

NAME.....INDEX.NO.....

SCHOOL.....CANDIDATE'S SIGNATURE.....

DATE.....

MATHEMATICS PAPER 121/1

TIME: 2 $\frac{1}{2}$ HOURS



KCSE ACHIEVERS PREDICTION



Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

- Write your **name**, **index number**, **signature** and **date** of the examination in the spaces provided
- The paper contains two sections. Section I and section II
- Answer **ALL** questions in section I and any five questions in section II
- Answers and working **must** be written on the question paper in the spaces provided below each question
- Show all steps in your calculation below each question
- Marks may be given for correct working even if the answer is wrong
- Non programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise

FOR EXAMINERS' USE ONLY

SECTION I

QUESTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL
MARKS																	

SECTION II

QUESTION	17	18	19	20	21	22	23	24	TOTAL
MARKS									

GRAND TOTAL

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SECTION I (50 MKS)

Answer all the questions in this section in the spaces provided.

1. Evaluate without using tables or a calculator the value of $\frac{1.33 \times 0.15}{0.19 \times 0.0017}$ **(3marks)**

3. Using logarithm table evaluate $\sqrt[3]{\frac{849.6 \times 2.41}{3941}}$. **(4marks)**

4. A 890kg culvert is made of a hollow cylindrical material with outer radius of 76cm and an inner radius of 62cm. It crosses a road of width 3m. Determine the density of the material used in its construction in Kg/m^3 correct to one decimal place. **(3marks)**



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5. Evaluate the value of x in $81^{x+1} + 3^{4x} = 246$.

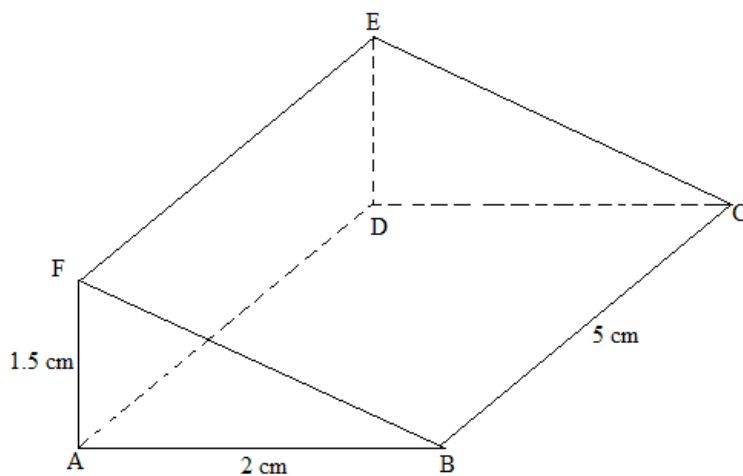
(3marks)

6. Simplify the equation $\frac{4x^2-9}{2x^2+5x+3}$.

(3marks)

7. The diagram below represents a prism whose Cross-section is a right-angled triangle. Draw the net of the solid.

(3marks)



8. During an annual general meeting at Elimu Mixed Day, goats and chicken were slaughtered. The number of heads for both chicken and goats were 45. The total number of legs were 100. Determine the exact number of goats and chicken slaughtered. **(3marks)**

9. In a mixed school there are 900 students, out of these 600 are girls.
(a) Find the ratio of boys to girls. **(2marks)**

(b) What is the percentage of boys in this school? **(1mark)**

10. Find the value of t in the equation $\frac{t-1}{3} - \frac{4+t}{4} = 0$. **(3marks)**



11. The sum of interior angles of a polygon is 1980° . Find the number of sides of the polygon and name the polygon. **(3marks)**

12. Solve the following inequalities and represent the solution on a single number line. **(3mks)**

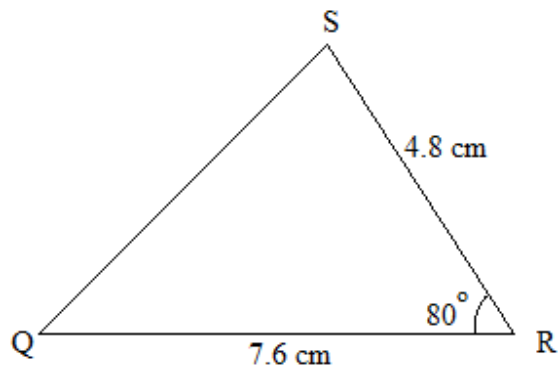
$$3-2x < 5$$

$$4-3x \geq -8$$

13. Line K whose equation is $2y - 6 = 4x$ is perpendicular to another line Q. Find the equation of line Q if it passes through point. $(-2, 7)$. **(3marks)**

14. The figure below is not drawn to scale.





Find correct to 1 decimal place;

(a) Length PQ.

