FORM FOUR CLUSTER KCSE MODEL11

MATHEMATICS PAPER 1 QUESTIONS

SECTION 1 (50 Marks)

Answer all questions in this section in the spaces provided below each question

1. Use logarithm tables to evaluate.

$$\sqrt[3]{\frac{(319.6)^2 \times 0.024}{204.6}}$$

2. Given that sin $(2x-30)^0$ = cos $(x+60)^0$, find tan $(3x)^0$

3. Solve x $4 \leq 3x - 2 < 9 + x,$ hence list all integral values that satisfy the inequalities.

4. In a fund raising committee of 45 people, the ratio of men to women is 7 : 2. Find the number of women required to join the existing committee so that ratio of men to women is changed to 5 : 4.

5. Without using tables or calculator, evaluate:

$$\left(\frac{8}{27}\right)^{-\frac{2}{3}} \times (16)^{\frac{3}{2}} \times (81)^{\frac{3}{4}}$$

6. The volumes of the similar solid cylinders are 1408cm^3 and 4752cm^3 respectively. If the area of the curved surface of the larger cylinder is 792cm^2. Find the area of the curved surface of the smaller cylinder.

7. Simplify-:

$$\frac{15x^2y - 10xy^2}{3x^2 - 5xy + 2y^2}$$

8. Find the obtuse angle between the lines whose equations are

$$2x - 3y = 11 \text{ and } 5x + y = 6.$$

9. a) Complete the table below for values of y given that y = 2x. (1 mark)

x	-2	-1	0	1	2	3
y	0.25				4	

b) Hence find the area under the curve y = 2^x, between x = -2 and x = 3. Using trapezium rule with 5 trapezia. (2marks)

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Page 1

10. The area of a sector of a circle, radius 2.1cm is 2.31cm^2. The arc of the sector subtends an angle , at the centre of the circle. Find the value of θ in radians correct to 2 decimal places.

11. The transformation whose. Matrix is

$$\begin{pmatrix} 4 & x \\ -3x & -3 \end{pmatrix}$$

maps triangle ABC whose area is 20cm^2
onto a straight line. Find the possible values of x.

12. A plane leaves airstrip A and flies on a bearing of 040^0 to airstrip B. 500km away. The plane then flies on a bearing of 316^0 to airstrip C. The bearing of C from A is 350^0. By scale drawing determine the distance between airstrips B and C.

13. A major arc of a circle subtends an angle of 255^0 at the centre of the circle. If the diameter of the circle. If the diameter of the circle is 16.8cm, find the length of the minor arc.

$$\left(Take \ \pi = \frac{22}{7} \right)$$

14. Given that $4x^2 + R + 1 - 10x$ is a perfect square, find the value of R.

15. The figure below is a velocity time graph for a certain vehicle.
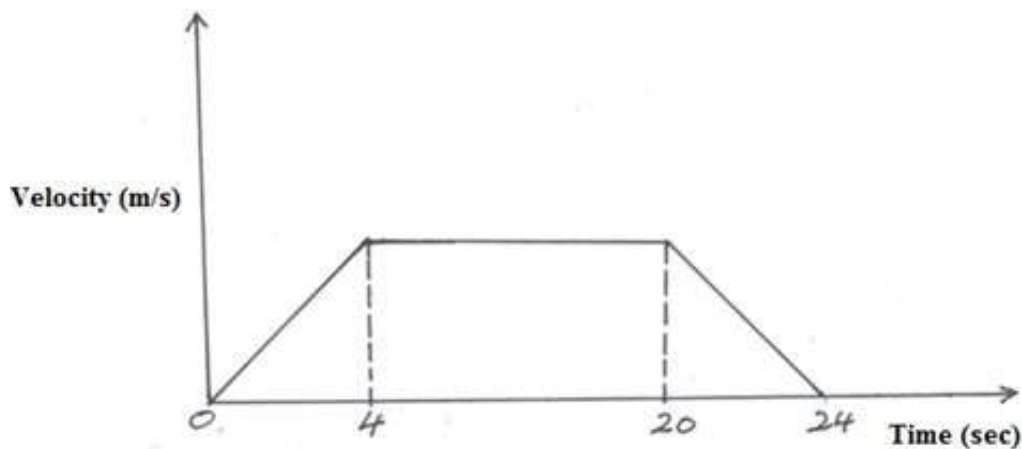
If the total distance covered by the vehicle is 1.6km, find. The maximum velocity attained by the vehicle .

