MANGU HIGH SCHOOL

121/1
MATHEMATICS
PAPER 1
MOCK 2022
TIME: 2½ HOURS

NAME:_____ ADM.NO. _____

INDEX.NO_____ CLASS:_____

Kenya Certificate of Secondary Education
MOCK EXAMINATIONS
Mathematics
Paper 1
2½ Hours.

Instructions to Candidates

(i) Write your **Name, Adm. No., Class** and **Index No.** in the spaces provided above.
(ii) *This paper contains **TWO** sections: section **I** and section **II**.*
(iii) Answer **ALL** the questions in section **I**. In section **II** choose **FIVE** questions only.
(iv) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
(v) Marks may be given for correct working even if the answer is wrong.
(vi) Negligent and slovenly work will be penalized.
(vii) Non programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.

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

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

GRAND TOTAL = [ ]

This paper consists of ***15 printed pages.*** Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

Turn Over

SECTION 1 (50 MARKS)

Answer all the questions in the space provided below each question

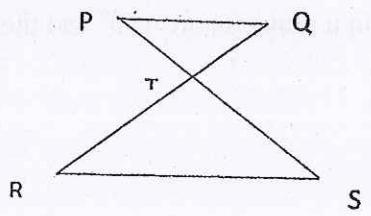
1. Without using mathematical tables or calculator evaluate $\frac{3\frac{2}{3}-2\frac{1}{3}\div 1\frac{1}{5}\times 1\frac{1}{2}}{(\frac{-1}{2})^3-(\frac{-1}{2})^2}$ (3marks)

2. Find the equation of a straight line that passes through the points A (2,-3) and B (-5, 1). Express your answer in the form $ax + by = c$ where a, b and c are integers. (3marks)

3. Solve for θ if $\frac{\sin(2\theta-50°)}{\cos(\theta+10°)} = 1$ (3marks)

4. A Swimming pool can be emptied by 3 pipes P, Q and R working together in $3\frac{3}{4}$ hours. Pipe P and Q working alone takes $7\frac{1}{2}$ *hours and* $11\frac{1}{4}$ respectively. Determine how long pipe R working alone would take to empty the swimming pool. (3marks)

5. In the figure below PQ ‖ RS.PS and RQ intersect at T. If PT: PS = 2:5 and QT = 3.5 cm, calculate correct to 2 decimal place RQ. (3 marks)



6. A is the point (2, 3, 4) and B is the point (X, 6, 8).Determine the possible values of X if $|AB| = 13$ (4 marks)

7. A metal hemisphere of radius 16 cm is melted down and cast into a cone of radius 8cm.Calculate the volume of the cone. (3marks)

8. Five of the ifiterior angles in a nonagon are 160° and the remaining are each x°. Find the possible values of x. (3marks)

9. Calculate the quartile deviation of the following set of data (4marks)

Marks	21 -30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
No. of students	3	5	8	12	15	11	9	4

10. A metallic pipe which is 21 meters long has an internal radius of 13 cm and an external radius of 15 cm. if the density of the metal is 8000 kg/ m^3, find its mass. (Take $\pi = \frac{22}{7}$). (4 marks)

11. Muthoni, Chebet and Amina contributed ksh 50,000, ksh 40,000 and ksh 25,000 respectively to start a business. After some time they realized a profit which was shared in the ratio of their contribution.If Amina's share was ksh 10,000, by how much was Muthoni's share more than that of Chebet's. (3marks)

12. The cost of two jackets and 3 shirts was 1800.After the cost of a jacket and that of a shirt were increased by 20%, the cost of 6 jackets and 2 shirts was ksh 4,800. Calculate new total cost of 5 jackets and 4 shirts.