(2 marks)

(b) Angle ABC

(2 marks)

15. The marked price of a car in a dealer's shop was Ksh.450 000. Kawira bought the car at 7% discount. The dealer still made a profit of 13%. Calculate the amount of money the dealer had paid for the car to the nearest shillings.

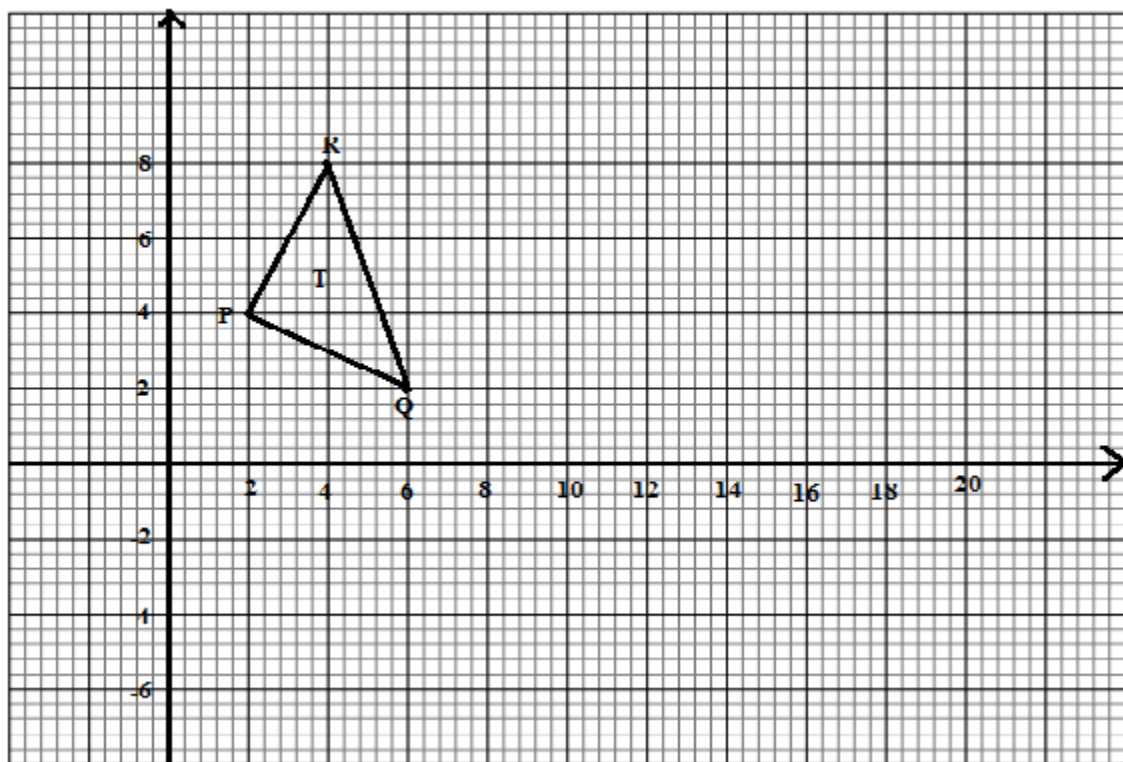
(3 marks)



16. The figure below shows triangle T with vertices P(2,4), Q(6,2) and R(4,8). It is mapped onto triangle T' with vertices P'(10,0), Q'(8,-4) and R'(14, -2) by a rotation.

(a) Draw on the same axis T' the image of triangle T.

