

**MATHEMATICS PAPER 1 K.C.S.E 1995 QUESTIONS**  
**SECTION 1 (52 MARKS)**

*Answer all the questions in this section*

1. Without using logarithms tables evaluate ( 3 marks)

$$\sqrt{\frac{384.16 \times 0.0625}{96.04}}$$

2. Simplify ( 3 marks)

$$\frac{2x-2}{6x^2-x-12} \div \frac{x-1}{2x-3}$$

3. Every week the number of absentees in a school was recorded. This was done for 39 weeks these observations were tabulated as shown below

Number of absentees	0.3	4 -7	8 -11	12 - 15	16 - 19	20 - 23
(Number of weeks)	6	9	8	11	3	2

Estimate the median absentee rate per week in the school ( 2 marks)

4. Manyatta village is 74 km North West of Nyangata village. Chamwe village is 42 km west of Nyangate. By using an appropriate scale drawing, find the bearing of Chamwe from Manyatta ( 2 marks)

5. A perpendicular to the line  $-4x + 3 = 0$  passes through the point ( 8, 5) Determine its equation ( 2 marks)

6. The volume  $V\text{cm}^3$  of an object is given by

$$V = \frac{2}{3} \pi r^3 \left( \frac{1-2}{sc^2} \right)$$

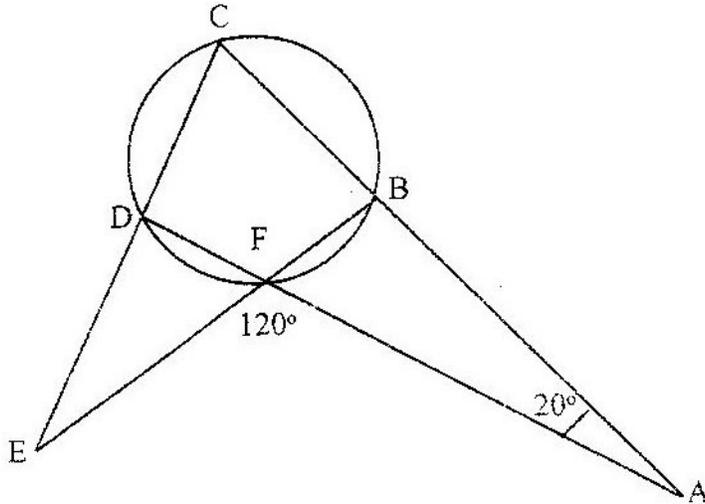
Express in term of  $\pi$  r, s and V ( 3 marks)

8. Two baskets A and B each contains a mixture of oranges and lemons. Basket A contains 26 oranges and 13 lemons. Basket B contains 18 oranges and 15 lemons. A child selected basket at random and picked at random a fruit from it. Determine the probability that the fruit picked was an orange.

9. A solid cone of height 12cm and radius 9 cm is recast into a solid sphere. Calculate the surface area of the sphere. ( 4 marks)

10. The first, the third and the seventh terms of an increasing arithmetic progression are three consecutive terms of a geometric progression. In the first term of the arithmetic progression is 10 find the common difference of the arithmetic progression. ( 4 marks)

11. Akinyi bought maize and beans from a wholesaler. She then mixed the maize and beans in the ratio 4:3 she bought the maize at Kshs. 12 per kg and the beans at 4 per kg. If she was to make a profit of 30% what should be the selling price of 1 kg of the mixture? (4 marks)
12. A clothes dealer sold 3 shirts and 2 trousers for Kshs. 840 and 4 shirts and 5 trousers for Kshs 1680. Form a matrix equation to represent the above information. Hence find the cost of 1 shirt and the cost of 1 trouser. (4 marks)
13. Water flows from a tap. At the rate  $27\text{cm}^3$  per second, into a rectangular container of length 60cm, breadth 30 cm and height 40 cm. If at 6.00 p.m. the container was half full, what will be the height of water at 6.04 pm? (3 marks)
14. In the diagram below  $\angle CAD = 20^\circ$ ,  $\angle AFE = 120^\circ$  and BCDF is a cyclic quadrilateral. Find  $\angle FED$ . (3 marks)