(3 marks)

13. Without using mathematical tables evaluate $\frac{\sqrt{0.108 \times 14.7}}{0.21 \times 0.048}$

(3marks)

14. Using a ruler and a pair of compass only, construct a rhombus ABCD such that AC = 10 cm and $\angle BAD = 60°$

(3marks)

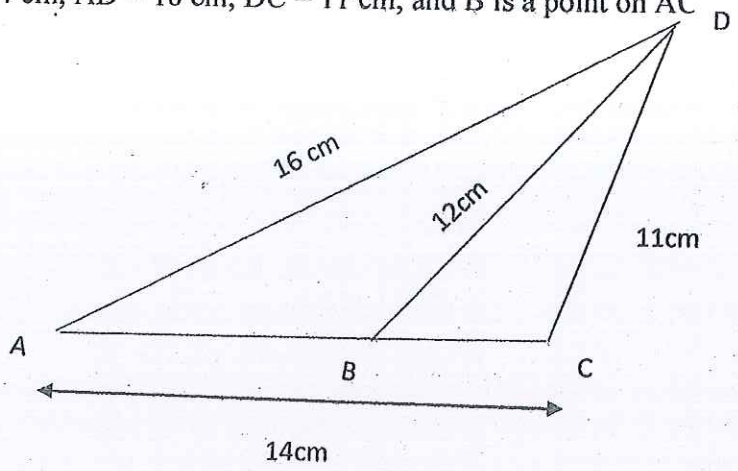
15. Without using a calculator or mathematical tables, evaluate $\frac{4^x \times \left(\sqrt{32}\right)^x}{(256)^{\frac{1}{x}}} = 1$ (3marks)

16. A point P divides a line AB externally in the ratio 4:3.Given that A is (-2, 4) and point B (2,-3). Find the coordinates of T. (3marks)

SECTION II (50MARKS)

Answer only five questions from this section.

17. In the figure below, AC = 14 cm, AD = 16 cm, DC = 11 cm, and B is a point on AC



a) Calculate, correct to 2d.p

(i) $\angle BAD$

(3marks)

(ii) The size of obtuse $\angle ABD$

(3marks)

b) Calculate correct to 1 decimal place:-

(i) The length of AB

(2marks)

(ii) The area of triangle BCD

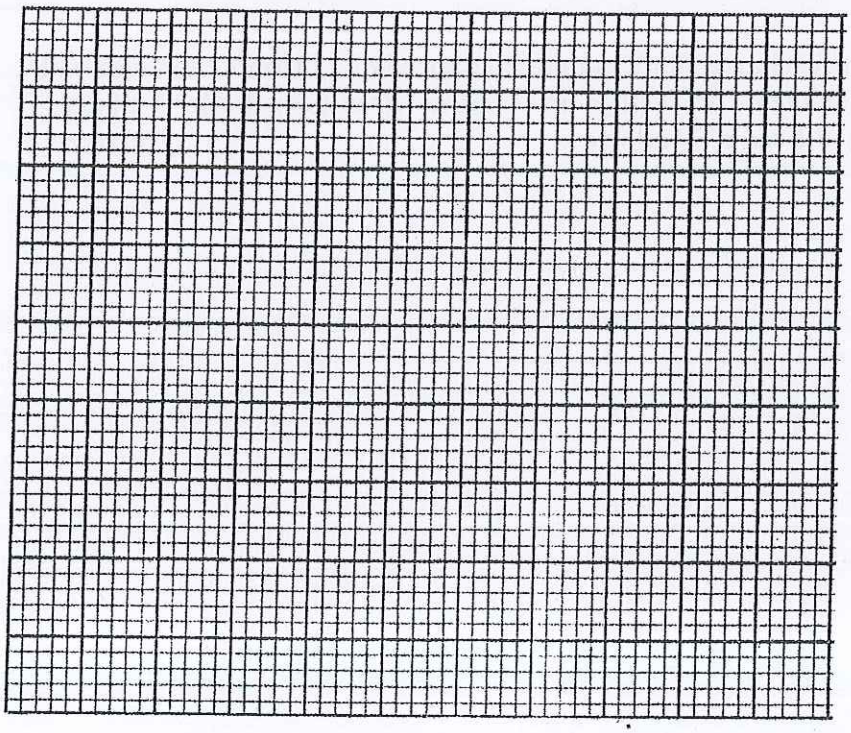
(2marks)

