

NAMEINDEX NO.....DATE.....
 SCHOOL.....SIGNATURE.....

121/1
 MATHEMATICS
 PAPER 1
 JULY / AUGUST 2010
 TIME: 2 ½ HOURS

BELGUT/AINAMOI JOINT EVALUATION EXAM Kenya Certificate of Secondary Education 2010

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 MATHEMATICS
 PAPER 1
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INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided at the top of this page.
2. This paper consists of two sections: **Section I and Section II.**
3. Answer **all** questions in **section I** and **any five questions** from **Section II.**
4. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
5. Marks may be given for correct working even if the answer is wrong.
6. Non- programmable silent electronic calculators **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**

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.

SECTION I (50 MARKS)

Attempt ALL questions in the spaces provided below each question.

1. Evaluate $\frac{3}{8}$ of $\left\{7\frac{3}{5} - \frac{1}{3}\left(1\frac{1}{4} + 3\frac{1}{3}\right) \times 2\frac{2}{5}\right\}$ (3mks)

2. Solve for y in the equation $(\log_3 y)^2 - \frac{1}{2} \log_3 y = \frac{3}{2}$ (3mks)

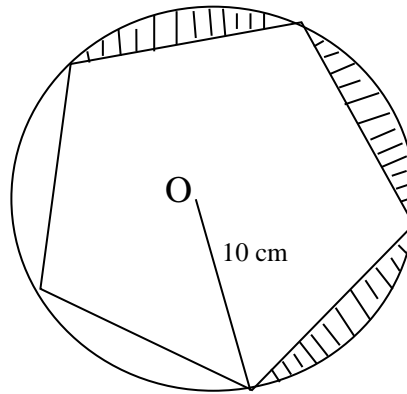
3. Given that $\vec{a} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} -4 \\ 5 \end{pmatrix}$, $\vec{c} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$ and $\vec{p} = 2\vec{a} + \vec{b} - 3\vec{c}$. find $|\vec{p}|$ (3mks)

4. The mean of four numbers n, 8n+1, 17, and 20 is 14. Find

(i) The value of n. (2mks)

(ii) The mode of the data. (2mks)

5. The diagram below, not drawn to scale, is a regular pentagon circumscribed in a circle of radius 10 cm at centre O



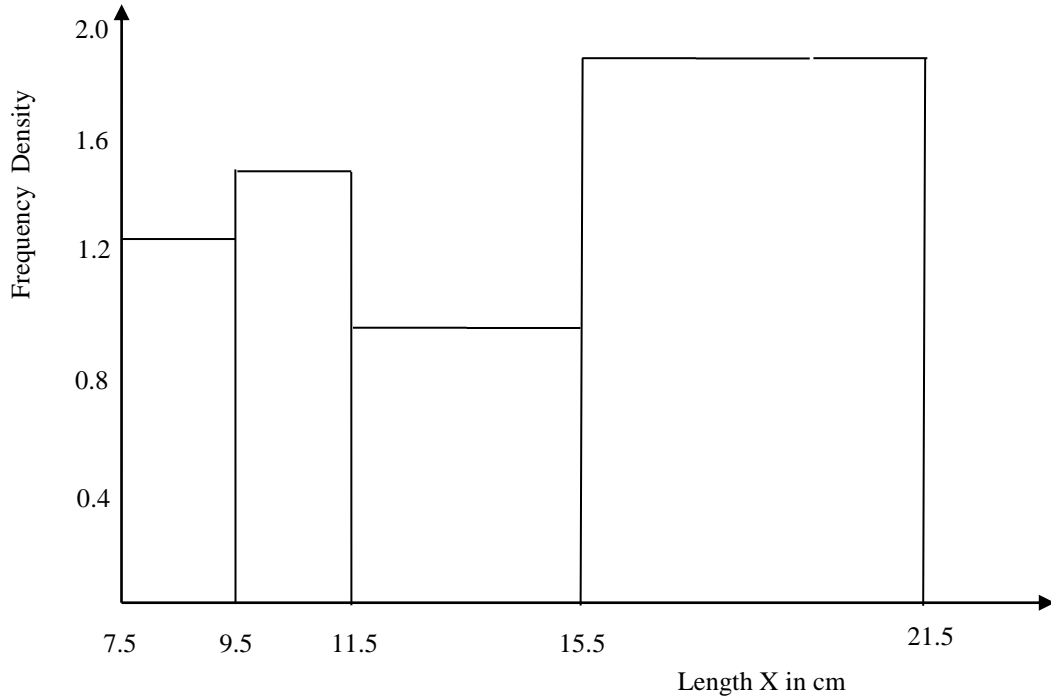
Find

(a) The side of the pentagon (2 mks)

