SOUTH NYANZA MATHEMATICS

NAME: …… ADM. NO. ……. STREAM. …….

SCHOOL: ……DATE……SIGNATURE……

121/1 – MATHEMATICS ALT A- PAPER1

TIME: 2 ½ HOURS

Kenya Certificate of Secondary Education (KCSE) Trials.

Marking Centre: St Mary's Nyamagwa Girls. Marking date: Friday 13th August, 2021.

INSTRUCTIONS TO CANDIDATES

a) Write name, admission number and class in the spaces provided above.
b) This paper contains **TWO** sections: **section I** and **section II**
c) Answer **ALL** the questions in **Section I** and only five questions from **section II.**
d) **Show all the steps in your calculations, giving your answers at each stage in the spaces provided below each question**.
e) Marks may be given for correct working even if the answer is wrong.
f) **Non-programmable** silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.
g) **This paper consists of 15 printed pages.**
h) **Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.**

FOR EXAMINER'S USE ONLY:

Section I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	**TOTAL**

Section II **GRAND TOTAL**

17	18	19	20	21	22	23	24	**TOTAL**

SECTIOIN I (50 MARKS)

Answer ALL questions in this section.

1. Evaluate without using tables or a calculator, the value of $\frac{1.33\ x0.51}{0.19\ x\ 0.0017}$ (3 Marks)

2. When a certain number is divided by 48, 72 or 100 the remainder is 3 in each case. Find the number. (3Marks)

3. Find all the integral values of x which satisfy the inequalities. (3 Marks)

   $20 - x > 5 + 2x \geq x + 5$

4. A Kenyan bank buys and sells foreign currency as shown below.

	Buying (Kenya shillings)	**Selling (Kenya shillings)**
1 Euro	84.15	84.26
1 US Dollar	80.12	80.43

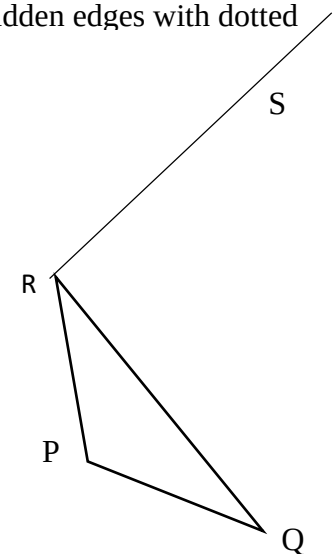
A tourist travelling from Britain arrives in Kenya with 5000 Euros. He converts all the Euros to Kenya shillings at the bank. While in Kenya he spends a total of Kshs.289, 850 and then converts the remaining Kenya shillings to US dollars at the bank. Calculate (to nearest dollar) the amount he receives (3 Marks)

5. Use logarithms to evaluate

$$\sqrt[3]{\frac{1.23\ x\ 0.0468}{\log 6}}$$ (4 Marks)

6. Find the value of x given that $\begin{pmatrix} 2x-1 & 1 \\ x^2 & 1 \end{pmatrix}$ is a singular matrix. (3 Marks)

7. The figure below shows a solid wedge PQRSTU. Complete the solid showing all the hidden edges with dotted (mk)



8. Evaluate the value of x in $81^{x+1} + 3^{4x} = 246$ (3 Marks)

9. During an annual general meeting at Patel Mixed Day, goats and chicken were slaughtered. The number of heads for both chicken and goats were 45. The total number of legs were 100. Determine the exact number of goats and chicken slaughtered. (3 Marks)

10. In a mixed school there are 900 students, out of these 600 are girls.

    a) Find the ratio of boys to girls. (2 Marks)

    b) What is the percentage of boys in this school? (1 Mark)

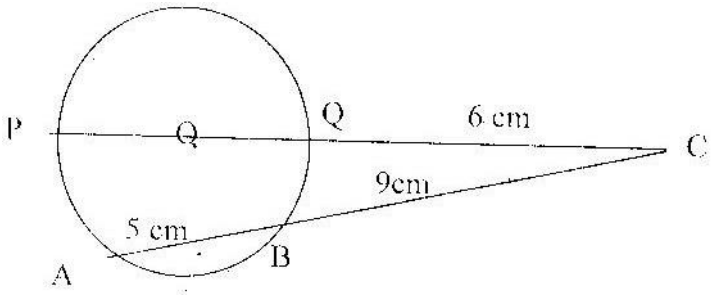
11. Find the value of t in the equation $\frac{t-1}{3} - \frac{4+t}{4} = 0$ (3 Marks)