SECTION II (50 Marks)

Answer only five questions

17. The table below shows the height of 40 children in a primary school.

Height (cm) -Frequency

118 – 126 -3

127 - 135-4

136 - 144-10

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Page 2

145 - 153 - 12

154 - 162 - 5

163 - 171 - 4

172 - 180 - 2

a) Determine the:

(i) Modal class. (1mark)

ii) Median class. (1mark)

b) Calculate:
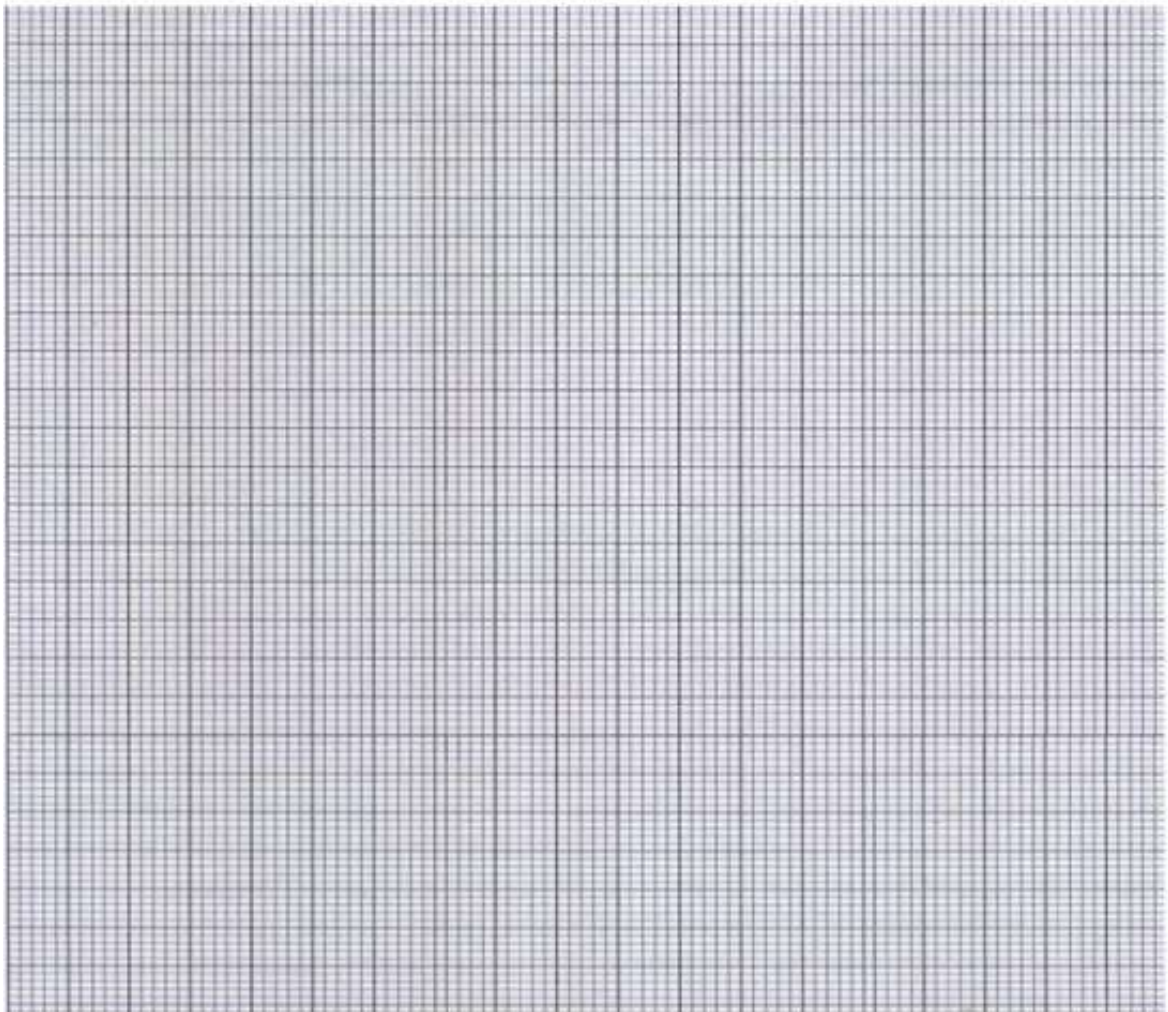
i) The mean of the children. (3marks)