18. The following table shows heights of 100 seedlings each measured to the nearest cm.

Height(cm)	frequency				
70- 79	14				
80-84	16				
85-89	18				
90-94	20				
95-99	17				
100-109	15				

a) Calculate the differences between the mean and the median. (6marks)

b) Draw a frequency polygon to illustrate the above information (4marks)



19. Tw o towns P and Q are 280 km apart. A bus left town P at 9.30 am and travelled to Q at an average speed of 80 km /h. After 30 minutes, a car left town p for Q and travelled at an average speed of 100 km/h.

a). Determine:-

(i) The time when the car caught up with the bus. (3marks)

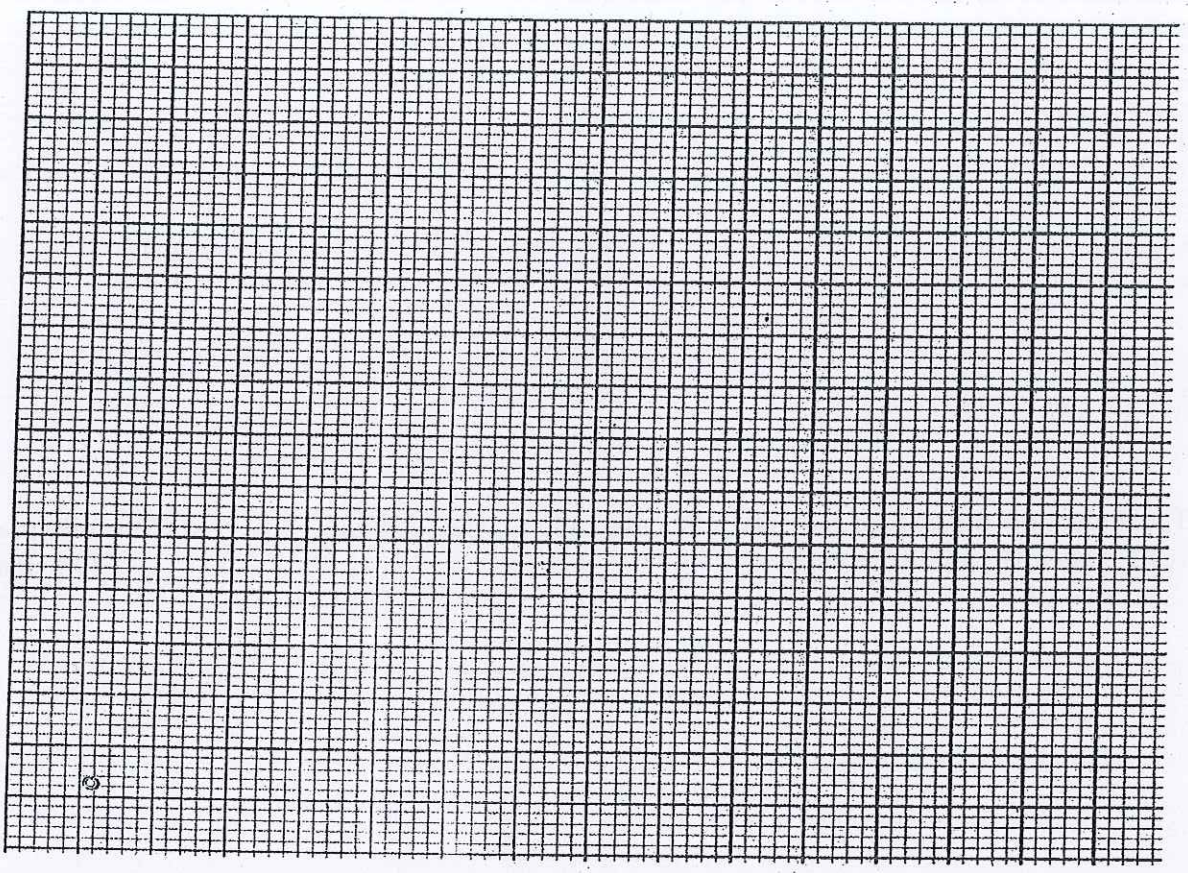
(ii) The distance of the car from town Q when it overtook the bus. (3marks)

