

Name: .....Index No.....

School.....sign.....Date.....

**HOLIDAY MATHEMATICS ASSESSMENT**  
**FORM 2 JAN 2023**                      **13/01/2023**  
*Empowering generations through mathematics*

**121/1**  
**MATHEMATICS ALT A.**  
**Paper 1**  
**JAN 2023**  
**TIME : 2HRS 30MINS**

**INSTRUCTIONS TO CANDIDATES**

- a) Write your **Name, Index Number** and **School** in the spaces provided at the top of this page.
- b) **Sign** and write the **date** of examination in the spaces provided above.
- c) This paper contains **TWO** sections: section I and section II
- d) Answer **all** the questions in section I and any **FIVE** questions from section II.
- e) **All** answers and **working must** be written on the question paper in the spaces provided below each question.
- f) Show **all** the steps in your calculations, giving your answers at each stage in the spaces provided below each question.
- g) **Marks** may be given for **correct** working even if the answer is wrong.
- h) 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	<b>TOTAL</b>

***Section II***

17	18	19	20	21	22	23	24	<b>TOTAL</b>

**GRAND TOTAL**

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5. Simplify the expression

$$\frac{2}{3}(3x - 2) - \frac{3}{4}(2x - 2)$$

(3 marks)

6. If  $f = \frac{uv}{u+v}$ , find  $f$  correct to 3 d.p, given that  $u = 0.5$  and  $v = 0.8$ .

(3 marks)

7. A square has an area of  $36 \text{ cm}^2$ . If the perimeter of the square increases by 30%, calculate the new perimeter.

(3 marks)

8. A man is  $x$  years old now. In 10 years' time, he will be twice as old as he was 5 years ago. How old will he be in 10 years' time?

(3 marks)

9. A Kenyan tourist left America through South Africa. While in South Africa, she bought a wrist watch worth 24 dollars. Given that 1 *South African rand* = 0.15 *dollars* and 1 *rand* = 11.24 *kenya shillings*, find the value of the watch in;
- a) South African rands. (1 mark)
- b) Kenya shillings. (2 marks)
10. A solid block in the shape of a cylinder has a height of 14 cm and weighs 22 kg. If it is made of material of density  $5 \text{ gcm}^{-3}$ , find the radius of the cylinder. Take  $\pi = \frac{22}{7}$  (3 marks)
11. Evaluate  $16^2 \times 25^2$  by factorization leaving your answer as a product of prime factors (3 marks)
12. An arc PQ of a circle of radius 15 cm subtends an angle of  $160^\circ$  at the centre of the circle. Find the length of the arc PQ correct to 2 significant figures.(Take  $\pi = 3.142$ ). (4 marks)

13. Evaluate;

a)  $56 \div -8 \times 7 + 5 - 2$

(2 marks)

b)  $-(-32) \div -4$

(2 marks)

14. Express the following recurring decimal as a fraction  $0.\dot{1}45\dot{3}$

(3 marks)

15. A church service lasted 2 hours 35 minutes. What time did it start if it ended at 12.15 p.m?  
Express your answer in 24 – clock system.

(3 marks)

16. Use tables of squares and square roots to evaluate;

$$11.98^2 + \sqrt{231.5}$$

(3 marks)

**SECTION II (50 Marks)**

**Answer all question in the spaces provided.**

17. a) Half the sum of the present ages of a mother and her daughter is equal to the difference between their ages now. In ten years time the mother's age will be exactly twice the daughter's age. Calculate their present ages. (3 marks)

b) In fourteen years' time, a mother will be twice as old as her son. Four years ago, the sum of their ages was 30 years. Find how old the mother was, when the son was born. (4 marks)

c) Khadija and Kagendo bought the same types of pens and exercise books from the same shop. Khadija bought 2 pens and 3 exercise books for Sh 78. Kagendo bought 3 pens and 4 exercise books for Sh 108. Calculate the cost of each item. (3 marks)

18. The inside of a rectangular hall measures 15 m long, 9 m wide and 3 m high. There are two doors each measuring 2 m by 2.2 m and six windows each measuring 1.5 m by 1.5 m. The walls are to be painted.

a) Calculate the total area of the walls to be painted. (4 marks)

b) To paint an area of  $2.5 \text{ m}^2$  requires one litre. If the paint is sold in 4 litre tins, determine the number of tins of paint that should be bought. (3 marks)

c) The cost of a 4 litre tin of paint is Sh. 1 700. The painter is paid fixed charge of Ksh. 2 000 and Ksh. 30 per square metre of the wall painted. Calculate the total cost of painting the walls. (3 marks)

