\right)$

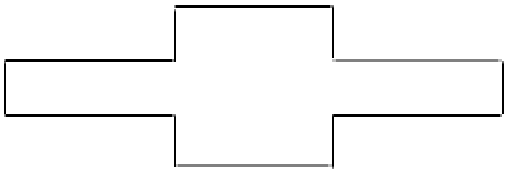
(b) The line from the point $\left(\frac{1}{e},1\right)$ to the point $\left(1,\frac{1}{2}\right)$ is parallel to the line $-2x+4y=12$. Find the value of e

(c) Point P is moving in a plane and it is the point of intersection of lines $m(y-3)=x+1$ and $y=mx$.

Eliminate m from the equation and form the path

6. (a) i. Name all capital letters in the English alphabets that have more than one line of symmetry.

ii. By using dotted lines, show and state how many lines of symmetry does the figure below have?



(b) List all letters in English alphabets which have rotational symmetry of order two.

7. (a) Define these terms as used in logic: Tautology and Contradiction

(b) Negate the statement "Sylvia likes either biryani or burger"

(c) Symbolize the following statement then test its validity:

"If salary is paid then Jackie will not attend at work. The salary was not paid. Therefore , Jackie did not attend at work"

8. If y varies directly with the square root of x and inversely with the square root of z ; given that $y=15,$ when $x=2\frac{1}{4}$ and $z=\frac{16}{25}$.

   (a) Deduce the equation connecting z , y and x

   (b) Find the value of x when $y=56$ when $z=\frac{2}{49}$

9. (a) Let μ be a universal set, A and B be the subsets of μ where $\mu = \{1,2,5,7,9,10\}$, A is a set of even numbers and B is a set of prime numbers. Present set A, B and μ in a Venn diagram

(b) At Robert's graduation ceremony, 45 people drank *Mo* Energy, 80 drank Vita Malt and 35 drank both *Mo* Energy and Vita Malt. By using Venn diagram, find how many people were at the ceremony if each person drank *Mo* Energy or Vita Malt

(c) Use the information above to find the number of people who drank *Mo* Energy only and Vita Malt only

10. (a) The ages of a cow and its bull calf are 50 and 15 years respectively. How many years ago the product of their ages was 200

(b) If points $A(3,7)$, $B(-2,-3)$ and $C(x,-7)$ are collinear points. Find the value of x

(c) Find the mid-point of a line passing through the x – axis at $(6,0)$ and y – axis at $(0,-8)$