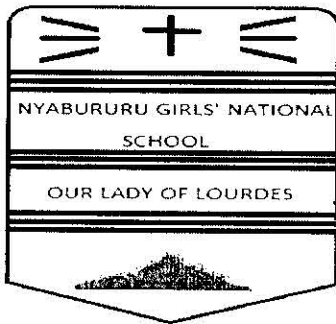


Name.....

Index No.....

CLASS/STREAM.....C/NO.....ADM/NO.....

Date.....



Date done	
Invigilator	
Date returned	
Date revised	

121/1
MATHEMATICS
PAPER 1
MARCH SERIES 2016
TIME: 2 ½ HRS

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided.
- This paper consists of **TWO** sections I and II.
- Answer **ALL** questions in section I and only five from section II.
- All answers and working must be done on the question paper in the spaces provided below each question.
- Show all the steps in your calculations giving your answers at each stage in the spaces below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non-programmable silent electronic calculation and KNEC Mathematical tables may be used.

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

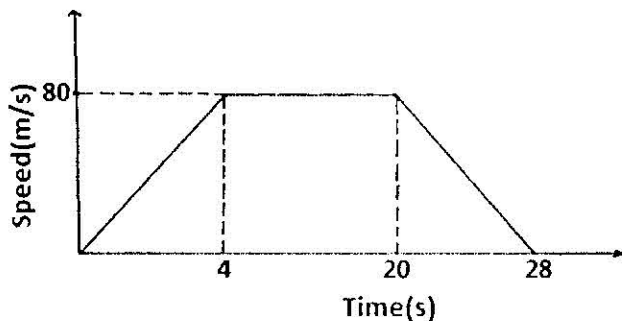
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SECTION I (50MARKS)

1. The figure below is a velocity–time graph for a car.

a) Find the total distance traveled by the car?

(2 marks)



b) Calculate the deceleration of the car.

(2 marks)

2. The size of an interior angle of a regular polygon is 140° . Find the number of sides of the polygon.

(2marks)

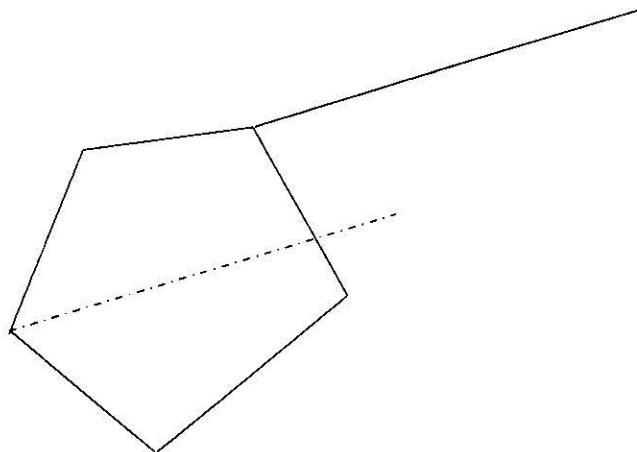
3. A line with gradient of -4 passes through the point (3, k) and (k, 8).Find the exact equation of the line in the form of $ax + by = c$ where a,b and c are constants.

(3marks)

4. Use the tables of reciprocals and square roots to evaluate $\frac{3}{56.79} + \sqrt{0.00457}$ (3marks)

5. A point P divides AB in the ratio 7: -5 where A (2,-3, 4) and B (-4, 7,-2). Find the coordinates of P. (3marks)

6. Below is part of a sketch of a solid which is a prism. Complete the sketch of the solid showing the hidden edges with broken lines. (3marks)



7. A Kenyan bank buys and sells foreign currencies as shown below.

	Buying (in Ksh)	Selling (in Ksh)
1 American dollar	76.83	77.01

A business man arrived in Kenya with 10 500 Dollars and changed the whole amount to Kenyan shillings. While in Kenya he spent Ksh 500 000 and changed the balance to American dollars, before going back to America. Calculate the amount of dollars that he received. (3marks)

8. Simplify $\frac{6+x-2x^2}{2x^2-8}$ (3marks)

9. Given that $\tan(90 - x) = 4$ find without using tables or a calculator $\cos x$ (2marks)

10. The table below shows rainfall amounts at 50 weather stations. There are two missing frequencies.

Rainfall in mm	$0 \leq x < 10$	$10 \leq x < 20$	$20 \leq x < 30$	$30 \leq x < 40$	$40 \leq x < 50$	$50 \leq x < 60$	$60 \leq x < 70$
Frequency	4	7	10		9		2

If the mean rainfall is 33.2mm, determine the two missing frequencies.

