GASABO DISTRICT **Date:17/02/2025**

RUTUNGA SECTOR

GS KAYANGA

CLASS: S2A&B

Duration: 3hrs

MID-TERM 2 TEST FOR MATHEMATICS /60 Marks

SECTION A /40marks

1. Simplify: a) $8a^2bc^2 \div 4ac$ /4 marks

   b) $(3^{-3})^{-2}$

2. If x=5, y=9 and z=1, evaluate: /4 marks
   a) x^2-z^2y+3,
   b) $x\div(y+z)+6$

3. Write each of the following in its simplest index form. /4 marks

   (a) 2 (b) 0.000016

4. Given that $f(x) = x^2+7x+12$ and $g(x)=x+4$, divide f(x) by g(x). /4 marks
5. Factorize: /4 marks
   a) $x^2 + 6x + 9$
   b) $3y(4 - y) + 6(4 - y)$

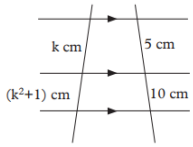
6. The sides of a rectangle are 7.8 cm and 6.4 cm long. Draw the rectangle and find the length of its diagonal /4 marks
7. Umutoni's salary last year was 15 000 FRW. This year it is increased by 20%. What is her salary this year? /4 marks
8. Rationalize: /4 marks

   $(a)\frac{\sqrt{12}}{4\sqrt{8}}$, (b) $\frac{\sqrt{8}}{2\quad-\sqrt{27}}$

9. If $\vec{a} = \binom{4}{1}, \vec{b} = \binom{3}{2}, \vec{c}\binom{1}{2}$, Evaluate the following: /4 marks

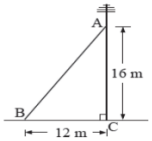
   a)$\vec{c} - \vec{a}$ b)$\vec{a} + \vec{b}$ c)$\vec{b} + \vec{c}$ d)$\vec{a} - \vec{c} - \vec{b}$

10. Find the value(s) of k in the figure below*:* /4 marks



SECTION B (Choose Two questions only/20 marks)

11. a) The figure below shows Betty's television antenna. Find the length of the wire AB holding the antenna /5 marks



b) A ladder reaches the top of a wall of height 6 m when the end on the ground is 2.5 m from the wall. What is the length of the ladder? /5 marks

12. Perform the following operations

$\vec{a} = \begin{pmatrix} -1 \\ -3 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} 5 \\ -4 \end{pmatrix}$ and $\vec{m} = \begin{pmatrix} 2 \\ 2 \end{pmatrix}$, Find: /10 marks

i) $\vec{a} + \vec{b}$

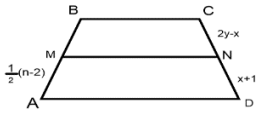
ii) $3\vec{m} - 2\vec{b} + 5\vec{a}$

iii) $\left\| \vec{a} + \frac{1}{2}\vec{b} - \frac{3}{4}\vec{m} \right\|$

iv) $\|\vec{m}\|$

v) $\vec{a} + \frac{1}{2}\vec{b} - \frac{3}{4}\vec{m}$

13. a) In the trapezium AM is a half of AB and CN is half of CD. Given that AB = 8 cm and CD=10 cm.



Determine the values of n, x and y. /6 marks

b) Solve the inequality; $\frac{3 - 7x}{2x + 21} \leq 3$ /4 marks

14. a) The sum of two numbers is 23 and their difference is 3. Find the sum of the squares of the two numbers. /6 marks

b) In the figure below, find the value(s) of x given that PQ is parallel to AB /4 marks