NAME…… ADM NO…….....CLASS..…….....

WERU SECONDARY SCHOOL

FORM 11
END TERM III EXAMINATION - 2019
Kenya Certificate of Secondary Education
MATHEMATICS
TIME: 2½ HOURS

INSTRUCTIONS TO CANDIDATES:

1. *Write your name, admission number and school in the spaces provided above.*
2. *Sign and Write the date of examination in the spaces provided above.*
3. *This paper consists of two Sections; Section **I** and Section **II**.*
4. *Answer all the questions in Section **I** and any **FIVE** questions from Section **II**.*
5. *All answers and working must be written on the question paper in the spaces provided below each question.*
6. *Show all the steps in your calculations giving your answer at each stage in the spaces below each question.*

SECTION I (50 MARKS)
Answer all questions in this section in the spaces provided

1. Use the logarithm tables to evaluate: (4 marks)

$$\left(\frac{7.062}{6430 \times 102}\right)^2$$

2. A sales woman earns a basic salary of Ksh. 35,000 per month plus commission of 7.5% of all the sales above Ksh. 150,000. Find her gross income for a month in which she sold goods of values Ksh. 156,000. (3 marks)

3. Without using a calculator, evaluate (3 marks)

$$\frac{36 - 8 \times 4 - 15 \div 3}{3 \times (-3) + (-8)}$$

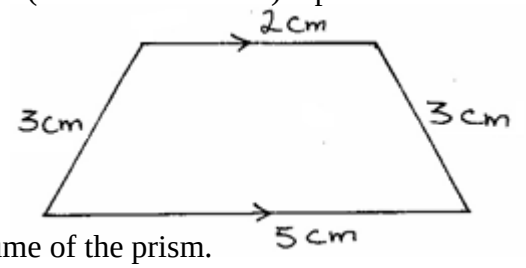
4. List the integral vales of X which satisfies the following inequalities. (3 marks)

$$2X + 3 > 5X - 3 > -8$$

5. A line perpendicular to y = 4x-3 passes through the point (-8,5). Find the equation of the line. (3 marks)

6. Two similar cans have different diameters 6cm and 8cm respectively. If the surface area of the smaller can is 180 cm^3. Find the surface area of the bigger can. (3 marks)

7. The diagram below (not drawn to scale) represents the cross-section of a solid prism to 8.0cm.



Calculate the volume of the prism. (3 marks)

8. A Kenyan company received US dollars 100,000. The money was converted into Kenya shillings in bank which buys and sells foreign currency as follows.

	Buying (in Kenya shillings)	Selling (in Kenya shillings)
1 US dollar	77.24	77.44
1 Sterling pound	121.93	122.24

Calculate the amount of money in Kenya shillings the company received (2 marks)

9. The exterior angle of a regular polygon is 24^{o}.
   a) The number of sides of the polygon. (2 marks)

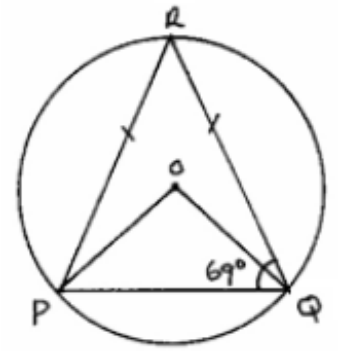
   b) The sum of the interior angles of the polygon. (2 marks)

10. The table below shows marks scored by 40 students in a mathematics test.

M arks	30-39	40-49	50-59	60-69	70-79
No of students	2	10	13	8	7

Calculate the median mark (3 marks)

11. In the figure above O is the centre of the circle. Given that PR = QR and angle PQR = 69º.



a) Find angle QPR. (1 mark)

b) Find angle QRP. (1 mark)

c) Find angle POQ. (1 mark)

d) Find angle OQP. (1 mark)

12. A translation $T = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$ maps point P (6, 5) onto P^1. Find P^1. (2 marks)

13. Solve the following quadratic equation: $5X^2 + 13X - 6 = 0$ (2 marks)

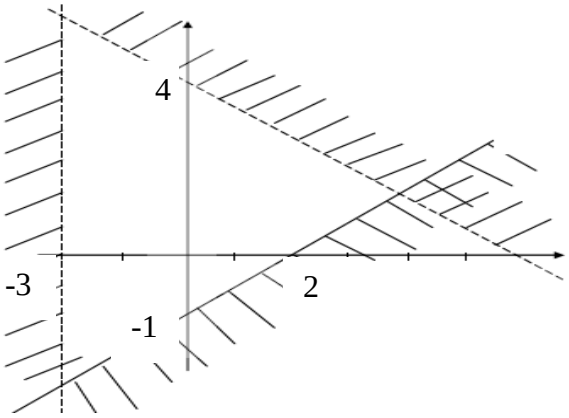
14. The co-ordinates of points A and B are (0,-5) and (3,-1) respectively. Find:

a) Vector **AB**. (2 marks)

b) Magnitude **|AB|** (2 marks)

