

FORM FOUR CLUSTER KCSE MODEL 3

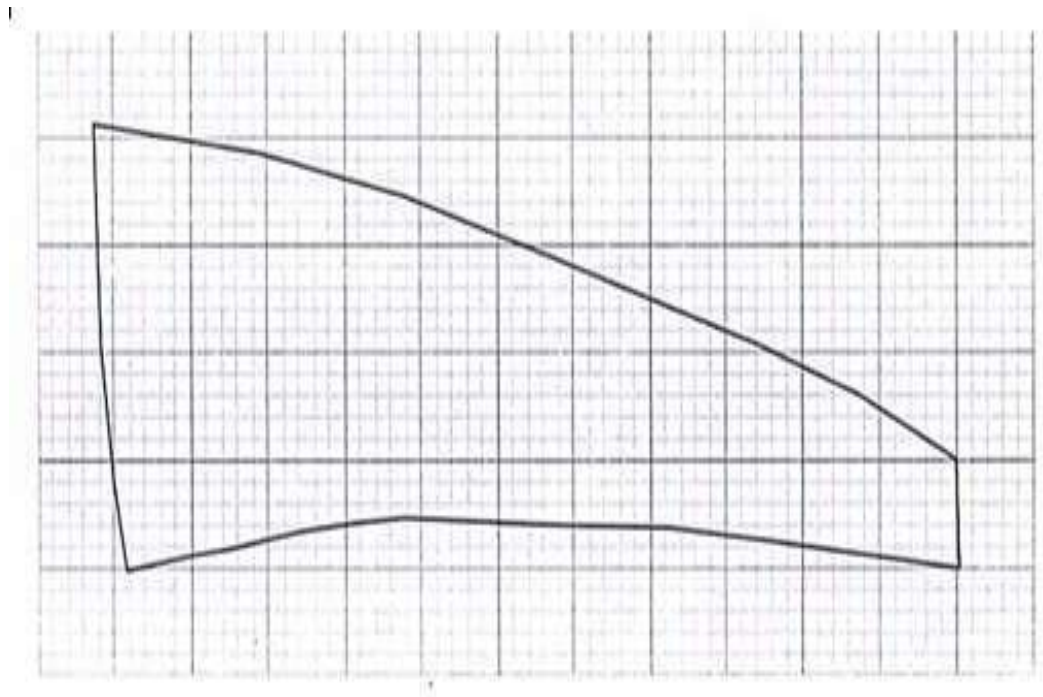
MATHEMATICS PAPER 1 QUESTIONS

SECTION 1 (50 Marks)

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

1. Without using mathematical tables, evaluate $\frac{\sqrt{0.0729} \times \sqrt{29.16}}{3.6 \times 4.5}$
2. The image of P (0, 2) under an enlargement with linear scale factor 3 is P1 (4, 6). Find the centre of enlargement.

The map in the figure below is drawn using the scale 1:2,500. Estimate the area covered by the map in hectares to 2d.p.



1. Find the equation of a perpendicular bisector of line PQ in the form

$$y = mx + c$$

2.

coordinates of P and Q are (-2, 6) and (4,-2) respectively. (3 marks)

Use reciprocal tables to find the value of hence find the value of

$$\frac{1}{3.75}^2$$

of

$$\frac{1}{3.75} + \frac{5}{0.0375}$$

(3 marks)

6. Find the greatest common divisor of the term $144x^3y^2$ and $81xy^4$

Hence factorise

$$144x^3y^2 - 81xy^4$$

(2 marks)

3. In the figure below PQRS is a rhombus,

$$\angle SQR = 55^\circ, \angle QST$$

is a right angle and

is a straight line.