12. Using tables, find the reciprocal of 0.432 and hence evaluate $\frac{\sqrt{0.1225}}{0.432}$ (3mks)

13. Find the equation of the line perpendicular of $3x - 7y - 20 = 0$, and passes through the point (5, 2). (3 Marks)

14. The angle of elevation of the top of a building from a point P is 45°. From another point T, 15 meters nearer the foot of the building, the angle of elevation of the top of the building is 52°. Calculate the height of the building. (4 Marks)

15. In the figure below O is the center of the circle. POQ & ABC are straight lines. QC = 6cm, AB = 5cm & BC = 9cm. Calculate the length of PQ. (3 Marks)



16. Given point P (-6,8) and $\underset{\sim}{PQ} = \begin{pmatrix} 4 \\ -4 \end{pmatrix}$ find the mid-point of PQ. (3Marks)

SECTION II (50 MARKS)

Answer only FIVE questions from this section.

17. A group of choir members decided to raise 3600/= to buy a guitar. Each member was to contribute equal amount. In the preparation process five members transferred to another church which meant the remaining contributors had to pay more to achieve the target.

a) Show that the increase in the contribution per member was:
Sh.$Sh\frac{18{,}000}{n(n-5)}$ if n is the initial number of members. (4 Marks)

b) If the increase in the contribution per member was sh. 24, what was the original contribution before the other members left? (4 Marks)

c) Calculate the percentage increase in the contribution after the others left. (2 Marks)

18. The table below shows the age groups and number of people who are HIV/AIDS positive in a certain Sub-county in Kenya.

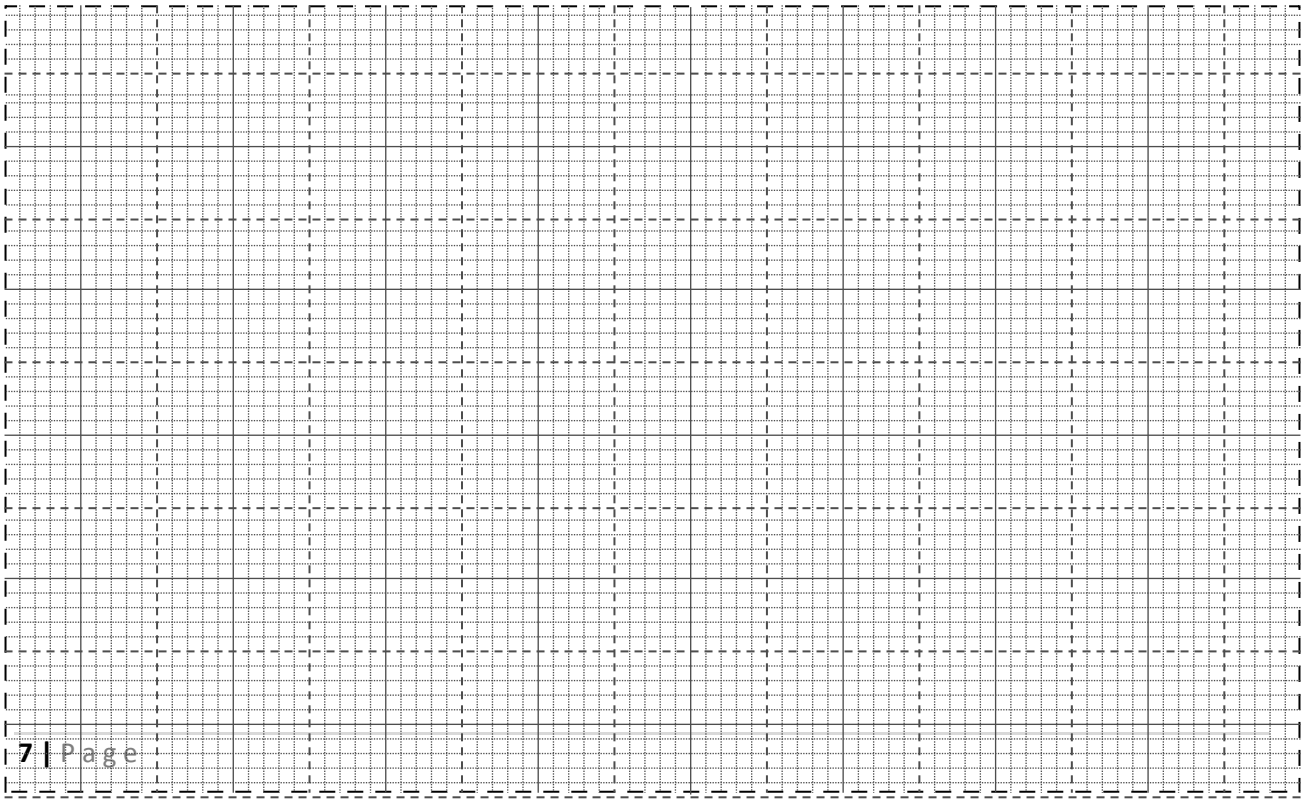
Age group	10-19	20-29	30-39	40-49	50-59	60-69	70-79
No. of people	12	15	16	25	18	10	4