(b) The area of the shaded region (3 mks)

6. The length of a rectangle is increased by 20% while the width is decreased by 10%. Find the percentage change in area. (2 mks)

7. The figure below shows a histogram



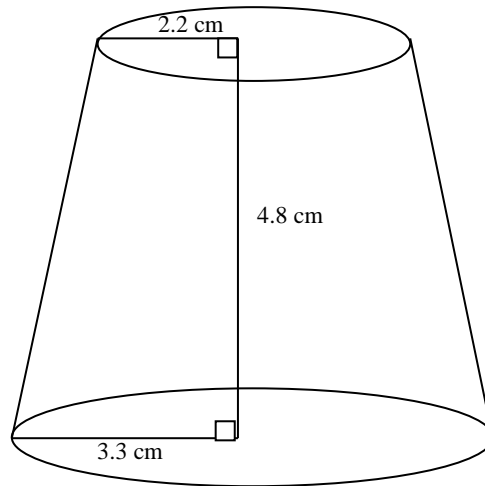
Fill the missing frequencies in the table below

(3 mks)

Length in cm	Frequency
$7.5 \leq x \leq 9.5$	12
$9.5 \leq x \leq 11.5$	
$11.5 \leq x \leq 15.5$	
$15.5 \leq x \leq 21.5$	

8. Two passenger trains A and B, 240m apart are travelling at 164km/h and 88km/h respectively approach one another on a straight railway line. Train A is 150 metres long. Determine the time in seconds that elapses before the two trains completely pass each other. (3 mks)

9. The figure below shows a frustrum



Find the volume of the frustrum

(4 mks)

10. Every time an insect jumps forward the distance covered is half of the previous jump.

If the insect initially jumped 8.4 cm, calculate

(i) To the nearest two decimal places the distance of the sixth jump (1 mk)

(ii) The total distance covered after the sixth jump (2 mks)

11. Convert the recurring decimal $12.\dot{1}\dot{8}$ into fraction

(3 mks)

12. Solve the inequality $-2x + 1 < x - 5 < 5 - x$ (2 mks)

13. The exterior angle of a regular polygon is equal to one-third of the interior angle.
Calculate the number of sides of the polygon and give its name. (4 mks)

14. The formula for finding the volume of a sphere is given by $V = \frac{4}{3}\pi r^3$. Given that $V = 311$ and $\pi = 3.142$, find r . (3 mks)

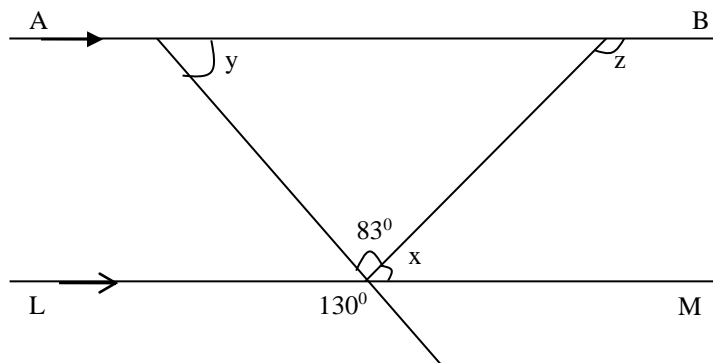
15. A triangle ABC is formed by the points A (3,4), B (-7,2), and C (1,-2).
(a) Find the coordinates of the mid-points k of AB and p of AC (1 mk)

(b) Find the equation of the perpendicular bisector of the line kp (2 mks)

(Use the graph paper provided next page)

Grid

16. In the figure below, lines AB and LM are parallel.



Find the values of the angles marked x , y and z

(3 mks)

SECTION II (50 MARKS)

Answer any five questions from this section

17. A Kenyan businessman bought a washing machine in Europe at 500 Euros. On coming back, the Kenyan government imposed a 120% import duty and a 50% sales tax. He decided to sell the washing machine at a profit of ksh. 32,800.

Calculate

(a) Import duty (2 mks)

(b) Sales tax (2 mks)

(c) Percentage profit (3 mks)

(d) Selling price (3 mks)

Take 1 Euro € = 95 Kenya shillings

18. From points A and B on a level ground the angles of elevation to the top of the building are 24° and 38° respectively. If the distance between A and B is 47m and that of B from the foot of the building is X;

(a) Form an expression for the height of the building

(b) Calculate the height of the building

(c) Find the difference in the distance between the top of the building and points A and B

19. (a) Divide 1000cm^3 in the ratio $\frac{1}{4} : \frac{1}{2} : \frac{1}{5}$, leaving your answer to the nearest 1 cm

(3 mks)

(b) In a Chemistry experiment, a boy mixed some acid solution of 45% concentration with an acid solution of 25% concentration. In what proportion should the two acids be mixed in order to get 100cm^3 of solution of 30% concentration?