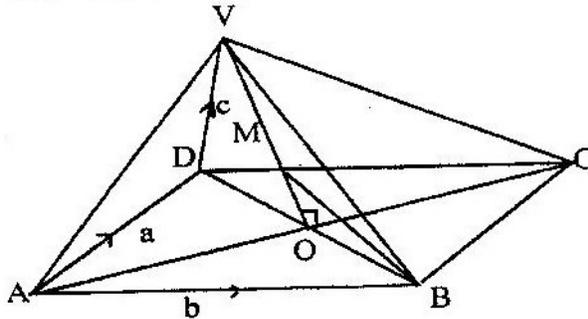
15. The cash price of a television is Kshs 25000. A customer paid a deposit of Kshs 3750. He repaid the amount owing in 24 equal monthly installments. If simple interest was charged at the rate of 40% p.a, how much was each installment? (4 marks)
16. A bus takes 195 minutes to travel a distance of  $(2x + 30)$  km at an average speed of  $(x - 20)$  km/h. Calculate the actual distance traveled. Give your answers in kilometers. (3 marks)

**SECTION II ( 48 MARKS)**

*Answer any six questions from this section*

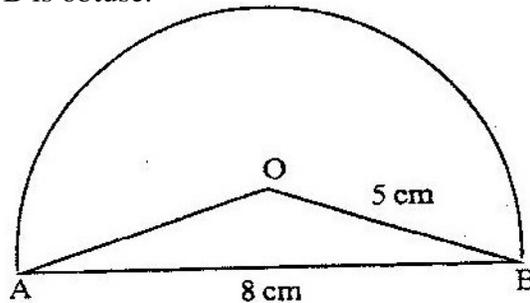
17. At the beginning of every year, a man deposited Kshs 10,000 in a financial institution which paid compound interest at the rate of 20% p.a. He stopped further deposits after three years. The Money remained invested in the financial institution for a further eight years.
- (a) How much money did he have at the end of the first three years ( 4 marks)
- (b) How much interest did the money generate in the entire period ( 4 marks)

18. The figure below is a right pyramid with a rectangular base ABCD and VO as the height. The vectors  $AD = a$ ,  $AB = b$  and  $DV = c$



- a) Express
- (i)  $AV$  in terms of  $a$  and  $c$  ( 1 mark)
- (ii)  $BV$  in terms of  $a$ ,  $b$  and  $c$  ( 2 marks)
- (b)  $M$  is point on  $OV$  such that  $OM: MV = 3:4$ , Express  $BM$  in terms of  $a$ ,  $b$  and  $c$ .  
Simplify your answer as far as possible ( 5 marks)

19. (a) In the figure below  $O$  is the centre of a circle whose radius is 5 cm  $AB = 8$  cm and  $\angle AOB$  is obtuse.



- Calculate the area of the major segment ( 6 marks)
- (b) A wheel rotates at 300 revolutions per minute. Calculate the angle in radians through which a point on the wheel turns in one second.

20. The table shows the height metres of an object thrown vertically upwards varies with the time  $t$  seconds

The relationship between  $s$  and  $t$  is represented by the equations  $s = at^2 + bt + 10$  where  $a$  and  $b$  are constants.

t	0	1	2	3	4	5	6	7	8	9	10
s		45.1									

- (a) (i) Using the information in the table, determine the values of  $a$  and  $b$  ( 2 marks)  
(ii) Complete the table ( 1 mark)
- (b) (i) Draw a graph to represent the relationship between  $s$  and  $t$  ( 3 marks)  
(ii) Using the graph determine the velocity of the object when  $t = 5$  seconds (2 marks)
21. (a) Construct a table of values for the function  $y = x^2 - 6$  for  $-3 < x < 4$  ( 2 marks)  
(b) By drawing a suitable line on the same grid estimate the roots of the equation  $x^2 + 2x - 2 = 0$  ( 3 marks)
22. The figure below represents a plot of land ABCD, where  $BC = CD = 60$  metres,  $\angle BCD = 120^\circ$ ,  $\angle ABC = 75^\circ$  and  $\angle ADC = 85^\circ$
- (a) Calculate the distance from B to through D ( 5 marks)  
(b) The plot is to be fenced using poles that are 3 metres apart except at corner A, where the two poles next to the corner pole are each less than 3 metres from A. Calculate the distance from the pole at corner A to each of the poles next to it.
23. On the grid provided on the opposite page ABCE is a trapezium
- (a) ABCD is mapped onto A'B'C'D' by a positive quarter turn. Draw the image A'B'C'D' on the grid. ( 1 mark)
- (b) A transformation maps  $\begin{pmatrix} -2 & -1 \\ 1 & -1 \end{pmatrix}$  A'B'C'D' onto A'' B'' C'' D''
- (i) Obtain the coordinates of A'' B'' C'' D'' on the grid ( 2 marks)  
(ii) Plot the image A'' B'' C'' D'' on the grid (1mark)
- (c) Determine a single matrix that maps A'' B'' C'' D'' ( 4 marks)

