FORM FOUR CLUSTER KCSE MODEL8

MATHEMATICS PAPER 1 QUESTION

SECTION I (50 Marks)

Answer ALL questions

1. Use the factor method to evaluate

$$\frac{(13{,}824\times 0.000125)^{\frac{1}{3}}}{1{,}1664^{\frac{1}{2}}}$$

and leave your answer in the form $\frac{a}{b}$ where a and b are integers.

2. Factorize completely

$$(5x-4)^2\ (-3x-1)^2$$

3. Solve for x in the inequalities below and hence find the sum of all possible integral primo numbers satisfying the inequalities.

$$\frac{1}{4}x-1<\frac{1}{2}x+1\leq\frac{1}{3}x+4$$

4. Find the exact value of x if:

$$13^{x+1}-13^{x-2}-4824612=0$$

5. The point (-4, 5) is the image of the point (3,-10) under a translation. Find the coordinates of the point whose image is (-1,-3) under this translation.
6. Determine the equation of a straight line which passes through (2,4) and is parallel to a line y-3x=4

7. Given that x is an acute angle and Sin 3x = Cos 2x. Find tan x

8. The marks of a practical examination for 40 students is as follow

Marks	5 - 9	10 - 14	15 - 19	20 - 24	25 -34	35 - 39
No. of students	3	8	12	10	4	3

Estimate the median mark

9. The interior angle of a regular polygon is five times its exterior angle. Find the number of sides of the polygon.

10. A car park area in a shopping mall measuring 54m by 72m is covered by equal square tiles. Find the area in cm^2 of the largest size of the title if only whole tiles are used.

11. Solve for x in the equation:

$$7^{2x}-8\times 7^{x}+7=0$$

12. Lydia can cultivate a piece of land in 7hours, while Damaris can do the work in 5 hours. If both work for 2 hours and Lydia falls sick. How long will Damaris take to complete the remaining piece of work?

13. The following data was obtained for the masses of certain animals.

Mass (kg)	Frequency
$1.5 \le x \le 5.5$	16
$5.5 \le x \le 7.5$	20
$7.5 \le x \le 13.5$	18
$13.5 \le x \le 15.5$	14

Draw the histogram to represent the above data.

14. Find the area enclosed by the curve $y = x^2 + x + 5$ and the lines x = -3 and x=2 using the trapezium rule.

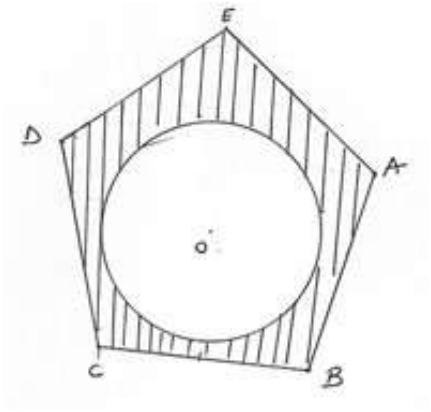
15. Find the inverse of $\begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix}$

hence, find the coordinates of the point of intersection of the lines

$2x + 3y = 12$ and $4y + x = 11$

16. The diagram below shows a cross-section of a steel beam solid which a regular pentagon with a circular hole drilled through

OA = 13cm, AB = BC= DE=EA =10cm. If the radius of the circle is 3.5cm. Calculate the shaded cross – section area.



SECTION II (50 Marks)

Choose any FIVE questions in this section

17. At 11.25am a trailer left Mombasa and travelled to Nairobi at an average speed of 60km/hr. At 1.40pm, a bus left Mombasa and travelled along the same road at an average speed of 90km/hr. The distance from Mombasa to Nairobi is 500km.
a) Calculate the distance travelled by the trailer before the bus started. (2marks)

b) At what time did the bus overtook the trailer. (3marks)

c) How far from Nairobi was the bus when it overtook the trailer. (2marks)

d) Find how far from Nairobi the trailer was when the bus reached Nairobi. (3marks)

18. a) Using the trapezium rule with seven ordinates estimate the area of the region bounded by the curve $y=x^2+6x+1$, the lines $x=0$, $y=0$ and $x=6$ (5marks)

b) Calculate:

i) The area of the region in (a) above by integration. (3marks)
ii) The percentage error of the estimated area to the actual area of the region, correct to two decimal places. (2marks)

19. Two bags A and B contain identical balls except for the colours. Bag A contains 4 red balls and 2 yellow balls. Bag B contains 2 red balls and 3 yellow balls.

