THE UNITED REPUBLIC OF TANZANIA
THE PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENTS
SHINYANGA REGION FORM FOUR MOCK EXAMINATION

BASIC MATHEMATICS

CODE:041

TIME: 3Hours Date: MAY, 2024

Instruction

1. Answer all questions in this paper
2. All necessary working and answers for each question must be shown clearly.
3. NECTA mathematical tables and non-programmable calculators may be used.
4. All communication devices and any unauthorized materials are not allowed in the examination room.

SECTION A (60 Marks)

1. (a) Three brothers visit the grandfather at intervals of 5days, 7 days and 12 days. If they start together at 15th July. Then find the date that they will visit the grandmother together next

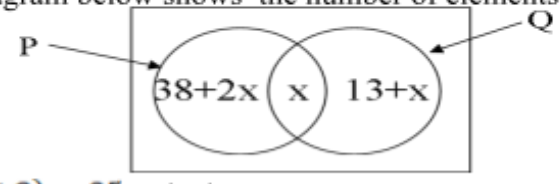
time. (Each moths are 30 days)

(b) The total mass of cotton harvested in Ali's district was 17452.225 kg. Round off this number to the nearest (i) Hundreds (ii) Thousandth.

2. (a) By using the substitution $k = 3^x$, solve for x in the equation $3^{2x+1} + 3^2 = 3^{x+3} + 3^2$

(b) Simplify $\frac{\log x^7 - \log x}{\log x^5 - \log x^3}$

3. (a) The Venn diagram below shows the number of elements in sets P and Q



If $n(P \cup Q) = 95$, calculate;

(i) The value of x

(ii) $n(P \cap Q)'$

(b) A letter is chosen from the word "RANDOM". What is the probability that it is;

(i) n? (ii) A vowel

4. (a) Find the equation of the line which is parallel to the line x +4y -1 = 0 and which passes through the point (4, -3)

(b) If $a = 2xi + 3j \quad b = (x^2 + y)i + 4yj$ and $v = \frac{8}{3}i + \frac{25}{12}j$ Find x and y given that $v = \frac{1}{4}a + \frac{1}{3}b$

5. In the following figure, a regular hexagon is inscribed in a circle.

If the perimeter of the hexagon is 42cm. find

(a) The radius of the circle

(b) The area of the shaded region

(c) The area of the circle and the regular polygon

6. (a) In the preparation of Pepsi cola, a bottling filling machine can fill 1,500 bottles in 45 minutes. How many bottles will it fill in $4\frac{1}{2}$ hours?

(b) The energy (E) stored in an elastic band varies as the square of the extension (x). When the elastic band is extended by 4cm; the energy is 240Joules. What is the energy stored when the extension is 6cm? What is the extension when the stored energy is 60 Joules?

7. (a) A car which its buying price was sh.12, 500,000 was sold at a loss of 40 percent. Find the loss made and selling price

(b) Given the following transactions

Sales for 2009. ..... 51,000/=
Stock at start. ..... 9,000/=
Purchases. ..... 34,650/=
Stock at close ..... 6,000/=
Returns on sales (inwards). ..... 1,000/=
Return outwards (return on purchase). ..... 150/=

From the above transactions, deduce

(i) Cost of sales (iii) Rate of stock turn

(ii) Average stock (iv) Net sales (turnover)

8. (a) How many integers are there between 14 and 1,000 which are divisible by 17?

(b) The 4th and 7th terms of a G.P are 144 and 18 respectively. Find

(i) The common ratio
(ii) The first term
(iii) The sum of the first six terms

9. (a) A ladder reaches the top of wall 18m high where the other end on the ground is 8m from The wall. Find the length of the ladder,

(b) Verify that

$$\sin\left(\frac{2\pi}{3}-\frac{7\pi}{6}\right)=\sin\frac{2\pi}{3}\cos\frac{7\pi}{6}-\cos\frac{2\pi}{3}\sin\frac{7\pi}{6}$$

10. (a) Solvefor x if $5-2x\geq 7x-4$

(b). The length of the sides of a right angled triangle is (2x+1) cm, (2x1) cm and x cm. Find x if 2x+1 is the hypotenuse

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SECTION B (40 marks)

11 (a) The following table shows the distribution of marks scored by 42 candidates in Mathematics exam at Kihesa Secondary School of Mock 2023.

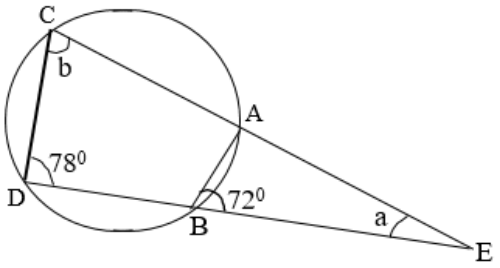
Marks (%)	40-45	45-50	50-55	55-60	60-65	65-70
frequency	7	**x**	11	**y**	4	2

Calculate

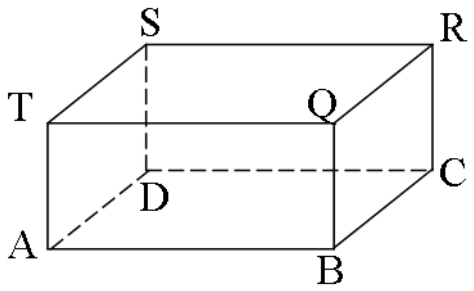
(i) The values of x and y if the Mode and the modal class is 53.75 and 50-55 respectively.

(ii) The mean (use an assumed mean of the class mark within the modal class)

(b) Find the value of angles a and b in the figure below



12 (a) The following rectangular prism represents a room 6m by 5m by 4m.



(i) Calculate the diagonal AR
(ii)Find the angle AR makes with the floor
(iii) Find the total surface area

a. Find the distance (in km) between towns P (12.45^{0}S, 30.5^{0}E) and Q (12.4^{0}S, 39.9^{0}E)

along a line of latitude, correctly to 4 decimal places.

13 (a) Find the value of k such that the matrix

$\begin{pmatrix} 2k+2 & k \\ 4k-3 & k+3 \end{pmatrix}$ is singular

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a. The vertices of triangle ABC are A (1,2) B (3,1) and C (-2,1). If the triangle is reflected in the x –axis. Find the coordinates of the vertices of its image.

b. Solve the following simultaneous equations by matrix method

$2x + 3y - 2 = 0$

-9x+8y – 1 = 0

14 (a) A technical school is planning to buy two types of machines. A lather machine needs 3m^2 of floor and a drill machine requires 2m^2. The total space available is 30m^2. The cost of one lather machine is 25,000 shillings, a drill machine costs 30,000 shillings and the school can spend not more than 300,000. Find the greatest number of machines the school can buy. (b) Given that $f(x) = \frac{5x+7}{x+2}$ find $f^{-1}(4)$