a) State the modal age group. (1 Mark)

b) Calculate the mean age of the people who are HIV/AIDS positive. (3 Marks)

c) Calculate the median of the age group. (3 Marks)

d) On the grid below, draw a histogram (3 Marks)



19. Using a pair of compass and ruler only construct.

a) Triangle PQR in which PQ=5cm, $\angle QPR = 30^{o}$ and $\angle PQR = 105^{o}$. (3 Marks)

b) A circle that passes through the vertices of the triangle PQR. Measure its radius. (3 Marks)

c) The height of triangles PQR with PQ as the base. Measure the height. (2Marks)

d) Determine the area of the circle that is outside the triangle correct to 2 decimal places. (2 Marks)

20. A business lady bought 100 quails and 80 rabbits for Sh. 25,600. If she had bought twice as many rabbits and half as many quails she would have paid Sh. 7,400 less. She sold each quail at a profit of 10% and each rabbit at a profit of 20%.

a) Form two equations to show how much she bought the quails and the rabbits (2 Marks)

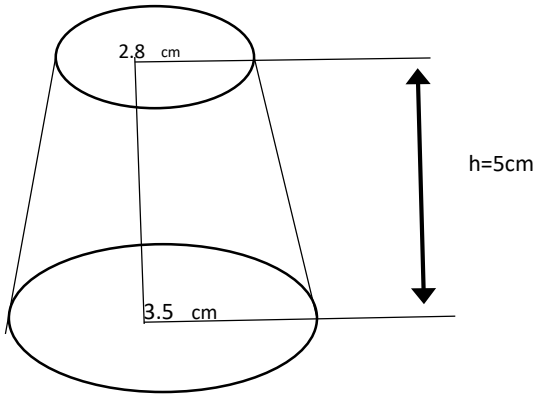
b) Find the cost of each item (3 Marks)

c) Calculate the profit she made from the sale of the 100 quails and 80 rabbits (3 Marks)

d) What percentage profit did she make from the sale of the 100 quails and 80 rabbits

(2 Marks)

21. The figure below is t frustum of a cone.



Find,

a) The surface area of the frustum. (5 Marks)

b) The volume of frustum shown. (5 Marks)

22. A pirate boat sails from port A on a bearing of 050° at a speed of 112km/h, for 2 ½ hours to port B. from port B it changes its course and travelled on a bearing of 170° at a speed of 75km/h for 2 $^{2}/_{3}$ hours toward port C. From C it graveled to port D. D is on a bearing of 130° and 160km from A.

a) Using a scale of 1cm represent 40km, Draw a diagram showing the positions of the ports A,B,C and D. (4 Marks)

b) Use your drawing to find,

i) The distance CD (1mk)

ii) The bearing of C from D (1mk)

i) A marine police patrol leaves port A to intercept the pirate boat at M as it moves from B to C in the shortest time possible.

ii) How far from A will the two boats meet at M? (2 Marks)

iii) If the boats meet after 2 hours, what is the speed of the marine police patrol boat? (2 Marks)