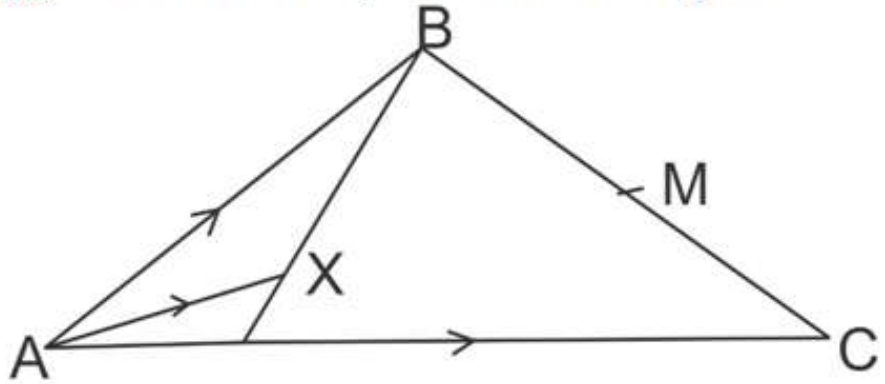
a) If a ball is drawn at random from each bag, Find the probability that both balls are of the same colour. (4marks)

b) If two balls are drawn at random from each bag, one ball a time without replacement, find the probability that:

i) The two balls from bag A or bag B are red. (4marks)

ii) All the four balls drawn are red. (2marks)

20. In the triangle ABC below, $AB=3\underset{\sim}{b}$ and $AC=2\underset{\sim}{c}$. $BX=\frac{4}{13}\underset{\sim}{c}-\frac{30}{13}\underset{\sim}{b}$. Point M divide BC in the ratio 2:3. Line BX has been produced to meet AC at point N.



(a) Find the following vectors in terms of $\underset{\sim}{b}$ and $\underset{\sim}{c}$.

(i) AX

(ii) AM

(4 marks)

(b) Prove that points A, X and M are collinear and state the ratio in which X divides AM. (3marks)

(c) Given that BX: XN =10:3, find the ratio in which N divides AC. (3marks)

