Name: ..... Class: ....

Date: ..... Adm No: .....

MATHEMATICS

TIME: 2 HOURS 30 MINUTES

MID TERM 2 EXAM 2019

Kenya Certificate of Secondary Education (K.C.S.E.)

FORM THREE

MATHEMATICS

INSTRUCTIONS TO CANDIDATES

1. Write your name, class and Admission Number in the spaces provided above.
2. The paper consists of two sections. Section I and Section II.
3. Answer **ALL** the questions in **Section I**.
4. Answer **only five** questions only in **Section II**.
5. All answers and working must be written on the question paper in the spaces provided below each question.
6. Marks may be given for correct working even if the answer is wrong.
7. Negligence and slovenly work will be penalized
8. Non programmable silent electronic calculator and KNEC Mathematical tables may be used except where stated otherwise.

FOR EXAMINER'S USE ONLY

Section I

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

Section II

Question	17	18	19	20	21	22	23	24	TOTAL
Marks									

GRAND TOTAL	

SECTION I (50 Marks)

Answer all the questions in this section.

1. Evaluate $\frac{-2(4-7)+8(-5+3)}{-5+(-8+2)}$ (3 marks)

2. Without using logarithm tables or calculator, evaluate (3 marks)

$$\frac{64000^{\frac{2}{3}} \times 36^{\frac{-1}{2}}}{5^3 \times 13^0 \times 30^{-2}}$$

3. Use the table of reciprocals to find $\frac{1}{0.582}$, hence evaluate (4 marks)

$$\frac{\sqrt[3]{0.000216}}{0.582}$$

4. Mwiti a Kenyan trader bought goods from Japan worth 5,500,000 Japanese yen. Custom duty of 20% was charged on the value of goods on their arrival in Kenya. If the exchange rates were
   1 US dollar =115 Japanese yen
   1 US dollar= 74 Kenyan shillings
   Calculate the duty paid in Kenyan shillings. (3 marks)

5. Simplify (3 marks)
   $\frac{9x-4x^2}{2x^2-3x-9}$

6. If $\cos x = 0.8$, evaluate $\tan x - \sin x$ without using tables or calculators. (3 marks)

7. Solve the equation by completing the squares. (3 marks)
   $2x^2+4x-9=0$

8. Use logarithms to evaluate (4 marks)

$$\sqrt[4]{\frac{(0.8932)^2 \times (582.3)^{\frac{1}{3}}}{(69.35)^{\frac{1}{2}}}}$$

9. Solve the simultaneous equation (3 marks)

$xy=4$

$x+y=5$

10. Simplify (3 marks)

$$\frac{9}{2\sqrt{3}}$$

11. If the position vectors of A and B are $\begin{pmatrix} 3 \\ -5 \end{pmatrix}$ and $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$ respectively. Find $|AB|$

(3 marks)

12. A frustum of height 24cm is obtained when a small cone of height 8cm is cut off from a larger cone. The smaller cone has a volume of 200cm^3. Determine the volume of the frustum.

(3 marks)

13. A liquid has a mass of 7.5kg and a density of 0.25g/cm^3. Calculate the volume of the liquid in litres.
(3 marks)

14. A spherical metal ball has a radius of 3.5cm.if it has a density of 7.2g/cm^3 find its mass in grams
(3 marks)

15. By correcting each number to one significant figure, approximate the value of
(788 X 0.006).
Hence calculate the percentage error arising from this approximation
(3 marks)

16. The sum of the interior angles of a regular polygon is 1800^0. Find the size of each exterior angle.
(3 marks)

SECTION II (50 MARKS)

Answer any FIVE Questions ONLY from this section

17. The following table shows the height to the nearest centimeters of some maize plants in a research farm

Height (cm)	80-84	85-89	90-94	95-99	100-104	105-109	110-104	105-119
frequency	5	14	16	17	24	12	11	4

a) State the modal class (1 mark)

b) Calculate to 2 decimal places

i) The mean height (5 marks)

ii) The median height (4 marks)

18. A town is 90km from a college. At 9:30a.m a lecturer left the college and drove towards the town at an average speed of 60km/h. At 9:45a.m, Nalonja left the town and cycled towards the college at an average speed of 30km/h

a) Find

(i) The distance from the college to the point where Nalonja met the lecturer

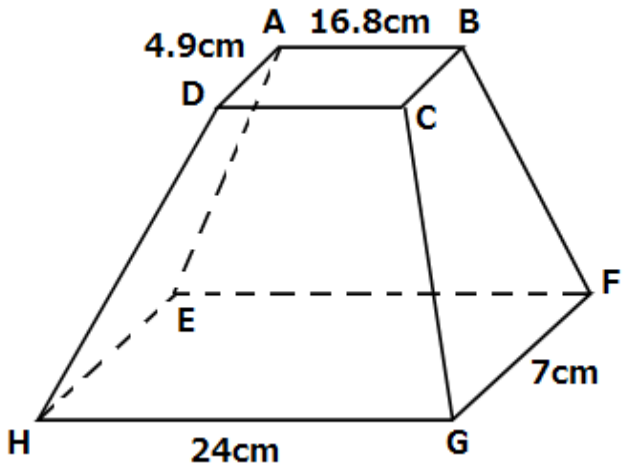
(4 marks)