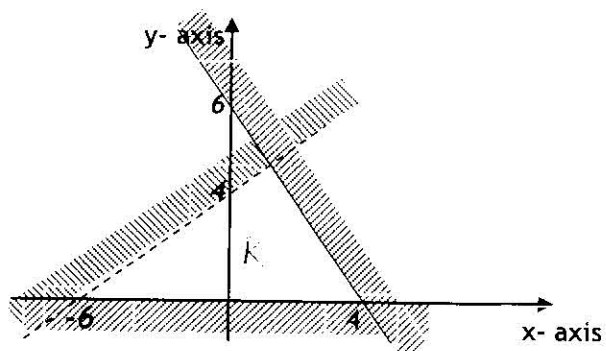
(3 marks)

11. A boy standing on top of a cliff sees two ships in the sea at an angle of depression of 30° and 70° if the two ships are 200m apart find the height of the cliff.

(4marks)

12. Identify the inequalities represented by the region R below.

(3marks)



13. A mixture of water and alcohol in equal proportions by volume is filled in a one litre container. If a quarter of the mixture is poured out and water added until the container is full calculate the percentage of water in the mixture. (4marks)

14. An agent sells goods for a company. He earns a basic salary of Ksh10 000, on top of this he earns no commission for the first Ksh10 000 selling price of goods, 10% on the next Ksh10 000 and 20% on the remainder. In a certain month he earned a total of Ksh20 000 what was the value of goods sold. (3marks)

15. The diagonals of a rhombus are 8cm by 6cm. Calculate the,

i) Area

(2mks)

ii) Perimeter

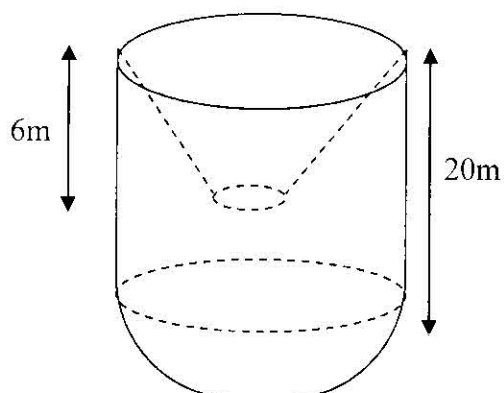
(1mark)

16. Solve for x if $\log_{(2x+7)} 81 = 4$.

(3 marks)

SECTION II (50MARKS)

17.



The figure above represents a container with a fixed funnel for pouring in grains and a hemispherical bottom. The funnel has a diameter of 21m and 7m and a height of 6m. The height of the cylindrical part is 20m.

a) Find the volume of air inside the container.

(7marks)

b) Students in a class made a model of the container using plasticine. The volume of plasticine used was 5000cm^3 . Find the surface area of the curved surface of the hemisphere of the model. (3marks)

18. A car traveling at a speed of 100Km/h left Mombasa for Mumias, a distance of 800Km, one hour after a van had already started moving towards the same direction at a speed of 75Km/h

a) i) After how many hours did the car catch up with the van. (3marks)

ii) How far were they from Mumias when they met? (1mark)

b) A bus and a lorry left Mombasa for Mumias at the same time. The speed of the bus was 20Km more than that of the lorry and it arrived at Mumias two hours twenty minutes earlier than the lorry calculate the speed of the lorry. (6marks)

19. Using a ruler and a pair of compasses only construct a parallelogram ABCD where $AB = 5\text{cm}$, $AC = 8\text{cm}$ and angle $ABC = 97.5^\circ$ (4marks)

a) A point X divides the line AD externally in the ratio 3:2, plot X and measure BX (1mark)

b) Construct a perpendicular at X to meet BC produced and hence find the area of triangle BDY. (3marks)

c) Construct a circle to touch line DC and also line AD produced at X. Measure its radius (2marks)

20. Four buildings A,B,C and D Stand on level ground such that B is 240m on a bearing of 60° from A. C is south east of B and east of A. D is 320m from on a bearing of 150° from A.
- a) Using a scale of 1cm represents 40m draw a diagram to show the relative positions of the buildings. (4marks)