19. A cylindrical container of diameter 14 cm and depth 20 cm is half full of juice.

a) Calculate the volume of juice in the container in cubic metres. (3 marks)

b) The juice is to fill a rectangular tank whose dimensions are 1.5 m by 1 m by 0.5 m. Calculate the number of cylindrical containers required to fill the tank to the nearest whole number. (3 marks)

c) A cube has a surface area of  $216 \text{ cm}^3$

i. Calculate the volume of the cube in cubic metres. (3 marks)

ii. Find the capacity of the cube in litres. (1 mark)



20. Jane is a sales executive earning a salary of Ksh. 20,000 and a commission of 8% for the sales in excess of Ksh 100,000. If in January 2010 she earned a total of Ksh.48, 000 in salaries and commissions.

a) Determine the amount of sales she made in that month (4 marks)

b) If the total sales in the month of February and March increased by 18% and then dropped by 25% respectively. Calculate

i. Jane's commission in the month of February (3 marks)

ii. Her total earning in the month of March (3 marks)

21. In order to start a business, three businessmen Macharia, Omondi and Kimtai contributed Sh 25 000, Sh 35 000 and Sh 45 000 respectively as business capital. They also had to pay Sh 15 000 more as rental fee for business premises. The rental fee was shared equally among the partners. The three partners agreed to put 25% of the annual profits back in the business and share the rest in the ratio of their contributions. During the first year the business realized Sh 128 000 in gross profits.

a) Find the ratio in which they contributed business capital and rental fees. (2 marks)

b) Calculate;

i. The profits shared. (2 marks)

ii. Each partner's share of the profits. (6 marks)

22. In a Safari rally drivers are to follow route ABCGA. B is 250km from A on a bearing of  $075^{\circ}$  from A. C is on a bearing of  $110^{\circ}$  from A and 280km from B. the bearing of C from D is  $140^{\circ}$  and at a distance of 300km.
- a. By scale drawing, show the position of the point A, B, C and D. (4 mks)

(b) Determine

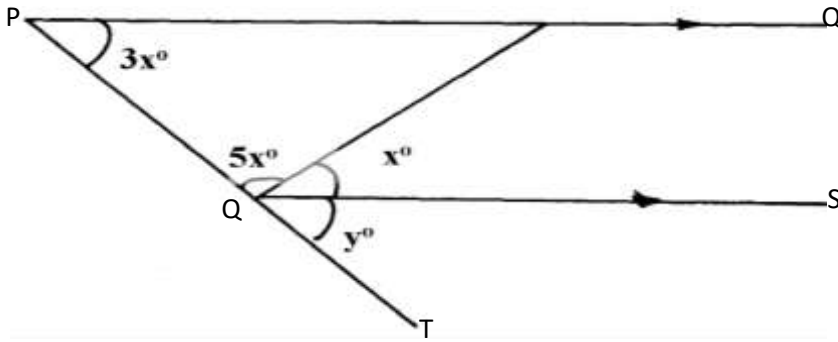
(i) Distance of A from C (2 mks)

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

(iii) The distance and bearing of A from D (3 mks)

23. a. In the figure below PQ is parallel to RS. Calculate the value of  $x$  and  $y$

(4 marks)



b. The interior angle of a  $n$ -sided regular polygon exceeds its exterior angle by  $132^\circ$ .  
Find the value of  $n$

(4 marks)

c. The size of an interior angle of a regular polygon is  $4x^\circ$ , while its exterior angle is  $(x - 30)^\circ$ .  
Find the number of sides of the polygon

(2 marks)

24. The table below gives a field book showing the results of a survey of a section of a piece of land between A and E. All measurements are in metres.

<b>D</b> 33	<b>E</b> 95	
	90	<b>F</b> 36
<b>C</b> 21	70	
<b>B</b> 42	30	<b>G</b> 25
	25	<b>H</b> 40
	<b>A</b>	

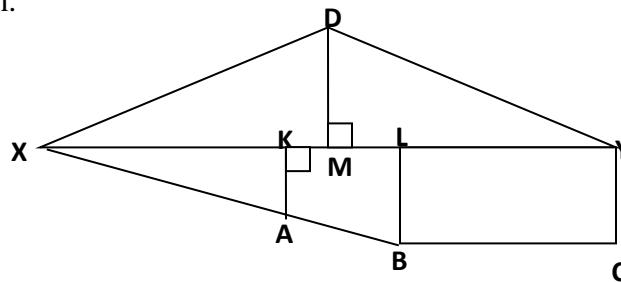
(a) Draw a sketch of the land.

(3 marks)

(b) Calculate the area of this piece of land.

(3 marks)

(c) The figure below represents a surveyor's sketch of a plot of land. Calculate the area of the plot in square metres given that  $XY = 50\text{m}$ ,  $XK = 20\text{m}$ ,  $XM = 25\text{m}$ ,  $XL = 35\text{m}$ ,  $KA = 40\text{m}$ ,  $MD = 38\text{m}$  and  $LB = YC = 60\text{m}$ .



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