ii) Median of the child. (2marks)

iii) Standard deviation of height. (3marks)

18. Oketch makes two types of trousers, A and B. He takes 3 hours to make one pair of type A and 4 hours to make one pair of type B. He works for a minimum of 120 hours to make x pairs of type A and y pairs of type B. It costs him sh. 400 to make a pair of type A and sh.150 to make a pair of type B. His total cost does not exceed sh.9000. He must make atleast 8 pairs of type A and more than 12 pairs of type B.
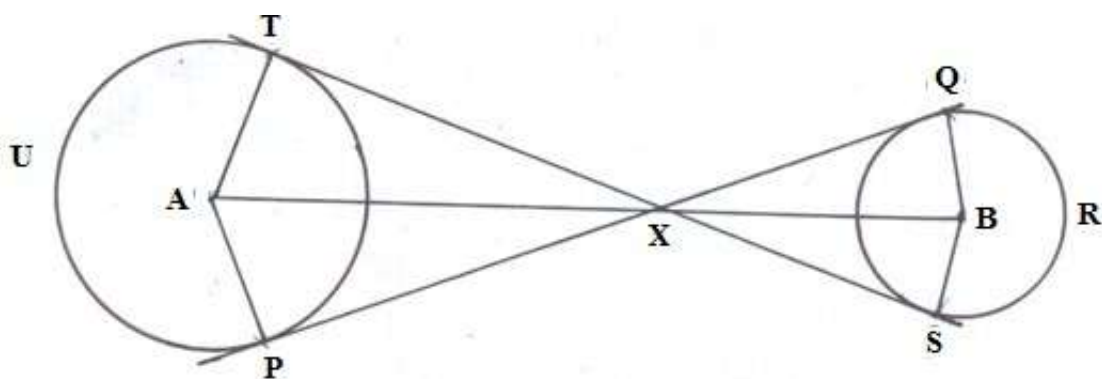
a) Write down four inequalities representing the above information. (4marks)

b) On the grid provided draw the inequalities and shade the unwanted region. (4marks)

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Page 3

c) Oketch makes a profit of sh. 40 on each pair of type A and sh.70 on each pair of type B trousers. Use the graph in part (b) above to determine the maximum possible profit he makes. (2marks)

19. a) The figure below shows two pulleys whose centres are 34cm apart. Connected by the belt PQRSTUP. The pulley centre A has radius 13cm and the pulley centre B has a radius of 4cm.
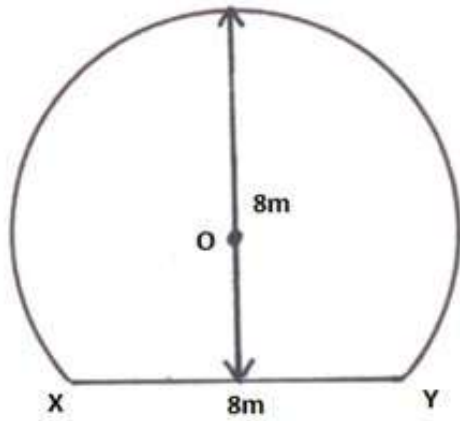

Calculate;

a) the length of PQ. (2marks)

b) the reflex angle TAP and QBS. (2marks)

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Page 4

c) the length of PUT and QRS. (4marks)

d) The total length of the belt. (2marks)

20. The diagram below shows the cross section of a tunnel.

Calculate:

a) The radius of the circle whose segment form the cross –section of the tunnel. (3marks)

b) The area of the above cross section. (5marks)

c) The volume of earth removed to make the tunnel if it is 140m long. (2marks)

21.