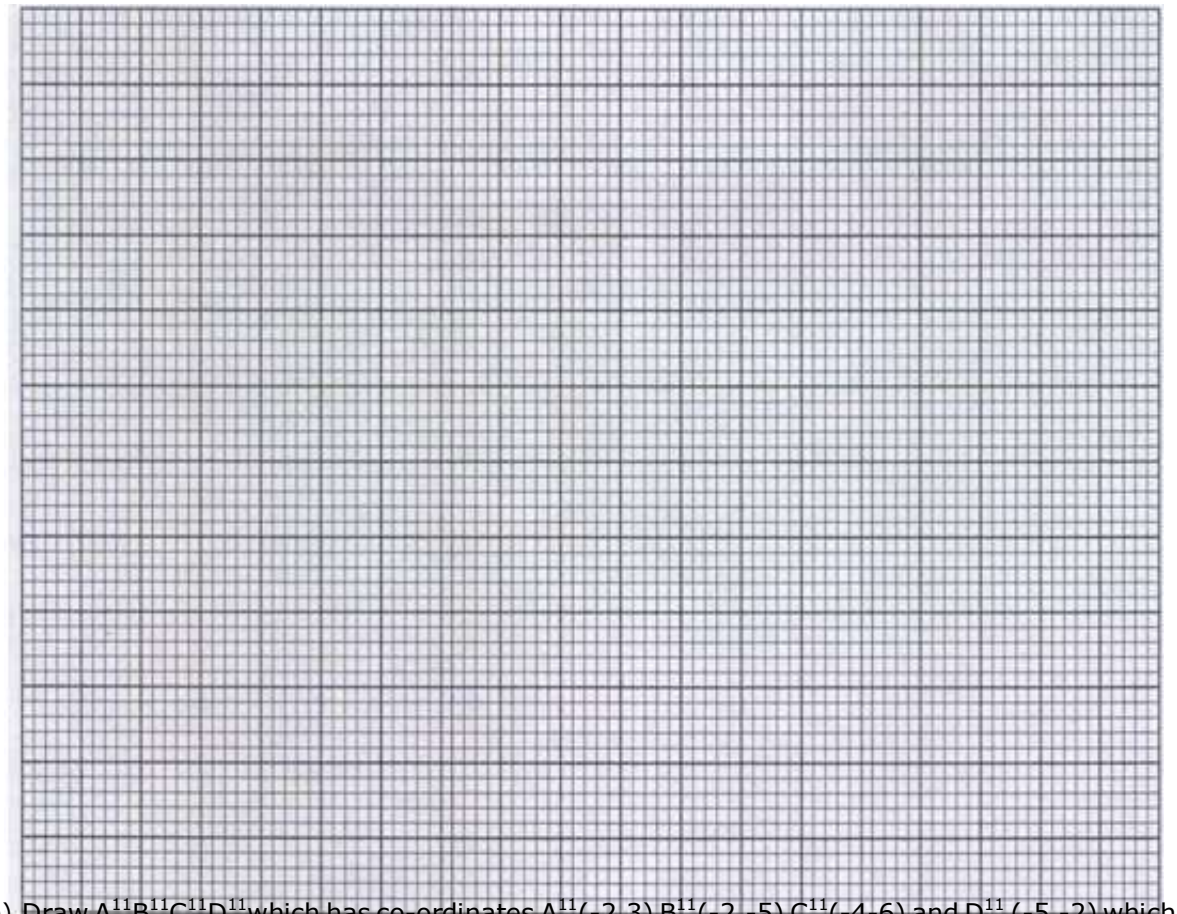
21. A bus left point A at 7.00 a.m. travelling at 84 km/h and heading to point B. At a certain time after the bus had left, a car left point A and was headed for B travelling at speed of 125 km/h. The car met the bus at 10.45 a.m.
(a) At what time did the car leave point A and how far had the bus travelled at this time. (5marks)

(b) Despite the fact that the car stopped for 30 minutes at the instance. It caught up with the bus

and still reached B 30minutes earlier. Determine the distance between A and B and the time the car caught up with the bus the second time. (5marks)

22. A quadrilateral ABCD with A, (1, 1) B, (3, 0) C, (4, 2) and D (0, 3).On the grid below draw ABCD.

(a) Draw $A^1B^1C^1D^1$ which has coordinates $A^1(-3,1)$, $B^1(-2,3)$, $C^1(-4,4)$, D^1 (-5,0)on the same axes and fully explain the transformation that will map ABCD onto $A^1B^1C^1D^1$ (4mark)



(b) Draw $A^{11}B^{11}C^{11}D^{11}$which has co-ordinates $A^{11}(-2,3)$ $B^{11}(-2,-5)$ $C^{11}(-4-6)$ and D^{11} (-5,-2) which is the image of ABCD under a single transformation. Fully describe the transformation. (3marks)

(c) Draw $A^{111}B^{111}C^{111}D^{111}$ the image of ABCD under an enlargement with the centre (2, 3) and a linear scale factor of -1.5 and state its co-ordinates. (3marks)

23. (a)Using a ruler and a pair of compasses only construct a rhombus ABCD such that AB=6 cm and $<ABC=135^0$. (4marks)
(b) Drop a perpendicular from C to AB extended meeting AB at N. Measure BN and CN. (3marks)

(c) Bisect < ABC and < DAB, Let the two bisectors meet at M. Measure AM. (1mark)

(d) Determine the area of triangle ABM (2marks)

24. Parents of Miwani Secondary decided to buy a school bus coasting sh 3,600,000.Each parent was to contribute the same amount of money. Before they bought the bus 60 parents transferred their children to St.Lukes Secondary school hence the remaining parents had to contribute kshs 2,000 more.
(a) Determine the original number of parents. (8marks)

(b) How much did each parent contribute at the end. (2marks)