Diocese of Kigoma Index Number _____Education department

THE CATHOLIC DIOCESE OF KIGOMA

FORM TWO PRE – NATIONAL EXAMINATION FOR DIOCESAN SECONDARY SCHOOLS

CODE:043 **MATHEMATICS**

Time: 2½ Hours **22rd SEPTEMBER 2026**

Instructions

1. This paper consists of a total of 10 questions.
2. Attempt all questions.
3. Each question carries 10 marks.
4. Mathematical tables and non-programmable calculators are allowed
5. Write your examination number on every page of your answer sheets

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QUESTION NUMBER	**SCORE**	**EXAMINER'SINITIALS**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		
CHECKER' SINITIALS		

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1. (a) Mention three branches of mathematics you learnt in your class
   (i) .....
   (ii) .....
   (iii).....

   (b) i. Deals with properties and manipulations of numbers through the use of basic mathematical operations such as addition, subtraction, multiplication, and division. Which branch of Mathematics is described?.....

   ii. With examples explain briefly the application of Mathematics in Agriculture

   .....
   .....
   .....

2. (a) i. Mtakuja is paid 18 000 shillings per hour. How much is he paid after working for 336 minutes?

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   ii. If two painters can paint a certain length of a railway line for a period of 15 hours, how long will it take 6 painters to paint the same length of the railway line?

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(b) If a: b=$\sqrt{3}$, evaluate $\frac{a^2+b^2}{a^2-b^2}$

3. (a) Write $10\frac{5}{11}$ *into*:

i. Decimal notation

ii. 1 significant figure

iii. 2 decimal places

iv. Tenths

(b) Rationalize the denominator of the following expression:

$$\frac{\sqrt{8}}{3\sqrt{2}-\sqrt{2}}$$

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4. (a)Solve the following equation by the method of factorization: $x^2 - 10x - 24 = 0$.

(b) If $a * b = a^2 - b^2$, find the value of the following:

i. $897 * 103$

ii. $n\ if\ n * 6 = 64$

5. (a)Solve the following equations:

i. $4\left(\frac{1}{3}\right)^x = 324$

ii. $\sqrt{30 - b} = b$

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(b) Given that $\log 3 = 0.4771$, use the given logarithm to evaluate $\log 810$.

6. (a) Solve the following simultaneous equations: $\begin{cases} 5x-2y=19 \\ 3x+y=7 \end{cases}$

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(b) Use calculator to evaluate the following

i. $\sqrt[10]{\frac{99}{205}}$, leave the answer to 3 significant figures

ii. A rectangular canvas has an area of $(50+14\sqrt{3})\ m^2$. If one side of the canvas is $(5+\sqrt{3})m$, find the other side in radical form.

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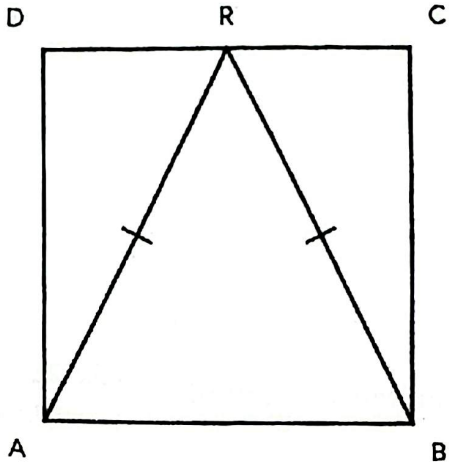
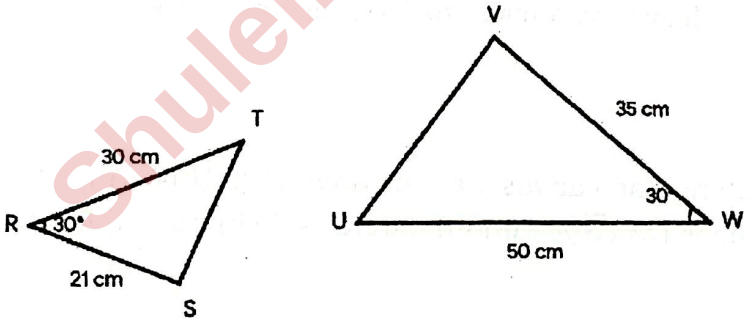
7. (a) If ABCD is a square and $\overline{AR}=\overline{BR}$, prove that R is the midpoint of $\overline{DC}$.



(b) Show with reasons that the following triangles are similar:



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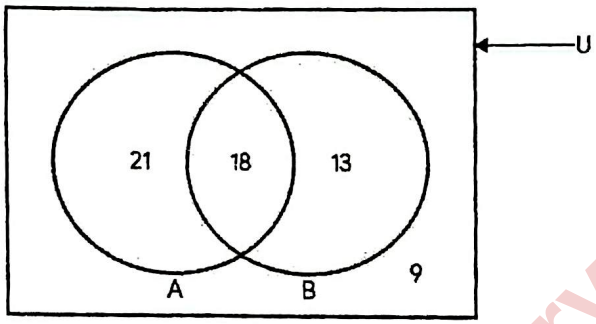
8. (a) Given that U=(4,5,6,7,8,9,10,11,12) where U is a universal set and B'=(4,5,11,12) where B is a subset of the universal set U. Find the following:

i. n(B)

ii. How many subsets are in set B?

(b) Given the following Venn diagram



How many elements are in each of the following sets?

i. A

ii. $A \cap B$

iii. AUB

iv. $(AUB)'$

v. $A \cap B'$

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9. (a) Find the value of x and the equation of the line through points $A(1, 3)$, $B(2, 2x-3)$, and $C(4, x-5)$, if all points are on the same straight line(collinear).

(b) A line with slope 6 passing through the point (2,2) intersects another line $px+3y=13$ *at*$(1, q)$.Find the value of p *and* q.

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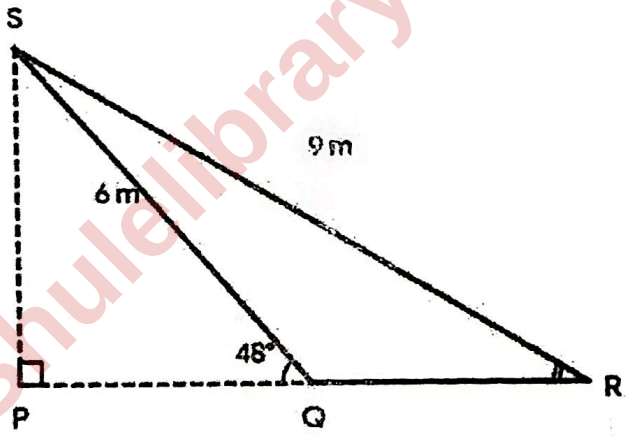
10. (a) If $\tan\theta = \frac{12}{5}$, where θ is an acute angle or $0^\circ < \theta < 90^\circ$. Find the value of

$$\frac{1-\cos\theta}{1-\sin\theta}.$$

(b) A railway signal $\overline{SP}$ is supported by two chains $\overline{SQ}$ and $\overline{SR}$ of length 6m and 9m respectively as shown in the following figure.



If the angle of the elevation of the top of the signal from point Q is 48°, find the following:

i. $\angle SRQ$

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iii. The distance $\overline{QR}$.

iv. The height of the signal $\overline{SP}$.

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