In the triangle ABC, $AB = 2a$, $AC = \frac{9}{2}b$. Point D lies BC such that BD : DC = 2 : 3 and point E on AC such that AE : EC = 2 : 1. Line BE intersects with AD at point X.
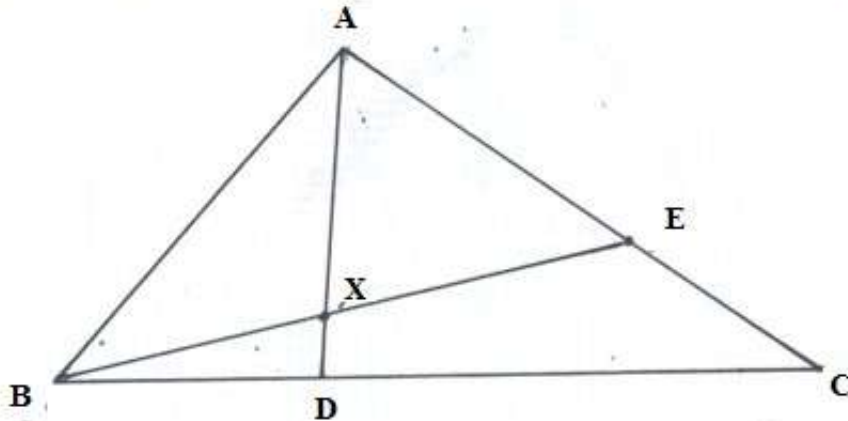
a) Express in terms of a and b only the following vectors.

i) BE (2marks)

ii) AD (2marks)

b) Given that AX =kAD and BX = hBE where k and h are scalars.

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Page 5

i) Express AX in terms of a, b and k only. (1mark)

ii) Express AX in terms of a, b and h only. (1mark)

c) Using your expressions in (b) above, find the values of k and h. (4marks)

22. A retailer bought 40kg of grade I sugar at Ksh. 65 per kg and 60kg of grade II sugar at Ksh. 27.50 per kg. He mixed the two types of sugar.

a) Find the buying price of one kilogram of the mixture. (2marks)

b) He packed the mixture into 2kg packets.

i) If he intended to make 20% profit, find the selling price per packet. (3marks)

ii) He sold 8 packets and then reduced the price by 10% in order to attract customers. Find the new selling price per packet. (2marks)

iii) After selling $\frac{1}{3}$ of the remainder at the reduced price, he raised the price so that he can realize the original goal of 20% profit overall. Find the new selling price per packet of the remaining sugar. (3marks)

23. A triangle has vertices A(-4, 1), B(1, -3) and C(-2,-4)

a) Draw triangle ABC on the Cartesian plane. (1mark)