Use the drawing to find the

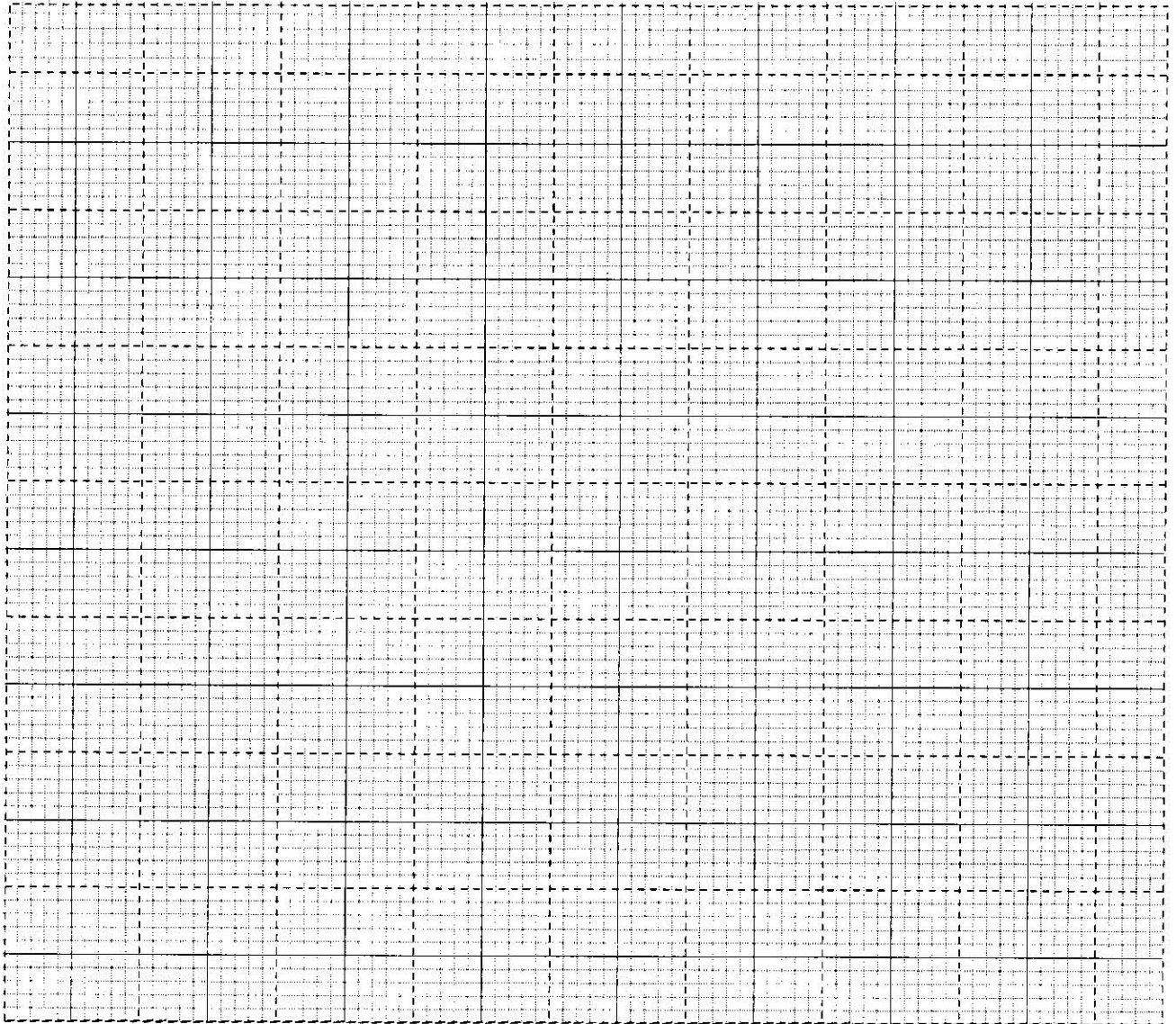
i) bearing of C from D (1mark)

ii) distance of C from A (1mark)

iii) direction of B from D. (1mark)