**MATHEMATICS PAPER 2 K.C.S.E 1995 QUESTIONS**  
**SECTION 1 (52 MARKS)**

1. Use logarithms to evaluate  $\frac{(0.07284)^2}{\sqrt[3]{0.06195}}$  ( 4 marks)

$$\frac{(0.07284)^2}{\sqrt[3]{0.06195}}$$

2. Solve the simultaneous equations ( 4 marks)
- $$\begin{aligned} 2x - y &= 3 \\ X^2 - xy &= -4 \end{aligned}$$

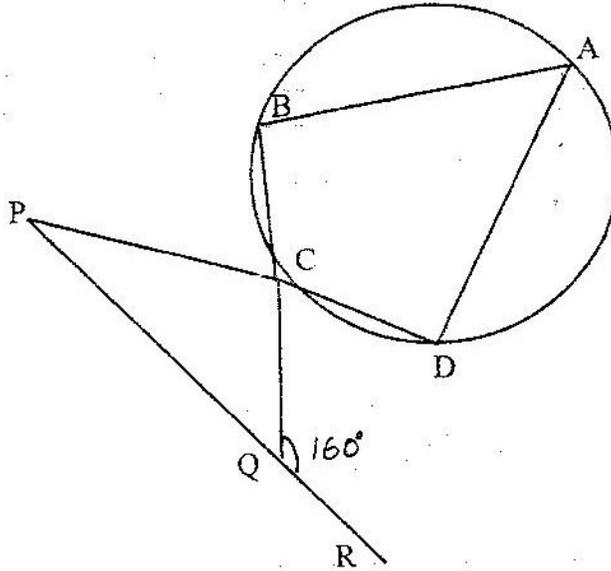
3. The tables shows the yearly percentage taxations rates.

Year	1987	1988	1989	1990	1991	1992	1993	1994
Percentage taxation rate	65	50	50	45	45	45	40	40

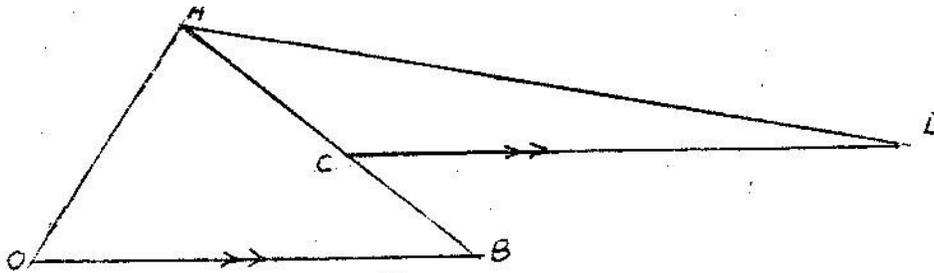
Calculate three- yearly moving averages for the data giving answers to s.f ( 3 marks)

4. Calculate volume of a prism whose length is 25cm and whose cross- section is an equilateral triangles of 3 cm
5. Find the value of x in the following equations: ( 4 marks)
- $$49^{x+1} + 7^{2x} = 350$$
6. A translation maps a point ( 1, 2) onto (-2, 2). What would be the coordinates of the object whose image is (-3, -) under the same translation?
7. The ratio of the lengths of the corresponding sides of two similar rectangular water tanks is 3:5. The volume of the smaller tank is 8.1 m<sup>3</sup>. Calculate the volume of the larger tank. ( 3 marks)
8. Simplify completely
- $$\frac{3x^2 - 1}{X^2 - 1} - \frac{2x + 1}{x + 1}$$
9. A boat moves 27 km/h in still water. It is to move from point A to a point B which is directly east of A. If the river flows from south to North at 9 km/ h, calculate the track of the boat.
10. The second and fifth terms of a geometric progressions are 16 and 2 respectively. Determine the common ratio and the first term

11. In the figure below  $CP = CQ$  and  $\angle CQP = 160^\circ$ . If  $ABCD$  is a cyclic quadrilateral, find  $\angle BAD$ .



