*Student's Assessment Number.....*

# THE UNITED REPUBLIC OF TANZANIA
# NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
# FORM TWO NATIONAL ASSESSMENT

**042** **ADDITIONAL MATHEMATICS**

**Time: 2:30 Hours** **Year: 2024**

**Instructions**

1. This paper consists of **ten (10)** questions.
2. Answer **all** the questions showing clearly all the working in the spaces provided.
3. All writing must be in blue or black ink **except** graphs and diagrams which must be in pencil.
4. Communication devices, calculators and any unauthorised materials are **not** allowed in the examination room.
5. NECTA Mathematical tables, geometrical instruments and graph papers may be used.
6. Write your **Assessment Number** at the top right corner of every page.

| FOR ASSESSOR'S USE ONLY | | |
|---|---|---|
| **QUESTION NUMBER** | **SCORE** | **ASSESSOR'S INITIALS** |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| **TOTAL** | | |
| **CHECKER'S INITIALS** | | |

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1. (a) One among Form two students at a certain school had a birthday party. During the occasion some drinks were distributed among the six tables as follows;

Wine = 7, 8, 11, 13, 20, 23

Juice = 4, 8, 12, 20, 32, 52

Water = 1, 2, 4, 5, 6, 7

Use the information stipulated to identify which one among the three represents Fibonacci sequence.

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(b) The tailoring mart association distributed sewing machines to four villages. Each village has the following number of people who belong to the association: Village A=69388, B=125362, C=164369 and D=378978. In order to be beneficiary of a sewing machine, it requires a group of 19 members of the same village. Use the divisibility rule to identify how many villages can acquire the sewing machines.



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2. (a) Find the solution set of the inequality $-18 < 6x + 6 \leq 36$ and hence show the solution on a number line.



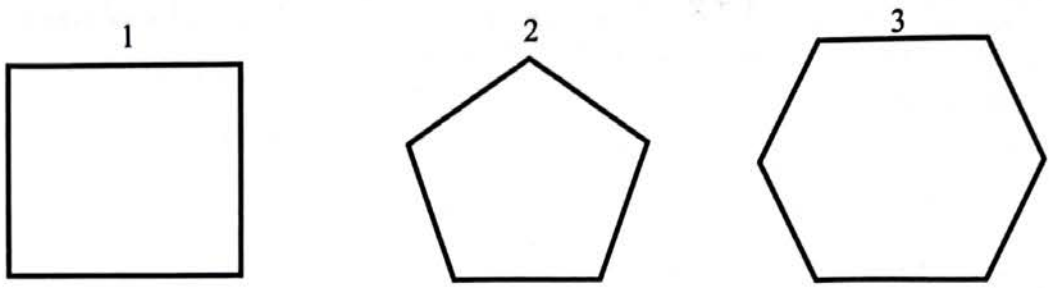
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(b) Given that $K^2 = \frac{T^2 g}{T+g}$, calculate the value of "$g$" if $K = 12$ and $T = 6$.



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3. Study the regular polygons 1, 2, and 3 and answer the questions that follow.




(a) Complete the following table by writing the number of triangles and sum of interior angles for each polygon.

| Polygon | Number of triangles | Sum of all interior angles |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |

(b) Write down the formula for calculating the sum of all interior angles of a polygon with $n$ sides.



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4. (a) Calculate the value of $k$ when two lines given by the equations $5x + 6y = 5$ and $kx - 3y = 10$ are;

   (i) parallel.

   (ii) perpendicular.



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(b) Show whether the following points are collinear:

(i) $(-1,-4)$, $(1,2)$ and $(3,8)$.

(ii) $(0,1)$, $(1,3)$ and $(2,5)$.



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5. (a) A cow was tied up by a rope while the other end of the rope was tied on a pole which was fixed at point B. The cow moved around the pole such that the rope is always equidistant from point B. With the aid of a sketch diagram, describe the locus of the cow while moving around the point B.



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(b) If a point $T$ moving in a plane is equidistant between the points $M(5, 2)$ and $N(-1, 1)$, determine the locus of $T$ and hence describe its nature.



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6. (a) Determine the number of lines of symmetry in the following objects:

   (i) A ball

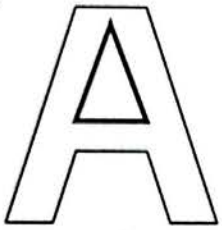
   (ii) A pencil



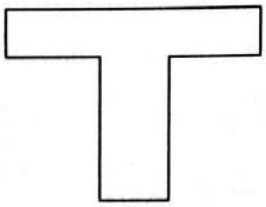
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(b) Use a dotted line(s) to verify the symmetry of the following letters;

(i)



(ii)





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(c) Sketch the following polygons and examine all lines of symmetry:

(i) Square

(ii) Equilateral triangle

(iii) Rhombus



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7. (a) Use the truth table to show whether the statement $\sim(p \wedge q) \vee (p \vee q)$ is a tautology or not.



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(b) Let P stands for "Clouds are heavy" and Q stands for "It is raining". Express for each of the following in symbolic form;

(i) Clouds are heavy and it is not raining.

(ii) If it is not true that clouds are heavy, then it is raining.

(iii) It rains if and only if clouds are heavy.

(c) Make a truth table for the argument $p \rightarrow (\sim q \wedge \sim p)$.



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8. In a certain seminar, store keeper was required to buy some stationaries. He decided to purchase 2 pens and 4 notebooks which cost Tsh. 1400/= from the first shop, and then he bought 6 pens and 8 notebooks from the second shop which cost Tsh. 3600/=. Suppose 1000 participants are expected to attend the seminar, evaluate the total cost that the store keeper will incur by using elimination method.



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9. (a) If $K$, $L$ and $M$ are three sets such that $n(K) = 18$, $n(L) = 22$, $n(M) = 25$, $n(K \cap L) = 11$, $n(K \cap M) = 15$, $n(L \cap M) = 14$ and $n(K \cap L \cap M) = 9$; Calculate $n(K \cup L \cup M)$.



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, $n(L) = 22$, $n(M) = 25$,

and $n(K \cap L \cap M) = 9$;

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(b) A sample of family survey composed of 80 families showed that all participants kept at least a goat, a cow or a dog. It was found that 49 families kept goats, 61 kept cows and 50 families kept dogs. Moreover, 33 families kept goats and cows, 35 kept cows and dogs, 27 kept goats and dogs. Without using Venn diagram, calculate the number of families which kept:

(i) all types of animals.

(ii) goats or cows if families kept dogs only were not supposed to be surveyed.

(iii) dogs or cows if families kept goats only was not supposed to be surveyed.



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10. (a) Variable $a$ is directly proportional to the square root of $b$. If $a = 24$ when $b = 36$; Calculate the value of $a$ when $b = 6\frac{1}{4}$.



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(b) 16 students can cultivate the school farm for 12 days consecutively. Calculate the number of days for which 8 students can cultivate the same piece of land.



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(c) Given that $p$ varies directly as the square of $q$ and inversely as $r$. If $p = 48$ when $q = 4$ and $r = 16$, solve for $p$ when $q = 8$ and $r = 12$.



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