15. Two Lorries leave Rurii travelling along Olkalou - Nyahururu highway. The first lorry travels at 75 km/h while the second lorry starts 40 minutes later and travels at 50 km/h. What distance did the second lorry cover before meeting the first lorry? (4 marks)

16. Three inequalities define the region R shown below. Form the inequalities. (3 marks)



SECTION II (50 MARKS)

Answer ONLY 5 questions in this section in the spaces provided

17. A translation maps a point P(1,3) onto $P^1(5,-1)$. Point M is the midpoint of PP^1.

a) i) Determine the translation vector. (2 marks)

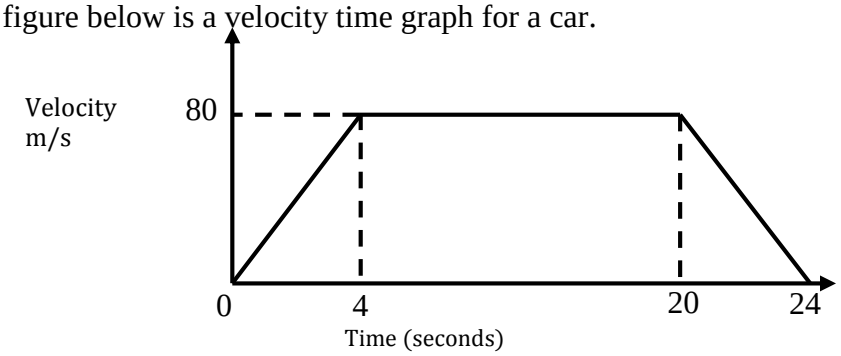
ii) Determine the midpoint of PP^1. (2 marks)

iii) Find the length of PP^1. (2 marks)

b) Given that $\boldsymbol{a} = \begin{pmatrix} -2 \\ 4 \end{pmatrix}, \boldsymbol{b} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$ and $\boldsymbol{c} = \begin{pmatrix} -3 \\ -6 \end{pmatrix}$. Find: $2\mathbf{a} + 3\mathbf{b} - \mathbf{c}$. (2 marks)

c) Find the value X and Y. $X\begin{pmatrix} 1 \\ 2 \end{pmatrix} + Y\begin{pmatrix} 2 \\ 1 \end{pmatrix} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$. (2 marks)

18. The figure below is a velocity time graph for a car.



a) Find the distance travelled by the car during:

i. The first 4 seconds. (1 mark)

ii. Between the 4^{th} and 20^{th} second. (1 mark)

iii. In the last 4^{th} seconds. (1 mark)

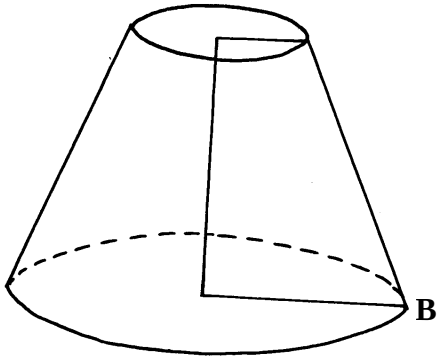
iv. The total distance travelled. (1 mark)

b) Calculate the acceleration of the car during the first 4 seconds. (2 marks)

c) Calculate the aceleration of the car during the last 4 seconds. (2 marks)

d) Calculate the distance the car traveled during the first half of the journey. (2 marks)

19. The diagram below represents a hollow conical frustum. O_1O_2=4cm, O_2B=R=4.9cm, O_1A=r=2.1cm.



a) Determine the height of the chopped off cone. (2 marks)

b) Determine the height of the bigger cone. (1 mark)

c) Calculate the volume of the solid. (3 marks)

d) Calculate the surface area of the solid. (4 marks)