12. In the figure below,  $OA = 3i + 3j$ ,  $OB = 8i - j$ ,  $C$  is a point on  $AB$  such that  $AC : CB = 3 : 2$ , and  $D$  is a point such that  $OB \parallel CD$  and  $2OB = CD$ .

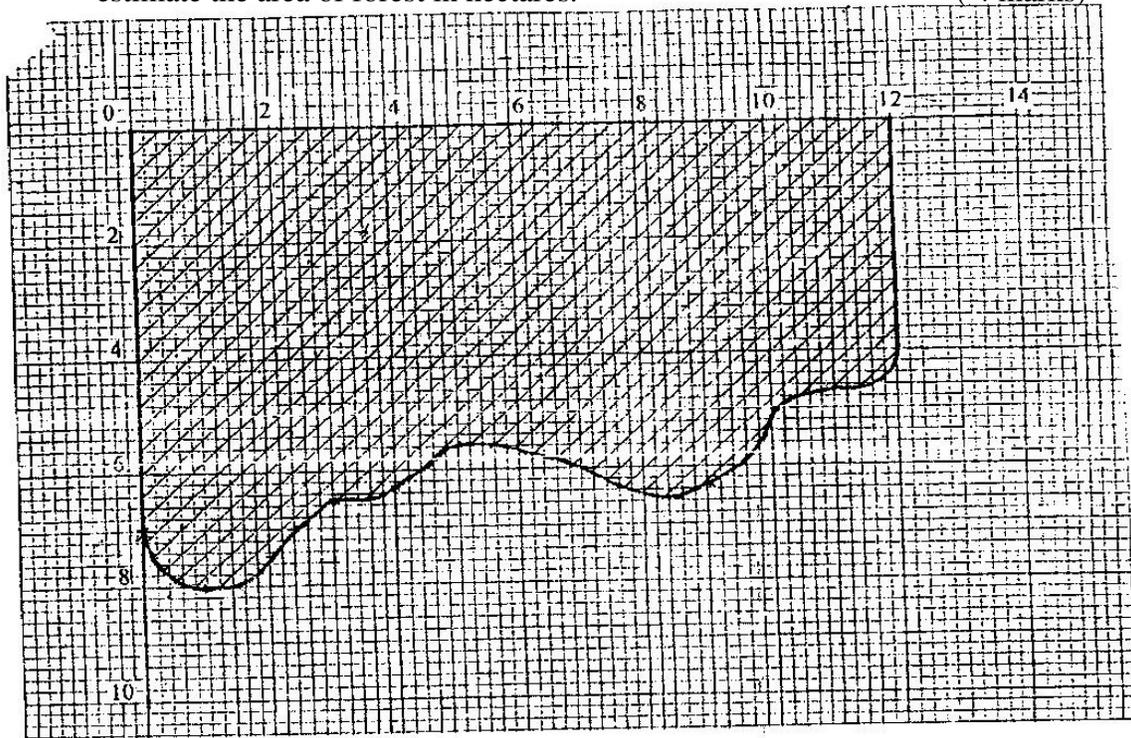


- Determine the vector  $DA$  in terms of  $i$  and  $j$ . (4 marks)
13. Without using logarithm tables, find the value of  $x$  in the equation

$$\log x^3 + \log 5x = 5 \log 2 - \log \frac{2}{5} \quad (3 \text{ marks})$$

14. Two containers, one cylindrical and one spherical, have the same volume. The height of the cylindrical container is 50 cm and its radius is 11 cm. Find the radius of the spherical container. (2 marks)
15. Two variables  $P$  and  $L$  are such that  $P$  varies partly as  $L$  and partly as the square root of  $L$ . Determine the relationship between  $P$  and  $L$  when  $L = 16$ ,  $P = 500$  and when  $L = 25$ ,  $P = 800$ . (5 marks)

16. The shaded region below represents a forest. The region has been drawn to scale where 1 cm represents 5 km. Use the mid – ordinate rule with six strips to estimate the area of forest in hectares. ( 4 marks)



### SECTION II (48 Marks)

*Answer any six questions from this section*

17. A circular path of width 14 metres surrounds a field of diameter 70 metres. The path is to be carpeted and the field is to have a concrete slab with an exception of four rectangular holes each measuring 4 metres by 3 metres. A contractor estimated the cost of carpeting the path at Kshs. 300 per square metre and the cost of putting the concrete slab at Kshs 400 per square metre. He then made a quotation which was 15% more than the total estimate. After completing the job, he realized that 20% of the quotation was not spent.
- (a) How much money was not spent?  
 (b) What was the actual cost of the contract?
18. The table below shows high altitude wind speeds recorded at a weather station in a period of 100 days.