b) After the car overtook the bus, it accelerated for 6 minutes to a speed of 120 km/h. It moved with that speed for 30 minutes after which breaks are applied and came to rest at town T after 3 minutes. Determine the distance travelled by the car in 39 minutes. (4marks)

20. a) Complete the table of values for the equation $y = -2x^2 + 3x + 6$. (2marks)

x	-3	-2	-1	0	1	2	3	4
y								

b) Use the values above to draw the graph of $y = -2x^2 + 3x + 6$. (3marks)



c) Using the graph drawn above Solve the equations:-

(i) $2x^2 = 3x + 6$ (2marks)

(ii) $-2x^2 + x + 9 = 0$ (3marks)

21. A trader deals with two types of Millet, type A and type B. type A costs ksh 400 per bag and type B costs ksh 350 per bag.

a) The trader mixes 30 bags of type A and 50 bags of type B. If she sells the mixture at a profit of 20%, calculate the selling price of one bag of the mixture. (4 marks)

b) The trader now mixes type A and type B in the ratio x: y respectively. If the cost of the mixture is ksh 383.50 per bag, find the ratio x:y. (4marks)

c) The trader mixes one bag of the mixture in part (a) with one bag of the mixture in part (b) above. Calculate the ratio of type A millet to type B millet in this mixture. (2marks)

22. The equation of a line L_1 is $3y + 2x = 10$

a) Find in form of $y = mx + c$, where m and c are constants:-

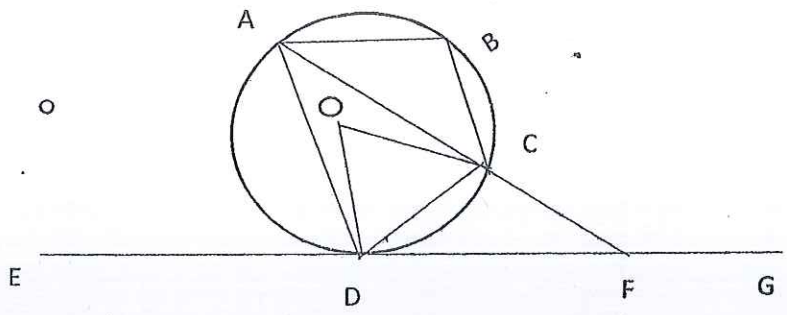
i. The equation of line L_2 passing through N (-5,2) and parallel to L_1 (2marks)

ii. The equation of line L_3 perpendicular to L_2 at M (1,-8) (3marks)

b) Find the angle of inclination of the line L_2 with the horizontal. (2marks)

c) Find the magnitude of MN. (3marks)

23. In the figure below A, B, C and D are points on the circle Centre O. ACF and EDFG are straight lines. Line EG is a tangent to the circle at D. $\angle CDF = 35°$ *and* $\angle CFG = 130°$



a) Calculate the size of:-

i) $\angle OCD$ (2marks)

ii) $\angle EDA$ (1mark)

iii) $\angle ABC$ (2marks)

b) Given that CF = 6.7 cm and DF = 8.5 cm, Calculate to 3 significant figures:

i) The length of DC. (3marks)

ii) The radius of the circle. (3marks)

24. The product of the first three terms of a geometric progression is 64.If the first term is **a** and the common ratio is **r**,

a) Express **r** in terms of **a**. (3marks)

b) Given that the sum of the three terms is 14

i) Find the value of **a** and **r** and hence write down two possible sequence up to the 4^{th} term. (5 marks)

ii) Find the product of the 50^{th} terms of the two sequence. (2marks)