

NAME:.....INDEXDATE.....

SCHOOL:.....SIGNATURE.....

121/1
MATHEMATICS
PAPER 1
JULY / AUGUST, 2010
2½ HOURS

KISUMU NORTH AND EAST DISTRICTS JOINT TEST Kenya Certificate of Secondary Education 2010

121/1
MATHEMATICS
PAPER 1
JULY / AUGUST 2010

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 16 pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

SECTION I (Answer all questions in this section – 50 MARKS)

1. Find the equation of a line passing through point (-3, 5) and perpendicular to the line $2y + x - 3 = 0$, answer in the form of $ay + bx + c = 0$ (3mks)

2. Factorize completely: $75x^2 - 27y^2$ (2mks)

3. A minibus covered a distance of 210km at an average speed of 90km/h. If it travelled $\frac{2}{3}$ of the distance at a speed of 105 km/h, at what speed did it travel the rest of the distance? (3mks)

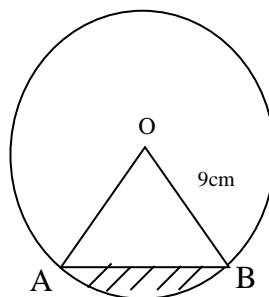
4. Find the value of x if $49^{x+1} + 7^{2x} = 350$ (3mks)

5. Without using log tables or a calculator; solve (4mks)

$$\frac{\log \frac{1}{4} + \log 64}{\log \frac{1}{3^2} - \log \frac{1}{8}}$$

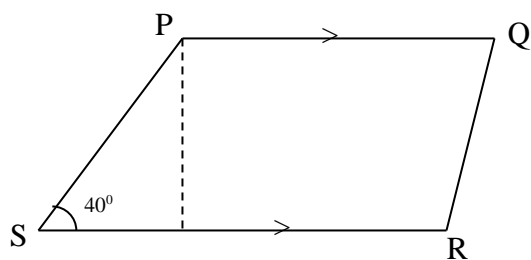
6. The sides of a triangle are in the ratio 3:5:6. If its perimeter is 56 cm, use the Hero's formula to find its area (4mks)

7. The figure below shows a circle of radius 9cm and centre O. Chord AB is 7cm long. Calculate the area of the shaded region. (4mks)



8. Given that $\tan \theta = \frac{11}{60}$ and θ is an acute angle, find without using tables $\cos (90 - \theta)$ (2mks)

9. PQRS is a trapezium in which PQ is parallel to SR, $PQ = 6\text{cm}$, $SR = 12\text{cm}$, $\angle PSR = 40^\circ$ and $PS = 10\text{cm}$. Calculate the area of the trapezium. (4mks)



10. A farmer made a loss of 28% by selling a goat for Sh.1440. What percentage profit would he have made if he had sold the goat for Sh.2100? (3mks)

11. Find x in $2(4^x) - 10(2^x) + 8 = 0$ (4mks)

12. Solve for θ if $-\frac{1}{4} \sin (2\theta + 30) = 0.1607$, $0 \leq \theta \leq 360^\circ$ (3mks)

13. A coffee blender mixes grade A and B in the ratio 3:2 respectively. If grade A costs Sh.30 per kg and B Sh.25 per kg, at what price per kg should he sell the mixture in order to make a profit of 15%? (2mks)

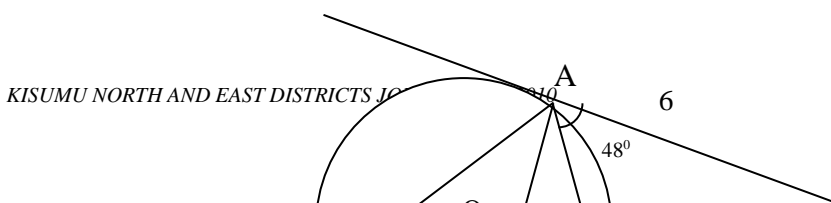
14. Simplify $(0.00243)^{\frac{2}{5}} \times (0.0009)^{\frac{1}{2}}$ without using tables or calculator. (3mks)

15. Two buses P and Q leave Kisumu at 7.30 am and 9.30 am respectively. If their speeds are 60km/h and 100km/h respectively, find when Q catches up with P. (3mks)

16. Solve the inequality below and write down the integral values that satisfy the equality $-3x + 2 < x + 6 \leq 17 - 2x$ (3 mks)

SECTION II (Answer any five questions in this section 50 - MARKS)

17. In the figure below, TA is a tangent to the circle ABCD with centre O. $\angle TAD = 48^\circ$ and $\angle BOD = 116^\circ$



Giving reasons calculate:

a) $\angle ACD$ (2mks)

b) $\angle ABO$ (2mks)

c) $\angle ADO$ (2mks)

d) $\angle ACB$ (2mks)

e) $\angle ATB$ (2mks)