20. The ages of people who attended a seminar are as shown in the table below..

Age	10-14	15-19	20-24	25-29	30-34	35-39	40-44
Frequency	2	4	6	10	9	7	2

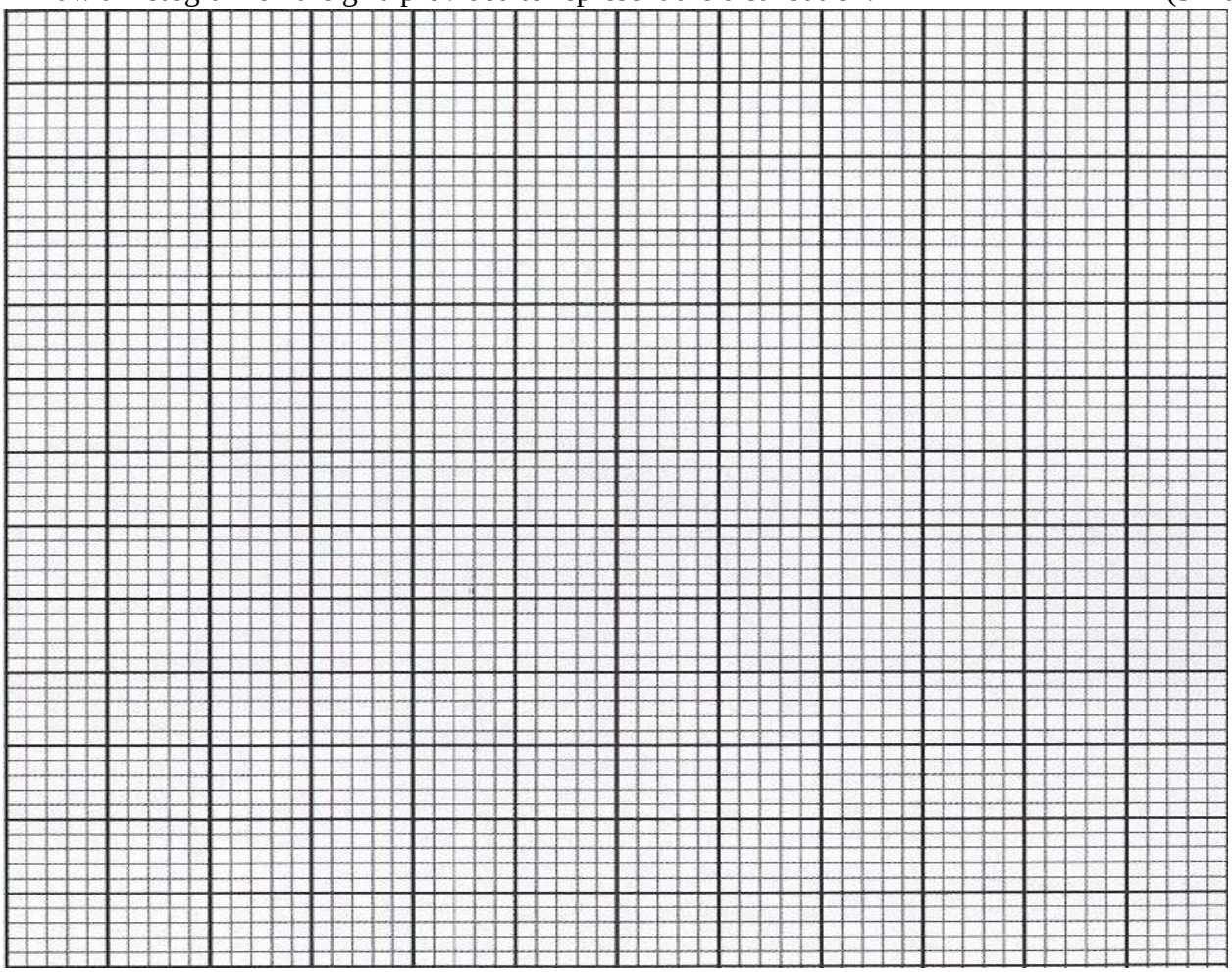
a) State:

i. The modal class. (1 mark)

ii. The median class. (1 mark)

b) Estimate the mean age (4 marks)

c) Draw a histogram on the grid provided to represent the distribution. (3 marks)



d) Hence draw a frequency polygon on the histogram. (1 mark)

