NAME: …… **INDEX**……...……

SCHOOL: ……

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MATHEMATICS
PAPER 1
JULY / AUGUST 2007
2½ HOURS

BOMET DISTRICT MOCK EXAMINATION
Kenya Certificate Of Secondary Education 2007

121 / 1
MATHEMATICS
PAPER 1
JULY / AUGUST 2007

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, 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 16 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)

Answer All the question in this section.

1. **Evaluate:** $\dfrac{4 \times 6 + \dfrac{1}{25} \div 0.05 + \dfrac{1}{5}}{(-3) \div (-6) + (23) - 6 \; of \; 3}$ (3mks)

2. **Simplify** the expression $\dfrac{2x^2 - 3xy - 2y^2}{4x^2 - y^2} \div \dfrac{2x + y}{2x - y}$ (4mks)

3. The price of foodstuff generally increased by 20% at the beginning of a drought season and reduced by 30% during harvesting season. **Express** the new price as a ratio of the original price in its lower form. (3mks)

4. Find the integral values of x which satisfy the inequalities: $\begin{matrix} 15 - 2x > 4 \\ 4 < 3x - 2 \end{matrix}$ (4mks)

5. A circle of radius 15cm is divided into ten equal sectors. In each sector, **find**:

   (a) The area of the triangle (2mks)

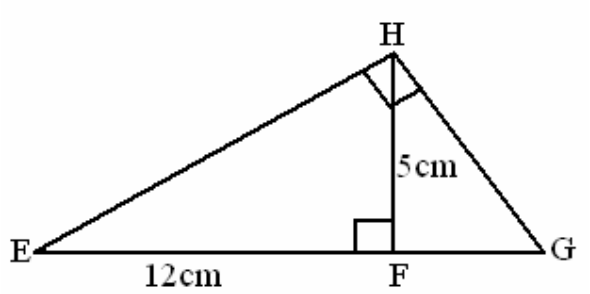
   (b) The area of the segment (2mks)

6. Tap A fills a water tank in 30min, B in 20mins and C in 10mins. All three taps are turned on from 8:55a.m to 8.59a.m and then C is turned off. At what time will the tank be filled after C has been closed? (3mks)

7. The logarithms of the squares of a and b are 1.204 and 0.954 respectively. **Find** the logarithms of their product. (2mks)

8. The mean of a set of n numbers is 28. If an extra number 18 is included in the set, the mean now becomes 26. **Find** the value of n (2mks)

9. In the figure below, $\angle EHG = \angle EFH = 90^0$ HF = 5cm, and EF = 12cm. calculate the lengths HG and FG. (4mks)



10. The line y = mx + 6 makes an angle of 75^0 58 with x – axis. **Find** the coordinates of the point where the line cuts the x-axis. (3mks)

11. Find the equation of the image of the line y = 3x + 5 under reflection in the line x = y. (3mks)

12. Given that log y = 3.143 and log x = 2.421, **evaluate**: $4 \log y^{1/2} + \log \sqrt[3]{x}$ (3mks)

13. (i) **Express** 98 and 72 as products of their prime factors. (1mk)

(ii) A rectangle of side 98cm by 72cm is divided into squares each of side x cm. **Find** the greatest value of x. (2mks)

14. The co-ordinates of points A, B and C are (0, -4), (2, -1) and (4, 2) respectively. **Use** vectors to show that the points A, B and C are collinear. (3mks)

15. If $2^{x+y} = 16$ *and* $4^{2x-y} = \frac{1}{4}$, find the ratio y – x : 2y (3mks)

16. **Determine** the lower quartile, upper quartile and the quartile deviation for the following set of numbers. 5, 10, 6, 5, 8, 7, 3, 2, 7, 8, 9. (3mks)

SECTION II (50 MARKS)

Answer any FIVE Questions from this section

17. The following are masses of 25 students in form 4 class.

49, 51, 50, 60, 55

45, 56, 51, 58, 59

44, 42, 59, 50, 62

46, 43, 57, 56, 52

43, 41, 40, 54, 44

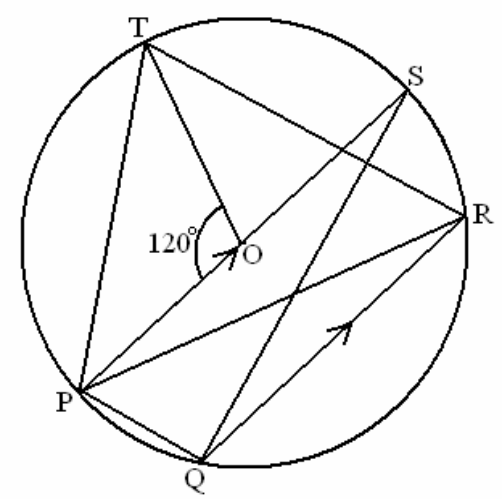
(a) **Draw** a frequency distribution table with the lower class 40 – 43 (4mks)

(b) **Estimate** the median mass (3mks)

(c) **Draw** a histogram for the data. (3mks)

GRAPH

18. In the figure below O is the centre and PS is a diameter of the circle. QR is parallel to PS. If angle PSQ is 25^0 and angle POT is 120^0, **find** the sizes of the given angles giving reasons.