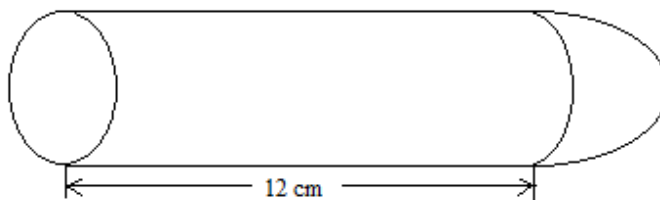
(1 mark)



(b) Determine the center and angle of rotation. (2marks)

SECTION II(50 marks). Answer only five questions in this section in the spaces provided.

17. The diagram below shows a solid made of a hemisphere and a cylinder. The radius of both the cylinder and the hemisphere is 3cm. The length of the cylinder is 12cm.



a) i) Calculate the volume of the solid.

(3marks)



ii) The solid fits in a box in the shape of a cuboid 15 cm by 6cm by 6cm. Calculate the volume of the box not occupied by the solid correct to four significant figures.

(2marks)

b) i) Calculate the total surface area of the solid correct to four significant figures.

(3marks)

ii) The surface of the solid is to be painted. One millilitre of paint covers an area of 8cm^2 . The cost of paint is Ksh 900 per litre. Calculate the cost of the paint required.

(2marks)

18. An expedition has 5 sections AB, BC, CD, DE and EA. B is 200m on a bearing of 050° from A. C is 500m from B. The bearing of B from C is 300° . D is 400m on a bearing 230° from C. E is 250m on a bearing 025° from D.

(a) Sketch the route

(1 Mark)

(b) Use the scale of 1cm to 50m to draw the accurate diagram representing the route.

(5 Marks)

(c) Use your diagram to determine

(i) Distance in metres of A from E

(2 Marks)

(ii) Bearing of E from A

(2 Marks)





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19. A trader bought 2 cows and 9 goats for a total of Ksh. 98,200. If she had bought 3 cows and 4 goats, she would have spent Ksh. 2, 200 less.

(a) Form two equations to represents the above information. **(2marks)**

(b) Use the matrix method to determine the cost of a cow and that of a goat. **(4marks)**

(c) The trader later sold the animals she had bought making a profit of 30% per cow and 40% per goats.
i) Calculate the total amount of money she received. **(2marks)**

ii) Determine corrects to 4 significant figures the percentage profit the trader made from the sale of animals. **(2marks)**



20. Two towns, Meru and Maua are 80km apart, Kimathi started cycling from Meru to Maua at 10:00 30a.m at an average speed of 40km/h. Mutuma started his journey from Maua to Meru at 10:30 a.m and travelled by car at an average speed of 60km/h.

(a) Calculate:

i) The time taken by Kimathi and Mutuma to meet.

(3marks)

ii) The distance from Meru when Kimathi and Mutuma met.

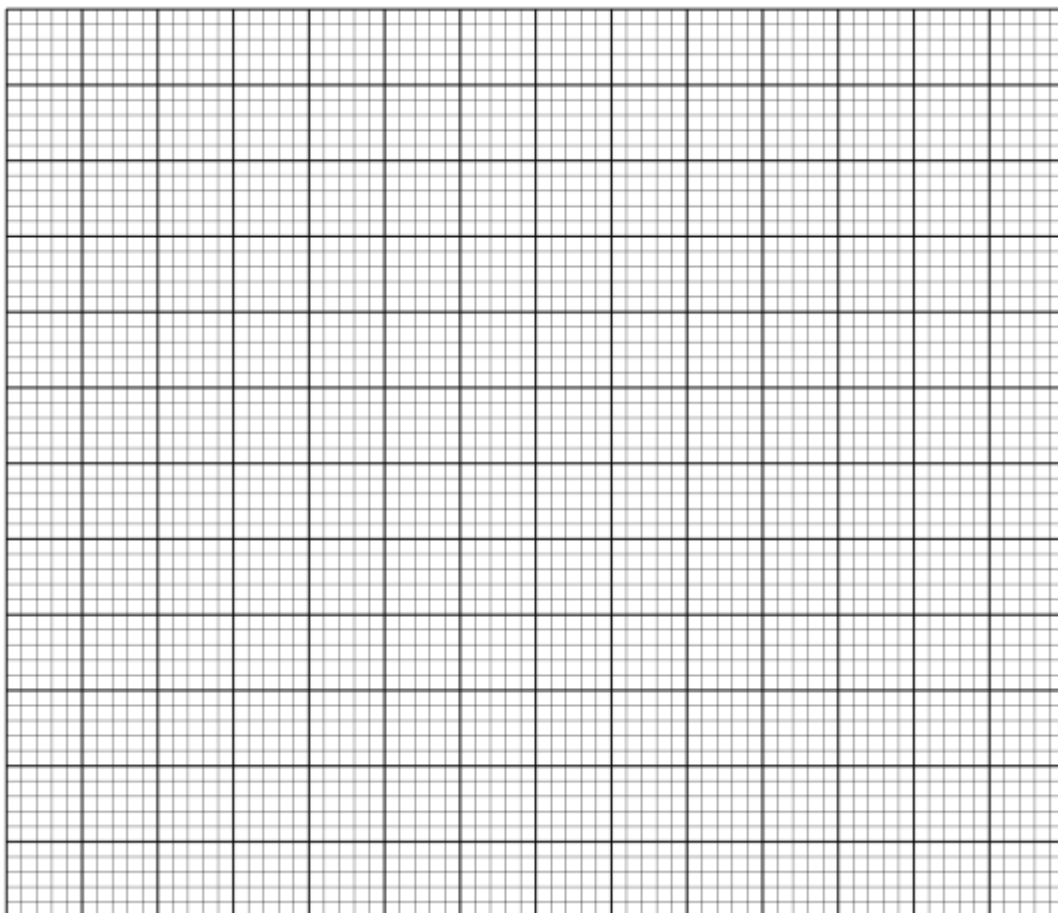
(2marks)