21. Show by shading the unwanted region the area represented by: (10 marks)

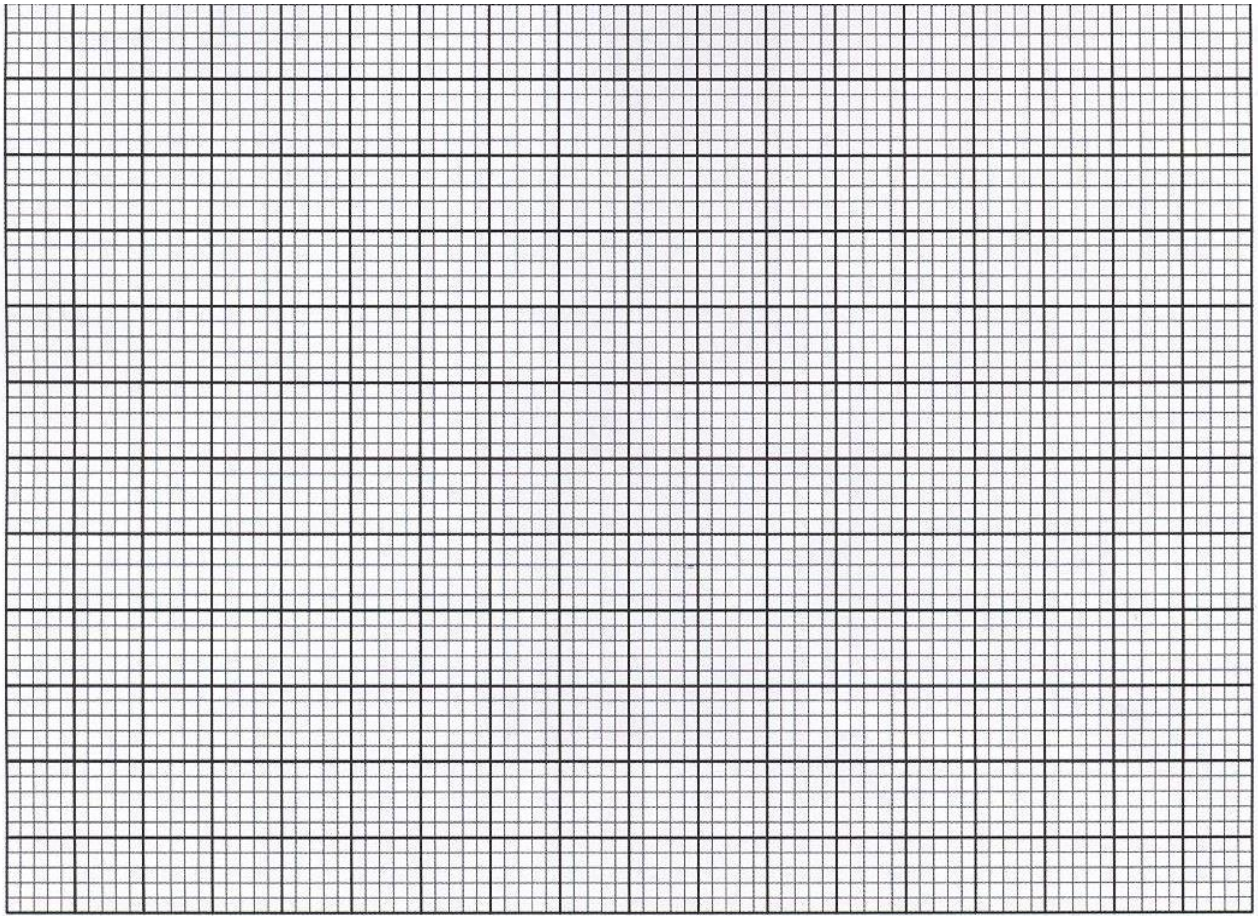
i. $Y > -2$

ii. $X \leq 1$

iii. $5Y - 3X \leq 15$

iv. $Y + 2X \geq -2$

v. $Y - 2X < 4$



22. a) Find the value of **x** in the following quadratic equation:

i. $x(2x + 3) = 0$ (2 marks)

ii. $x^2 + 3x + 2 = 0$ (2 marks)

b) Form a quadratic equation whose roots are; 4 and 3. (2 marks)

c) The length of a rectangular hall is 2m more than its width. The area of the hall is $36m^2$.

i. Determine the dimensions of the hall. (2 marks)

ii. Calculate the perimeter of the hall. (2 marks)

23. Mutwapa Primary School is 25 km on a bearing of 015º from a tourist hotel. The nearest town is 35 km from the school on a bearing of 120º.

a) Using a scale of 1cm to represent 5 km, make a scale drawing of the positions of the school the tourist hotel and the town. (4 marks)

b) How far is the tourist hotel from the town? (2 marks)