Wind speed ( knots)	0 - 19	20 - 39	40 - 59	60-79	80- 99	100- 119	120-139	140-159	160-179
Frequency (days)	9	19	22	18	13	11	5	2	1

- (a) On the grid provided draw a cumulative frequency graph for the data ( 4 marks)
- (b) Use the graph to estimate

- (i) The interquartile range ( 3 marks)
- (ii) The number of days when the wind speed exceeded 125 knots ( 1 mark)
19. The probabilities that a husband and wife will be alive 25 years from now are 0.7 and 0.9 respectively.  
Find the probability that in 25 years time,
- (a) Both will be alive  
(b) Neither will be alive  
(c) One will be alive  
(d) At least one will be alive
20. A hillside is in the form of a plane inclined at an angle of  $30^\circ$  to the horizontal. A straight section of road 800 metres long lies along the line of greatest slope from a point A to a point B further up the hillside.
- (a) If a vehicle moves from A and B, what vertical height does it rise?  
(b) D is another point on the hillside and is on the same height as B. Another height straight road joins and D and makes an angle of  $60^\circ$  with AB. C is a point on AD such that  $AC = \frac{3}{4} AD$ .  
Calculate
- (i) The length of the road from A to C  
(ii) The distance of CB  
(iii) The angle elevation of B and C
21. A part B is on a bearing of  $080^\circ$  from a port A and at a distance of 95 km. A submarine is stationed at a port D, which is on a bearing of  $200^\circ$  from AM and a distance of 124 km from B.  
A ship leaves B and moves directly southwards to an island P, which is on a bearing of  $140^\circ$  from A. The submarine at D on realizing that the ship was heading fro the island P, decides to head straight for the island to intercept the ship  
Using a scale Of 1 cm to represent 10 km, make a scale drawing showing the relative positions of A, B, D, P.  
( 2 marks)  
Hence find
- (i) The distance from A to D ( 2 marks)  
(ii) The bearing of the submarine from the ship was setting off from B ( 1mark)  
(iii) The bearing of the island P from D ( 1 mark)  
(iv) The distance the submarine had to cover to reach the island P ( 2 marks)
22. Using ruler and compasses only, construct a parallelogram ABCD such that  $AB = 10\text{cm}$ ,  $BC = 7\text{cm}$  and  $\angle ABC = 105^\circ$ . Also construct the loci of P and Q within the parallel such that  $AP \leq 4\text{ cm}$ , and  $BC \leq 6\text{ cm}$ . Calculate the area within the parallelogram and outside the regions bounded by the loci.

23. (a) Complete the table for the function  $y = 2 \sin x$  ( 2 marks)

x	$0^0$	$10^0$	$20^0$	$30^0$	$40^0$	$50^0$	$60^0$	$70^0$	$80^0$	$90^0$	$100^0$	$110^0$	$120^0$
Sin 3x	0	0.5000											
y	0	1.00											

(b) (i) Using the values in the completed table, draw the graph of  $y = 2 \sin 3x$  for  $0^0 \leq x \leq 120^0$  on the grid provided

(ii) Hence solve the equation  $2 \sin 3x = -1.5$  ( 3 marks)

24. A manufacture of jam has 720 kg of strawberry syrup and 800 kg of mango syrup for making two types of jam, grade A and B. Each types is made by mixing strawberry and mango syrups as follows:

Grade A: 60% strawberry and 40% mango

Grade B: 30% strawberry and 70% mango

The jam is sold in 400 gram jars. The selling prices are as follows:

Grade A: Kshs. 48 per jar

Grade B: Kshs 30 per jar.

- (a) Form inequalities to represent the given information ( 3 marks)
- (b) (i) On the grid provided draw the inequalities ( 3 marks)
- (ii) From your, graph, determine the number of jars of each grade the manufacturer should produce to maximize his profit ( 1 mark)
- (iii) Calculate the total amount of money realized if all the jars are sold ( 1 mark)