18. A(3, 7), B(5, 5), C(3, 1), D(1, 5)

a) On the grid provided in the next page, plot ABCD on a Cartesian plane (2mks)

b) $A'B'C'D'$ is the image of $ABCD$ under a translation $T\begin{pmatrix} -6 \\ -9 \end{pmatrix}$. Plot $A'B'C'D'$ and state its coordinates. (2mks)

c) Plot $A''B''C''D''$, the image of $A'B'C'D'$ after a rotation about $(-1, 0)$ through a positive quarter turn. State its coordinates. (3mks)

d) $A'''B'''C'''D'''$ is the image of $A''B''C''D''$ after a reflection in the line $y=x+2$. Plot $A'''B'''C'''D'''$ and state its coordinates (3 mks)

19. Plot a graph of $y = 2x^2 + 3x - 5$, $-4 \leq x \leq 2$ by completing the table below.

x	-4	-3	-2	-1	0	1	2
---	----	----	----	----	---	---	---

$2x^2$		-18			0		
$3x$	-12			-3			6
-5							
y			-3			0	

Use your graph to solve

(i) $2x^2 + 3x - 5 = 0$

(ii) $2x^2 + 6x - 2 = 0$

20. The table below shows the length of a sorted orange tree

Class	118 - 126	127 - 135	136 - 144	145 - 153	154 - 162	163 - 171	172 - 180
-------	-----------	-----------	-----------	-----------	-----------	-----------	-----------

Frequency	3	4	10	12	5	4	2
-----------	---	---	----	----	---	---	---

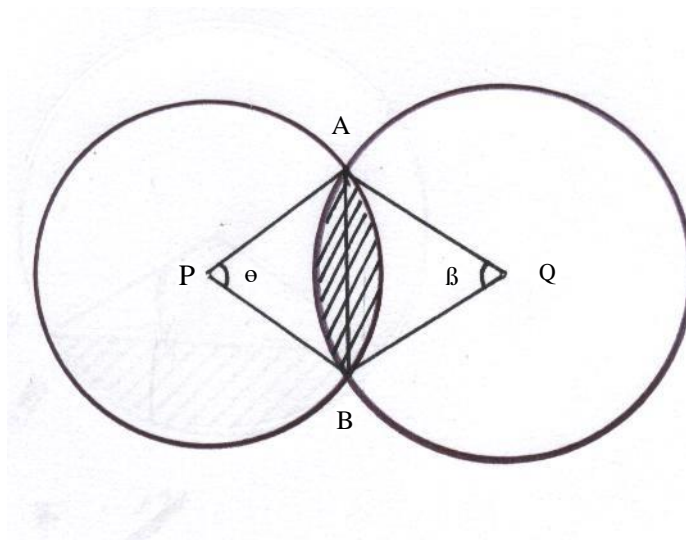
State the modal and median classes.

Calculate:

a) The median length

b) The mean length

21. The figure below shows two intersecting circles with centres P and Q of radius 8cm and 10cm respectively. Length $AB = 12\text{cm}$



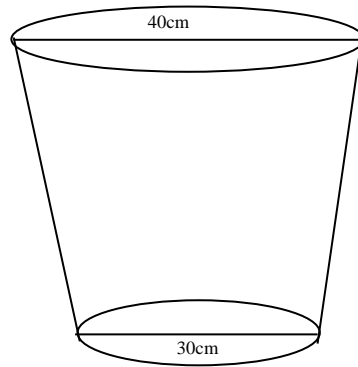
Calculate:

a) $\angle APB$ (2mks)

b) $\angle AQB$ (2mks)

c) Area of the shaded region (6mks)

22. The figure below shows a bucket of depth 30cm used to fill a cylindrical tank of radius 1.2m and height 1.35m which is initially three-fifth full of water.



a) Calculate, in terms of Π ;

(i) The capacity of the bucket in litres (5mks)

(ii) The volume of water required to fill the tank in litres (2mks)

(iii) Calculate the number of buckets that must be drawn to fill the tank (3mks)

23. A drapper bought some shirts and some trousers from a wholesaler Y at Sh.200 per shirt and Sh.600 per trouser, spending a total of Sh.22, 000. If he had bought the same items from wholesaler X, he would have paid 25% more for a shirt and 15% less for a trouser and he would have spent Sh.700 more.

a) Write a simultaneous equation to represent the above information.

(1mk)

b) Determine the number of each item he bought

(3mks)

c) He sold all the items as a profit of 50% per shirt and 30% per trouser. Find the total profit he made if he bought from wholesaler X.

(3mks)

d) Calculate to the nearest whole number, the percentage profit he made if he bought from wholesale Y

(3mks)

24. (a) Using a ruler and a pair of compasses only, construct a parallelogram PQRS in which $PQ = 8\text{cm}$, $QR = 6\text{cm}$ and $\angle PQR = 150^\circ$

(3 mks)

(b) Drop a perpendicular from S to meet PQ at B. Measure SB and hence calculate the area of the parallelogram. (5 mks)

(c) Mark a point A on BS produced such that the area of triangle APQ is equal to three quarters the area of the parallelogram (1 mk)

(d) Determine the height of the triangle. (1 mk)