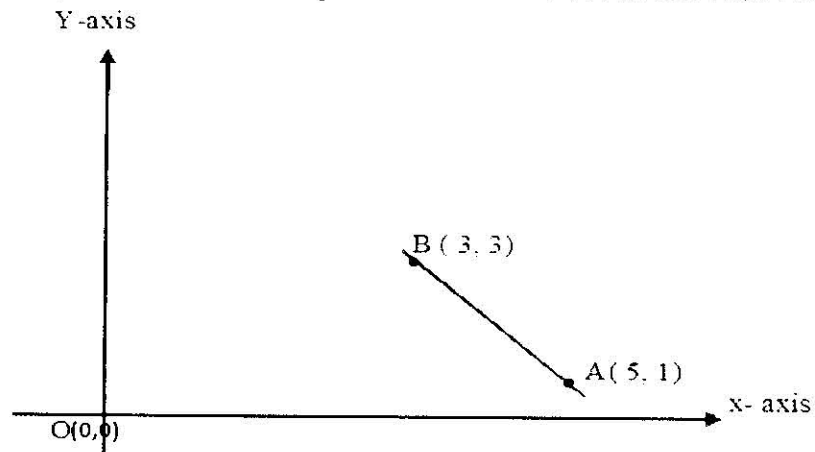
b) The height of building A is 200m and that of B is 80m on a separate drawing mark and determines the angle of depression of the top of building B from the top of building A (3marks)

21. (a) On the graph paper provided plot the points $P(2, -1)$, $Q(0, -3)$ and $R(2, -4)$ and join them to form a triangle PQR . (2marks)



- (b) The points $P'(1, 2)$, $Q'(3, 0)$ and $R'(4, 2)$ are the images of PQR under a certain transformation T_1 on the same grid draw triangle $P'Q'R'$ and describe transformation T_1 fully. (2marks)
- (c) The points $P''(1, -4)$, $Q''(-3, 0)$ and $R''(-5, -4)$ are the images of $P'Q'R'$ under another transformation T_2 . On the same grid draw $P'Q'R'$ and describe transformation T_2 fully. (2marks)
- (d) On the same grid draw $P'''Q'''R'''$ the image of $P'Q'R'$ under a reflection in the line $y + x = 0$ and write down its co ordinates. (2marks)
- (e) Write down the co ordinates of $P''''Q''''R''''$ the image of PQR under a translation with translation vector $\begin{bmatrix} 2 \\ -4 \end{bmatrix}$ (2marks)

22. In the diagram below, the co-ordinates of points A and B are (5, 1) and (3, 3) respectively.



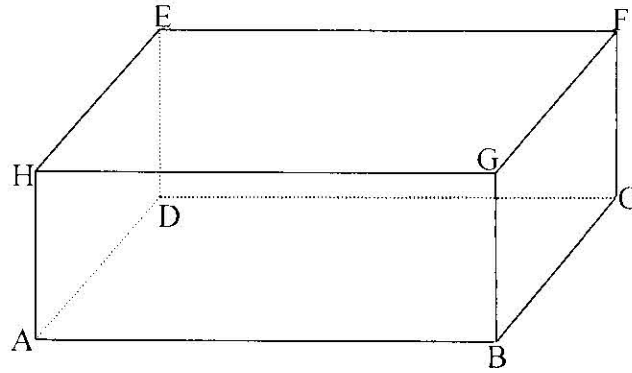
(a) A point C divides the line AB externally in the ratio 2:1 calculate the Co-ordinates of C. (3marks)

(b) Point D is on OB such that $2OB = 3OD$ calculate the co-ordinates of D. (2marks)

(c) Point E is the midpoint of OC; calculate the position vector of E. (1mark)

(d) Show that A, D and E are collinear. (4marks)

23. The figure below shows a cuboid of length 7 cm, width 5 cm and height 3 cm.



Calculate:

a) Length AC (2 marks)

b) Length AF (2 marks)