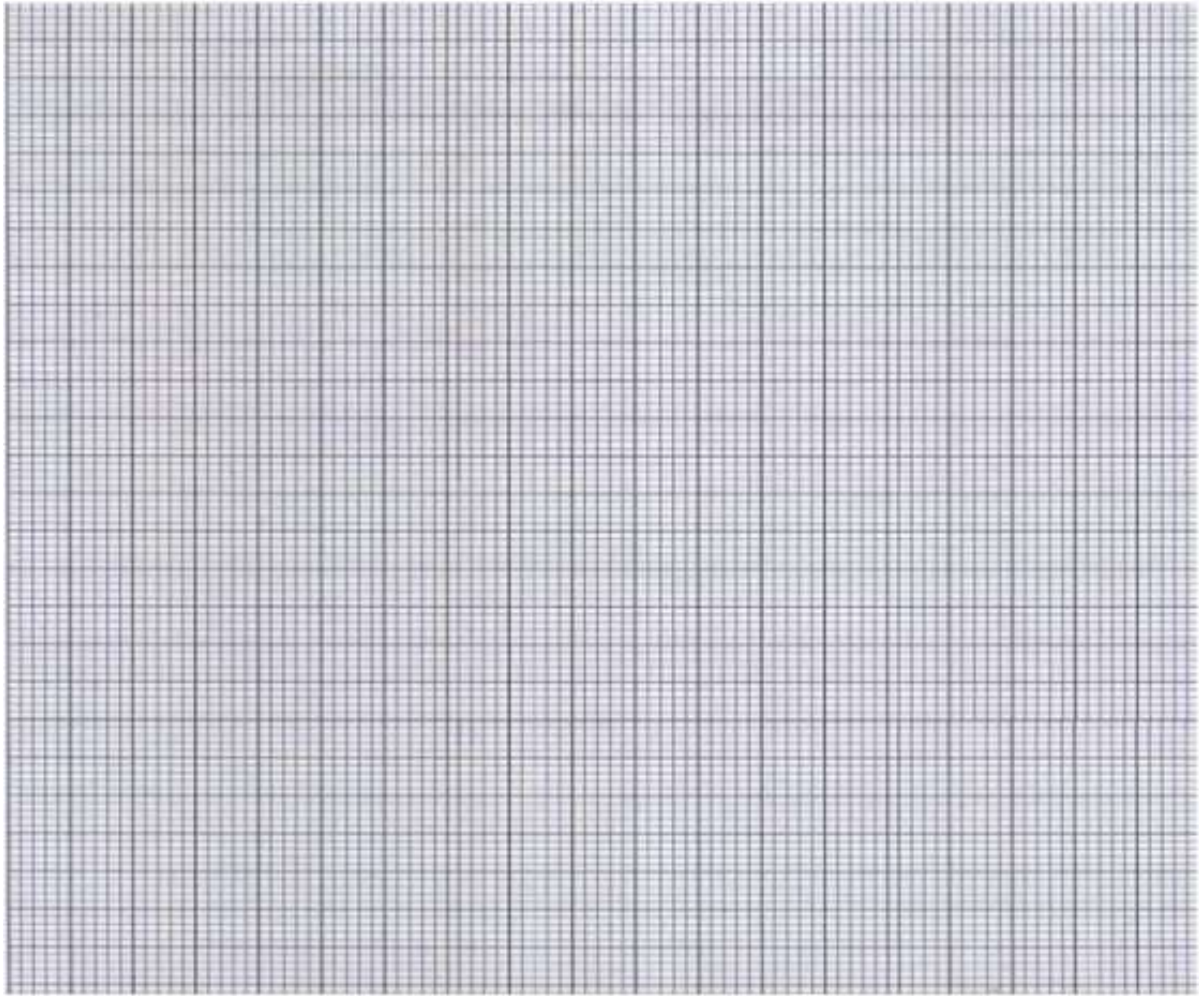b) Construct the image of ABC under reflection in the line y = -x. (3marks)

c) Construct triangle $A^{11}B^{11}C^{11}$, the image of triangle $A^1B^1C^1$ under the rotation of $+90^0$ about the origin. (3marks)

d) Construct the triangle $A_3B_3C_3$ the image of triangle $A_{11}B_{11}C_{11}$ under an enlargement scale factor -2 centre (-1, 0). Write down coordinates. (3marks)

24. a) Complete the table below for y= cos x and y = 2 sin x. (2marks)

x	-90	-60	-30	0	30	60	90	120	150	180	210	240	270
Cosx	0.00	0.50			0.87			-0.50		-1.00		-0.50	0.00
2sin x	-2.00		-1.00		1.00	1.73			1.00		-1.00		-2.00

b) On the grid provided, draw the graphs of y = cos x and y = 2sin x for $-90^0 \le x \le 270^0$. On the same set of axes, taking a scale of 2cm to represent 30^0 on x –axis and 2cm to represent 1 unit on y – axis. (5marks)

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Page 6

c) From your graph in (b) above.

i) Solve the equation $Sin\ x - \dfrac{1}{2}\cos x = 0.$

(1 mark)

ii) State the period and amplitude of the curve y = 2 sin x. (2marks)

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Page 7