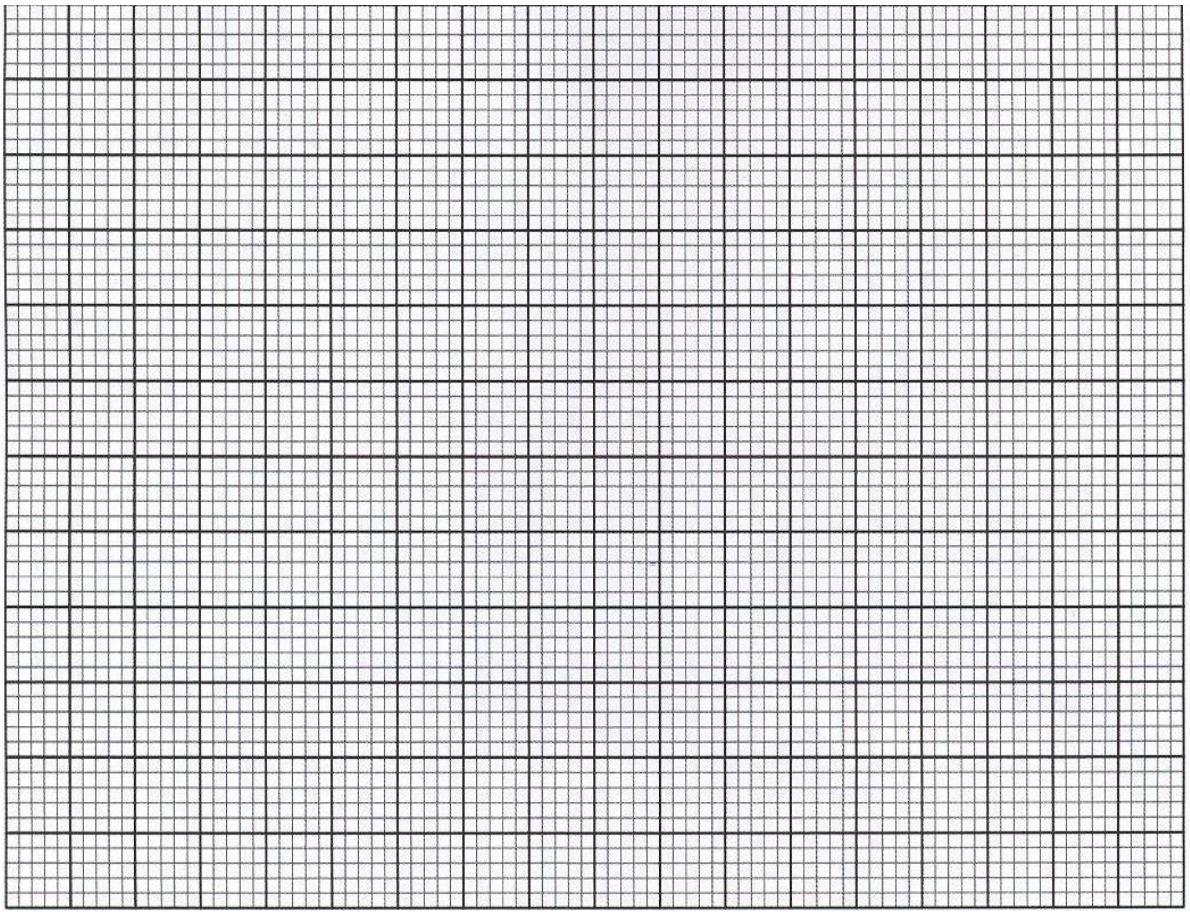
c) What is the bearing of

i. The town from the tourist hotel? (2 marks)

ii. The school from the town? (2 marks)

24. A triangle has vertices A (1, 2), B (4, 4) and C (6, 2).

a) Draw triangle ABC on the grid provided. (1 mark)



b) Construct the image triangle $A^1B^1C^1$ image of triangle ABC under a rotation of 90º clockwise about the origin. Write the coordinates of the image $A^1B^1C^1$. (3 marks)

c) Draw triangle $A^{11}B^{11}C^{11}$ the image of triangle $A^1B^1C^1$ under a reflection in line Y=X state the coordinates of $A^{11}B^{11}C^{11}$ (3 marks)

d) Draw triangle $A^{111}B^{111}C^{111}$ the image of triangle $A^{11}B^{11}C^{11}$ under a reflection in the line y = 0 and state the coordinates of its vertices. (2 marks)

e) Describe a single transformation that maps triangle $A^{11}B^{11}C^{11}$ onto triangle ABC. (1 marks)