TPQ

4. The currency exchange rates of a given bank in Kenya are as follows

Currency	Buying	Selling
1 Sterling pound	147.143	147.426
1 US pound	101.109	101.272

A tourist arrived in Kenya with 5000US dollars which he converted to Kenya shillings upon arrival. He spent Ksh. 214,500 and converted the remaining to sterling pounds. How much to the nearest pounds did he receive? (3 marks)

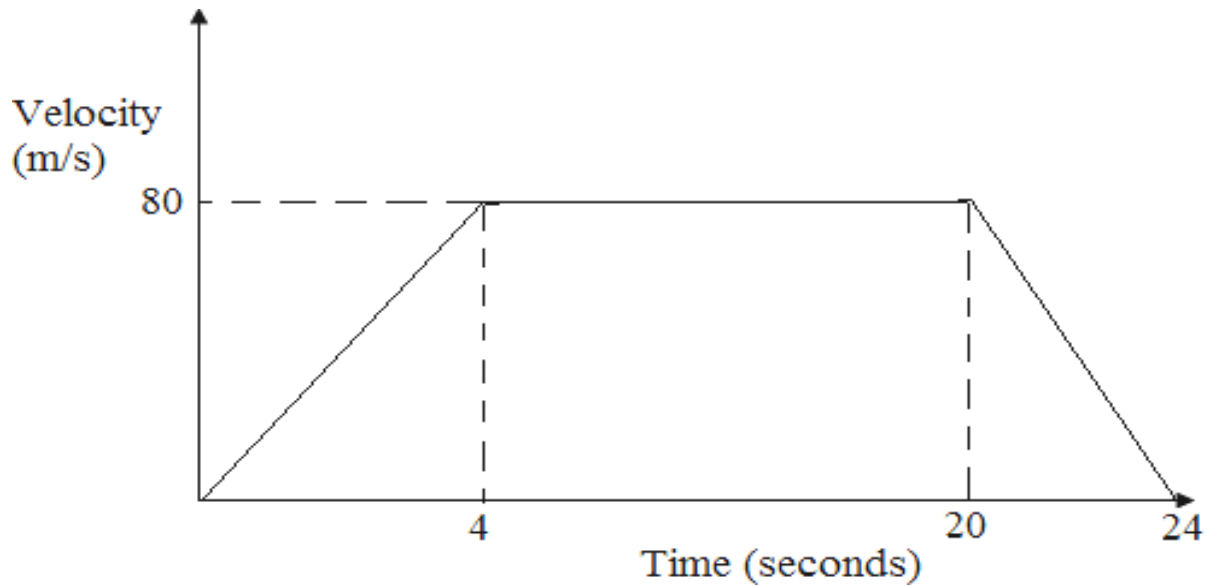
$$125^{-x} \times 5^{2(x-2)} = 25^{(x+2)}$$

Solve for x

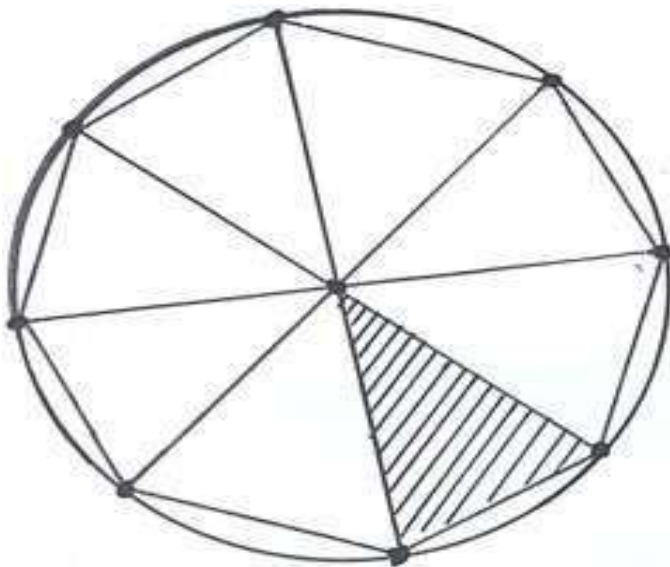
(3 marks)

1. The ratio of the surface area of the corresponding surfaces of two similar rectangular petrol tanks is 9:25. The volume of the smaller tank is 8.1 m^3 . Calculate the volume of the large tank. (3marks)