(ii) The time when the two met (2 marks)

b) Atieno started driving from the collage at 10:00a.m she met Nalonja 10 minutes after the lecturer met him. Calculate Atieno's average speed

(4 marks)

19. The figure below shows a solid frustum of a right pyramid with a rectangular base EFGH measuring 24cm by 7cm. the frustum was obtained by cutting off a small pyramid along plane ABCD that is parallel to base EFGH. Plane ABCD measures 16.8cm by 4.9cm, and is exactly seven tenths way up the vertical height of the original pyramid.



Given that the original pyramid had a slant edge of 32.5cm, find

a) The perpendicular height of the frustum (4 marks)

b) The volume of the frustum (3 marks)

c) The surface area of the original pyramid (3 marks)

20. (a) On the grid provided draw the quadrilateral PQRS whose vertices are P(-5,4), Q(-3,4), R(-5,3) and S(-4,3) (1 mark)

(b) On the same grid draw;

i) P’Q’R’S’ the image of PQRS under a reflection in the line y=0 (2 marks)

ii) P’’Q’’R’’S’’ the image of P’Q’R’S’ under a rotation of $+180^0$ about (0,0) (2 marks)

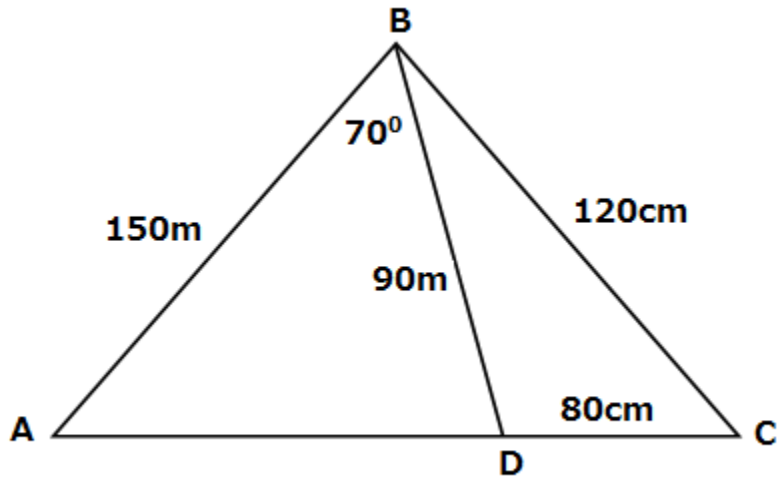
iii) P’’’Q’’’R’’’S’’’ the image of P’’Q’’R’’S’’ under an enlargement scale -2, centre (4,0)
(2 marks)

(c) Name the quadrilaterals that are

i) Directly congruent (1 mark)

ii) Oppositely congruent (2 marks)

21. The figure below is that of Wesonga farm ABC. He divides the farm such that BCD is the homestead and ABD is cropped land ABD=70^0, AB= 150 m, BC=120m, and BD=90m.



Find

a) Distance AD (2 marks)

b) Angle BAC (3 marks)

c) Angle DBC (3 marks)

d) The area of the cropped land (2 marks)

22. B is 102km on the bearing of 112° from A. C is 94km on the bearing of 062° from B D is 073° from A and 336° from C.

(a) Using a scale of 1cm to represent 20km, draw a diagram to show the positions of

A, B, C and D (6 marks)

(b) Using your diagram, determine;

i) The bearing of B from D and A from C. (2 marks)

ii) The distance AC and BD (2 marks)

23. (a) (i) Fill the table below for the function.

$y = 2x^2 + 5x - 12$ for $-8 \leq x \leq 4$ (2 marks)

x	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4
y	76					-9				-5			40

(ii) Using the table, draw the graph of the function $y = 2x^2 + 5x - 12$. Use the scale 1cm to represent 1 unit on the x-axis and 1cm for 10 units for the y – axis (4 marks)

(b) Use the graph drawn above to solve the following equations.

(i) $2x^2 + 5x - 12 = 0$ (2 marks)

(ii) $3 - 7x - 3x^2 = 0$ (2 marks)

24. Two lines L_1 with equation $2y-3x-6=0$ and L_2 with equation $3y+x-20=0$ intersect at point A.

a) Find the co-ordinates of A (3 marks)

b) A third line L_3 is perpendicular to L_2 at point A. find the equation of L_3 in the form $y=mx+c$ (3 marks)

c) Another line L_4 is parallel to L_1 and passes through $(-1,3)$, find the x and y intercepts of L

(4 marks)