(3 mks)

(c) (i) Two blends of tea costing ksh. 140 and ksh. 160 per kilogram respectively are mixed in the proportion of 2:3 by mass. The mixture is sold at ksh. 240 per kilogram. Find the gain percent

(2 mks)

(ii) In what ratio should the two blends be mixed to get a mixture that costs ksh. 148 per kilogram

(2 mks)

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

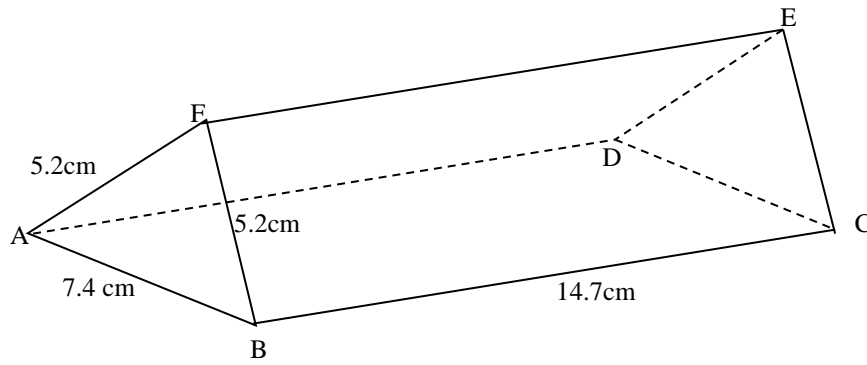
(b) Determine

(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)

21. The diagram shows a right glass prism ABCDEF with dimensions as shown.



Calculate:

(a) the perimeter of the prism (2 mks)

(b) The total surface area of the prism (3 mks)

(c) The volume of the prism (2 mks)

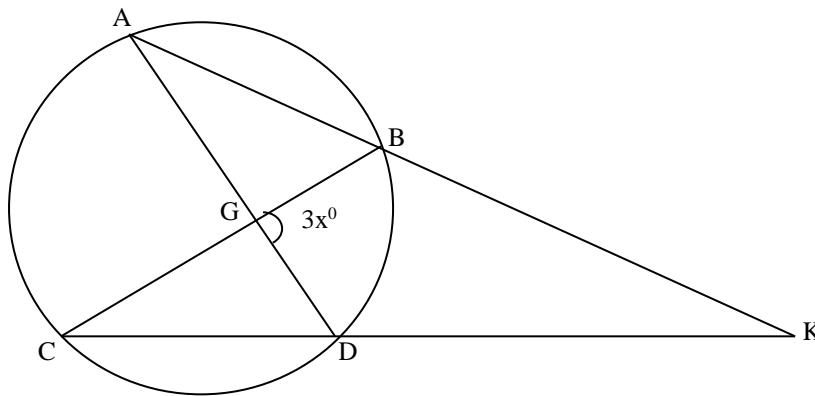
(d) The angle between the planes AFED and BCEF (3 mks)

22. (a) Show by shading the unwanted region the area represented by $4y < x + 11$, $x \geq 1$, $x + y \leq 9$ and $5y > 3x - 3$ on the grid provided (8 mks)

(b) Calculate the area of the enclosed region

(2 mks)

23.



The figure above shows a circle in which chords AD and BC intersect at G. chords AB and CD produced meet at K.

(a) If $\angle BGD = 3x^\circ$ and $\angle CGD = 2x$, determine the size of $\angle BGA$ (2 mks)

(b) Given that $KB = 5$ cm, $KC = 15$ cm and $KD = 7$ cm, determine the length of KA (3 mks)

(c) Giving reasons for your answer, show that triangle KDA and KBC are similar (5 mks)

24. Construct triangle ABC in which $AB = 4.4$ cm, $BC = 6.4$ cm and $AC = 7.4$ cm.

Construct an escribed circle opposite angle ACB (5 mks)

(a) Measure the radius of the circle (1 mk)

(b) Measure the acute angle subtended at the centre of the circle by AB (1 mk)

(c) A point P moves such that it is always outside the circle but within triangle AOB, where O is the centre of the escribed circle. Show by shading the region within which P lies. (3 mks)