10. The figure below is a velocity –time graph for a car. Find the total distance travelled by the car. (2marks)



12.1. Complete the figure below to make it have a rotational symmetry of order 4 about the centre. (3 marks)



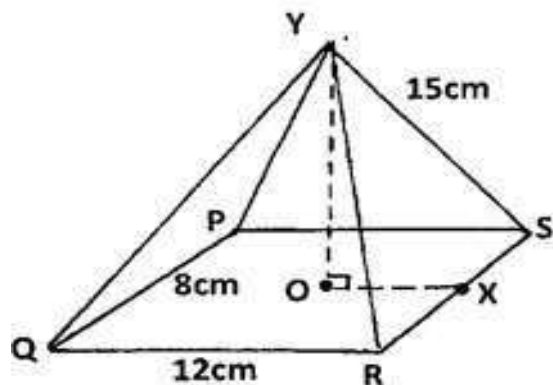
10. A man walks directly from A towards the foot of a tall building 240 m away. After covering 180m, he observes that the angle of elevation of the top of the building is 45° . Determine the angle of elevation of the top of the building from A. (3 marks)

$$\sin x = \sin 30^\circ = \frac{\sqrt{3}}{2}, \quad \text{find } x \text{ given that } 0^\circ \leq x \leq 90^\circ$$

(3 marks)

11. A real estate agent receives a commission of 6% of the selling price of a house. If he sells a house and paid the owner a net of Sh.1, 269,000 after charging his commission, what was his commission? (3 marks)

An ant moved from Y to X the midpoint of RS through P in the right pyramid below



Draw the net of the pyramid showing the path of the ant hence find the distance it moved.

SECTION II (50 Marks)

Answer ONLY FIVE questions in this section in the spaces below each question.

17. Three businessmen Mwanzia, Godana and Macharia decided to buy a bus. The marked price of the bus was sh. 7,200,000. The dealers agreed that the three men could pay a deposit of 40% of the money and the rest to be paid within one year. Mwanzia, Godana and Macharia raised the deposit in the ratio 2:3:4 respectively. The balance plus 10% interest on the outstanding amount was to be paid to the dealer from the proceeds from the bus operations in the same ratio as the deposits. The three men shared the proceeds from the bus in the same ratio as the deposits. The businessmen agreed to jointly save 15% of the proceeds

for maintenance. During the year the bus

realized sh. 8,044,000.

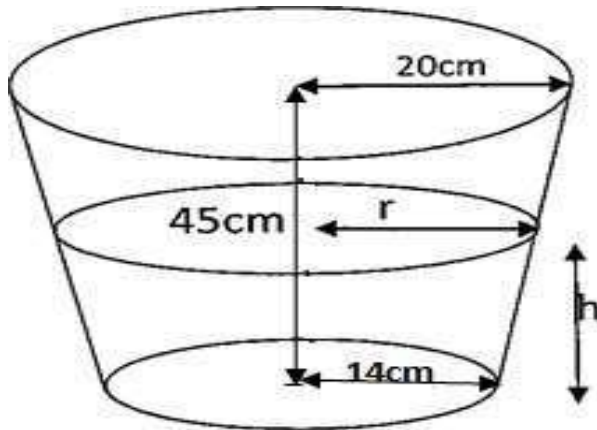
a) How much of the deposit did Godana contribute? (2 marks)

b) How much of the remaining amount did Macharia pay at the end of the year? (4 marks)

c) After paying the remaining amount at the end of the year, how much money was Mwanzia left with? (4 marks)

18. The figure shows a bucket in the form of a frustum of a cone of an open top radius 20 cm and base radius 14 cm. The depth is 45 cm.

a) Calculate the volume of the bucket. (4 marks)



b) If the bucket is half full of water, calculate the radius, r , of the water level (6 marks)