(a) Angle QRT (3mks)

(b) Angle QPT (2mks)

(c) Angle PQR (3mks)

(d) Angle PTR (2mks)

19. A bus left Nairobi at 7.00a.m and travelled towards Eldoret at an average speed of 80Km/hr. At 7.45a.m a car left Eldoret towards Nairobi at an average speed of 120Km/hr. the distance between Nairobi and Eldoret is 300km. **Calculate**:

(a) The time the bus arrived at Eldoret. (2mks)

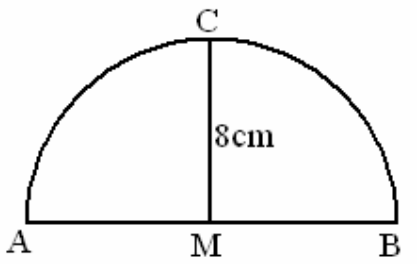
(b) The time of the day, the two vehicles met. (4mks)

(c) The distance from Nairobi where the two vehicles met. (2mks)

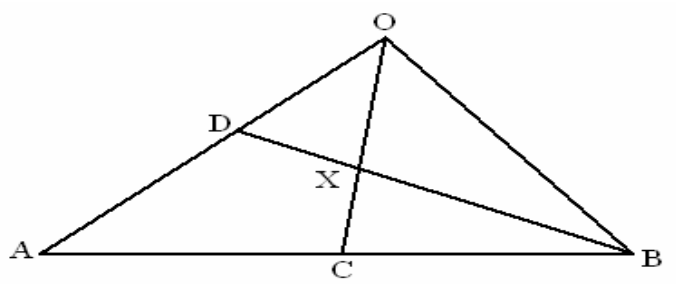
(d) The distance of the bus from Eldoret when the car arrived at Nairobi. (2mks)

20. A three digit number is such that the sum of its hundreds and tens digits is 10. When the number is divided by its hundreds digit, the quotient is 108. If the number is divided by the sum of all the digits, the quotient is 36. **Find** the number (10mks)

21. The figure below represents the cross-section of a tunnel. The cross-section is in the form of a major segment of a circle. M is the mid-point of AB and CM is perpendicular to AB. Given that AB = CM = 8cm, **Calculate** the volume of the tunnel if it is 15cm long. (10mks)



22. In the figure below C is a point on AB such that $\underset{\sim}{BA} = 3\underset{\sim}{BC}$ and D is the mid-point of OA. OC and BD intersect at X Given that $\underset{\sim}{OA} = \underset{\sim}{a}$ and $\underset{\sim}{OB} = \underset{\sim}{b}$



(a) **Write** down in terms of $\underset{\sim}{a}$ and $\underset{\sim}{b}$ the vectors.

(i) $\underset{\sim}{AB}$ (1mk)

(ii) $\underset{\sim}{OC}$ (2mks)

(iii) $\underset{\sim}{BD}$ (1mk)

(b) If $\underset{\sim}{BX} = \text{h}.\underset{\sim}{BD}$, express $\underset{\sim}{OX}$ in terms of $\underset{\sim}{a}$, $\underset{\sim}{b}$ and h (1mk)

(c) If $\underset{\sim}{OX} = \text{k}\underset{\sim}{OC}$, find h and k (4mks)

(d) Hence express $\underset{\sim}{OX}$ in terms of $\underset{\sim}{a}$ and $\underset{\sim}{b}$ only. (1mk)

23. (a) **Complete** the table below, giving your values correct to 2 decimal places.

x^0	0	15	30	45	60	75	90	105	120	135	150	165	180
Cos 2x	1.0		0.5	0		-0.87	-1.0		-0.5		0.5	0.87	0
Cos (2x + 30)		0.5	0	-0.5		-1.0		-0.5	0		0.87	1.0	0.87

(2mks)

(b) Using the grid provided, on the same axes **draw** the graphs of y = Cos 2x and y = Cos $(2x + 30^0)$

Use the scale 1cm for 15^0 on the x – axis, 5cm for 1 unit on y-axis. (5mks)

graph

(c) **State** the amplitude of each graph. (1mk)

(d) Use your graph to **determine**:

(i) The solution to the equation: Cos (2x + 30) – Cos 2x = 0. (1mk)

(ii) The transformation that would map the graph of y = Cos 2x onto the graph of y = Cos (2x + 30) (1mk)

24. (a) Three villages A, B and C are such that B is 3km on a bearing of 030^0 from A, C is 4km on a bearing of 120^0 from B.

(i) Using a scale of 1cm to represent 0.5km, **draw** a diagram to show the relative positions of the village A, B and C. (3mks)

(ii) **Find** the distance and bearing of village A from C. (2mks)

(iii) A straight main road runs from village A to C. **Find** the length of the shortest path from village B to the main road. (1mk)

(b) The measurements (in metres) of a field were given in a field note book as follows:

Base line XY = 240m

	Y	
To R 60	190	
	150	50 To P
To Q 60	120	
To T 30	50	20 To M
	X	

(i) **Make** a sketch of the field (1mk)

(ii) **Find** the area of the field in hectares. (3mks)