23. Helena left town A at 8.00am and travelled towards town B at an average speed of 64km/h. half an hour later. Joan left town B and travelled towards A at the same speed if the two towns are 384km apart;

a) At what time of the day did they meet? (5 Marks)

b) How far from town B was their meeting point? (2 Marks)

c) How far apart were they at 10.30am (3 Marks)

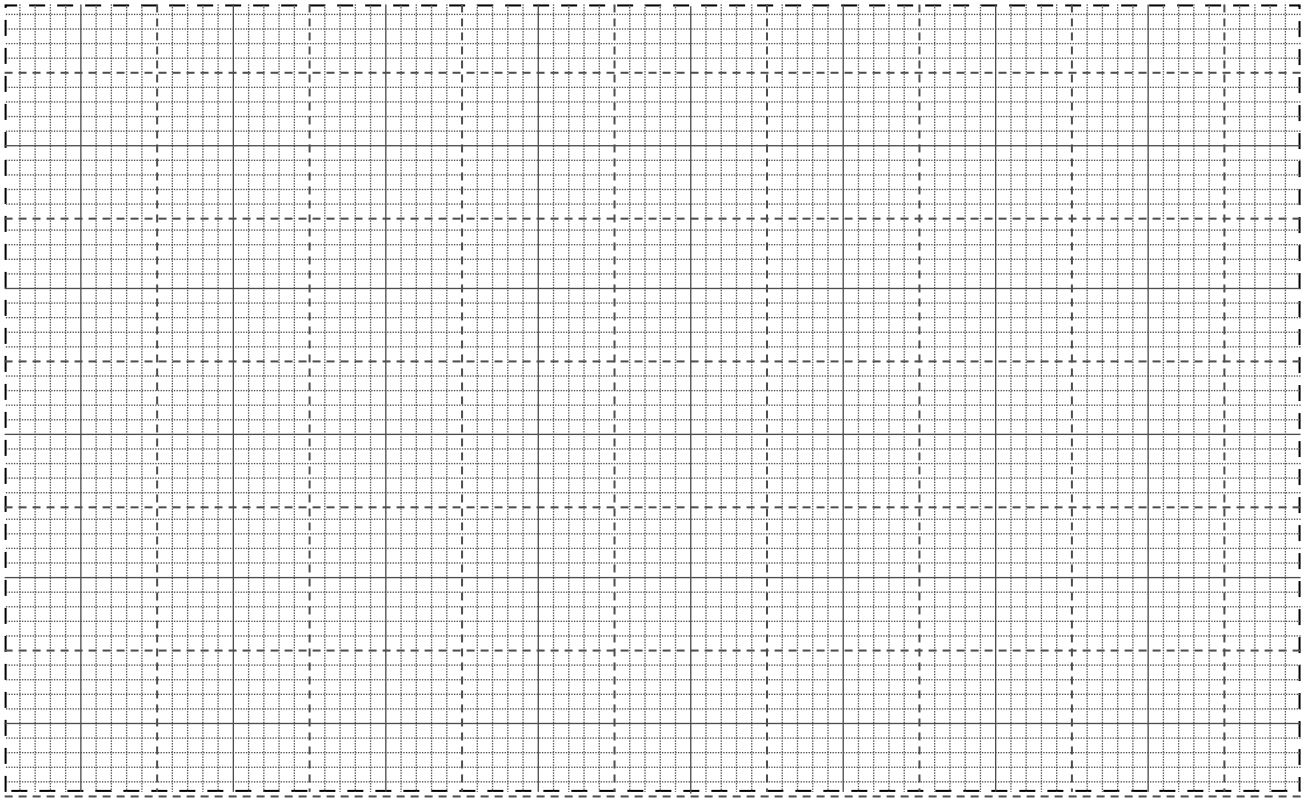
24. The table below shows values of X and some values of y for the curve y = $x^3 + 2x^2 - 3x - 4$

for -3≤ $x \geq 2$. (2 Marks)

x	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2
y	-4.0	-0.4		1.6	0		-4.0	-4.9			6

a) Complete the table by filling in the missing values of y, correct to 1 decimal place.

b) On the grid provided draw the graph of y = $x^3 + 2x^2 - 3x - 4$ (4 Marks)



c) Use the graph to

i) Solve the equation $x^3 + 2x^2 - 3x - 4 = 0$ (2 Marks)

ii) Estimate the coordinates of the turning points of the curve. (2 Marks)