19. The table below shows the distribution of marks by pupils in a mathematical test at Leadan school.

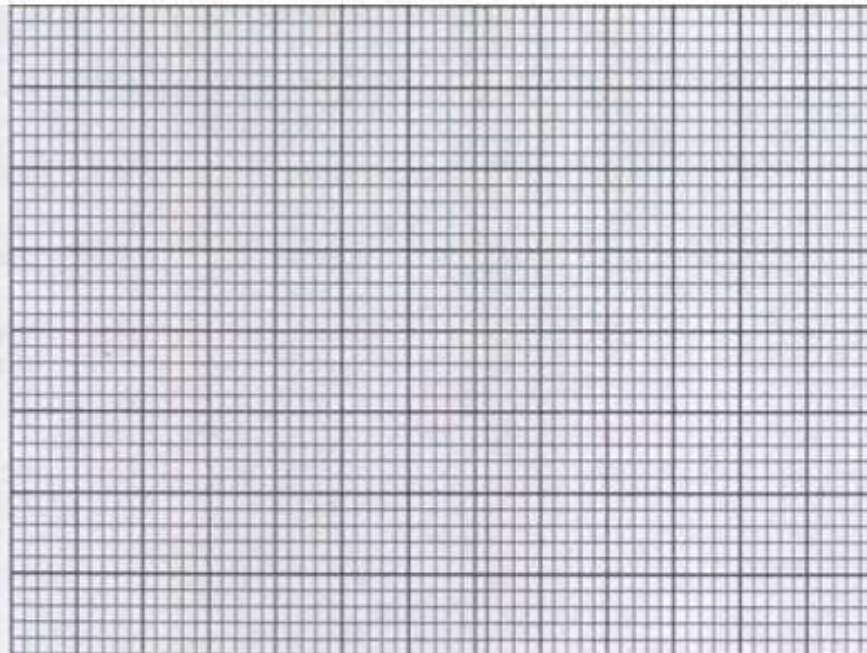
marks	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
No of students	2	5	6	10	14	11	9	3

Calculate the:

a) Mean (3 marks)

b) Median (3 marks)

c) Draw a frequency polygon from the data given above (4 marks)



20. A trader bought 8 cows and 12 goats for a total of Ksh. 294,000 on one of the market days. The following market day he bought 1 more cow and 3 more goats and spent a total of Ksh. 337,500.

- a) Form two equations to represent the above information. (1 mark)
- b) Use matrix method to determine the cost of a cow and that of a goat. (4 marks)
- c) In another market day the trader sold all the animals he had bought making a profit of 40% per cow and 45% per goat.
 - i. Use matrix method to calculate the total amount of money he received. (3 marks)
 - ii. Determine his profit in Kenya Shillings. (2 marks)

21. Three cars A, B and C are approaching a stage R which is on a bearing of 3450 from an adjacent stage Q. B is east of stage R and 6 km from Q, on a bearing 0450, while A is on a bearing of 0450 from R. A and C are due north of Q. C is on a bearing of 2500 from B, a) Using a scale of 1:100,000 locate the relative positions of three cars and the two stages. (4 marks)