iii) The time of the day when the two met.

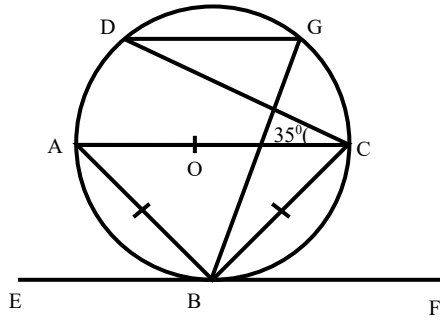
(2marks)



- (b) Murianki cycled from his home to a school 6km away in 20minutes. He stopped at the school for 5 minutes, before taking a motorbike to a town 40 km away. The motorbike travelled at 75km/h. On the grid provided, draw a distance time graph to represent Murianki's journey. **(3marks)**



21. In the figure below AOC is a diameter of the circle centre O; $AB = BC$ and $\angle ACD = 35^\circ$. EBF is a tangent to the circle at B. G is a point on the minor arc CD.



Giving reason

(a) Calculate the size of

(i) $\angle BAD$

(3 Marks)

(ii) The obtuse $\angle BOD$

(2 Marks)

(iii) $\angle BGD$

(2 Marks)

(b) Show that $\angle ABE = \angle CBF$

(3 Marks)



22. a) Solve the equation $\frac{(x+3)}{24} = \frac{1}{(x-2)}$

(4 marks)

(b). The length of a floor of a rectangular hall is 9m more than its width. The area of the floor is 36m^2 .

(i). Calculate the perimeter of the floor.

(4 marks)

(ii). A rectangular carpet is placed on the floor of the hall leaving an area of 28m^2 . If the length of the carpet is twice its width, determine the width of the carpet.

(2 marks)



23. Using a pair of compass and ruler only construct.

- (a) Triangle PQR in which $PQ = 5\text{cm}$, $\angle QPR = 30^\circ$ and $\angle PQR = 105^\circ$.

(3marks)

- (b) A circle that passes through the vertices of the triangle PQR. Measure its radius.

(3marks)

- (c) The height of triangles PQR with PQ as the base. Measure the height.

(2marks)



(d) Determine the area of the circle that has outside the triangle correct to 2 decimal places. **(2marks)**

24. (a). The equation of a line L_1 is $7y - 5x - 20 = 0$. Find the x-intercept of the equation **(1mark)**

b). Another line L_2 is perpendicular to L_1 and passes through $(-5, 3)$. Find the equation of L_2 . **(3marks)**

c). L_3 passes through $(0, -3)$ and parallel to the line L_4 whose equation is $3y - 8x = 3$ find the equation of L_3 . **(3marks)**



d). Calculate the coordinates of point of intersection between the lines L_1 and L_3 .

(3marks)