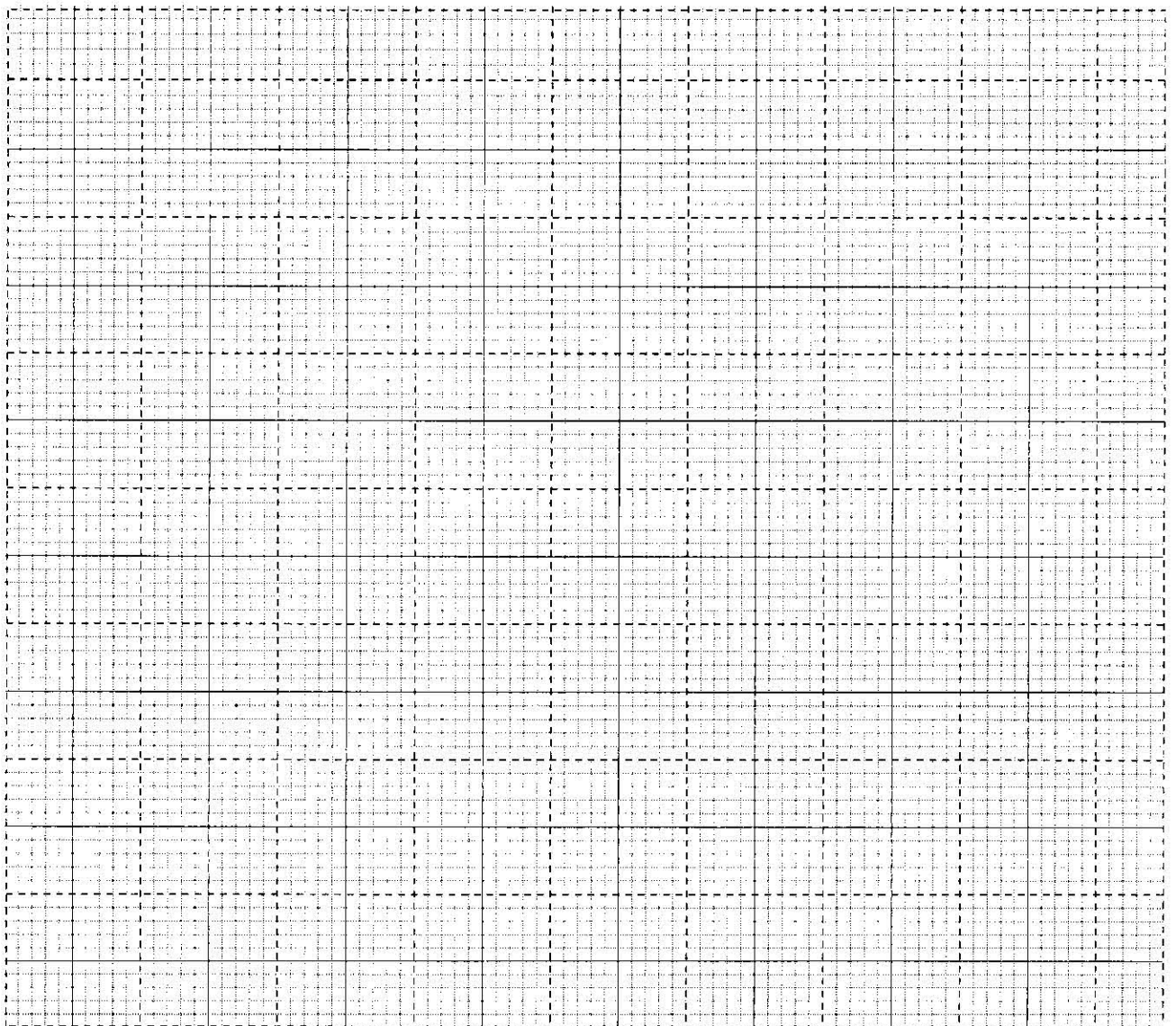
c) Angle HF makes with AB (3 marks)

d) Angle between planes AEFB and ABCD. (3 marks)

24. (a) Complete the table given below for $y=x^3 - 4x^2 + x + 6$ for $-2 < x < 4$ (2 marks)

x	-2	-1	0	1	2	3	4
x^3		-1	0	1			64
$4x^2$			0	4		36	
6							
$y=x^3 - 4x^2 + x + 6$	-20		6	4		0	

(b) On the grid provided, draw the graph of $y=x^3 - 4x^2 + x + 6$. Use scale 1cm to represent 2 units on the y-axis and 2cm to represent 1 unit on the x-axis. (4 marks)



(c) Use your graph to solve the equation $x^3 - 4x^2 + x = -6$

(1 mark)

(d) By use of mid-ordinate rule with 4 strips. Estimate the area bounded by the curve $y=x^3 - 4x^2 + x +6$, x-axis, $x=-1$ and $x=3$.

(3 marks)