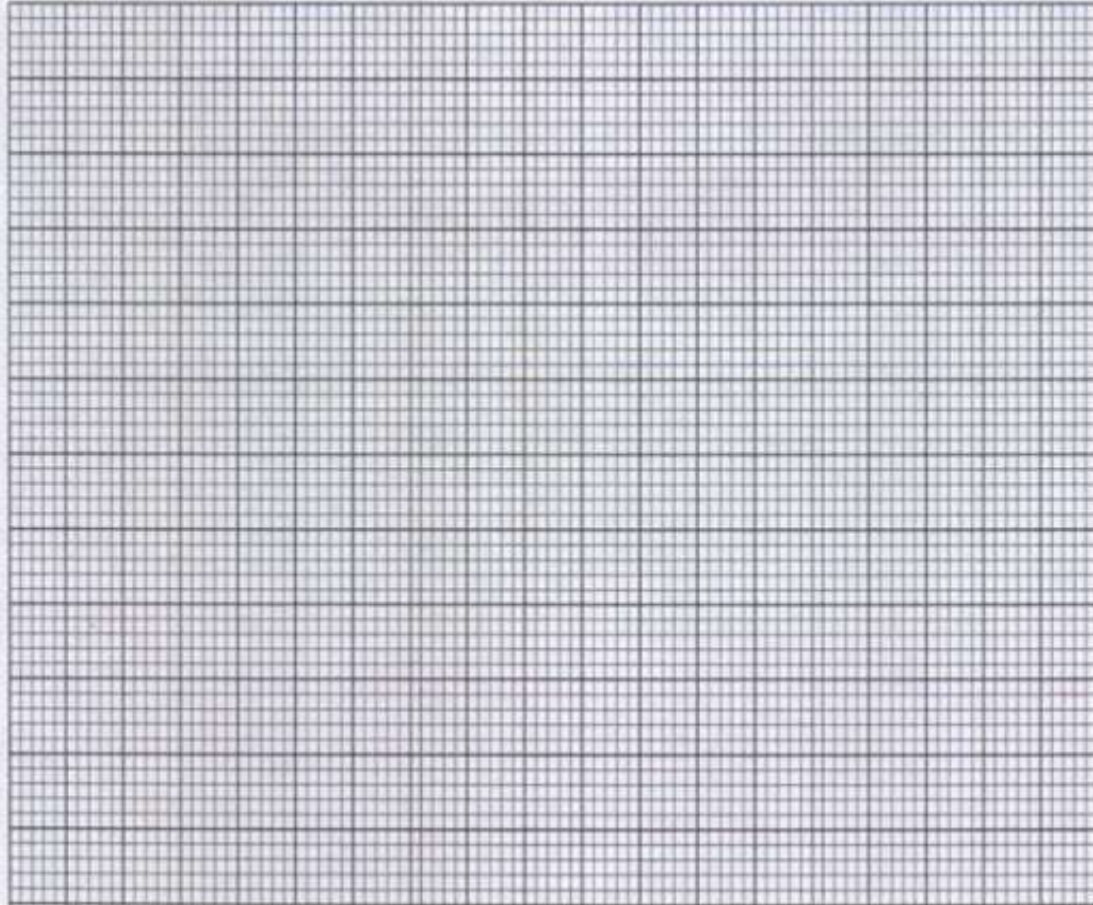
b) Use the scale drawing in (a) above to determine:

- i. The bearing of B from A.
- ii. The bearing of C from R.
- iii. The distance between R and C.

22. Kirui is standing at a point P 160m south of a hill H on a level ground. From point P she observes the angle of elevation of the top of the hill to be 67°

- a) Calculate the height of the hill. (3 marks)
- b) After walking 420m due east to the point Q Kirui proceeds to point R due east of Q where the angle of elevation of the top of the hill is 35° . Calculate the angle of elevation of the top of the hill from Q. (3 marks)
- c) Calculate the distance from P to R. (4 marks)

23. Triangle ABC has vertices A(1,2), B(2,3) and C(4,1) while triangle A₁B₁C₁ has vertices A₁(1,-2), B₁(2,-3) and C₁(4,-1) a) Draw triangle ABC and A₁B₁C₁ on the same grid hence describe fully a single transformation that maps triangle ABC onto triangle A₁B₁C₁. (4 marks)



b) On the same grid draw triangle (3 marks)

$\triangle A^{\text{II}}B^{\text{II}}C^{\text{II}}$

the image of triangle ABC under a reflection in line

c) $\triangle A^{\text{III}}B^{\text{III}}C^{\text{III}}$ Draw

such that it can be mapped onto triangle ABC by a negative quarter turn about the origin. (3 marks)

24. The displacement, s meters, of a moving particle after t seconds is given by

$$s = t^3 - 4t^2 + 4t + 3$$

Determine:

(a) The velocity of the particle when $t=3$ seconds (3marks)

(b) The value of t when the particle is momentarily at rest (3marks)

- (c) The displacement when the particle is momentarily at rest. (2marks)
- (b) The value of t when the particle is momentarily at rest (3marks)
- (c) The displacement when the particle is momentarily at rest. (2marks)
- (d) The acceleration of the particle when $t=2$ (2marks)