FORM FOUR CLUSTER KCSE MODEL12

MATHEMATICS PAPER 1 QUESTIONS

SECTION I (50 Marks)

Answer all the questions in the spaces provided

1. Using prime factors method, Evaluate

$$3\sqrt{\frac{0.729 x 409.6}{0.1728}}$$

2. Use squares, square roots and reciprocals tables to find the value of

$$\frac{3.045^2}{5.823 - \sqrt{2.518}}$$

3. Simplify completely :-

$$\frac{3x^2 - 5xy + 2y^2}{9x^2 - 4y^2}$$

4. Solve for x if :

$$4^{2x+1} - 7(4^x) + 3 = 0$$

5. A container of height 90cm has a capacity of 25cm^3. What is the height of a similar container of volume 0.2litres.

6. The diagram below represents a room in the shape of a cuboid 5m by 6m by 3m. X and Z are midpoints of AD and CG respectively. A spider wishes to travel from H to X to B to Z and Back to H. Draw the net and show the path.
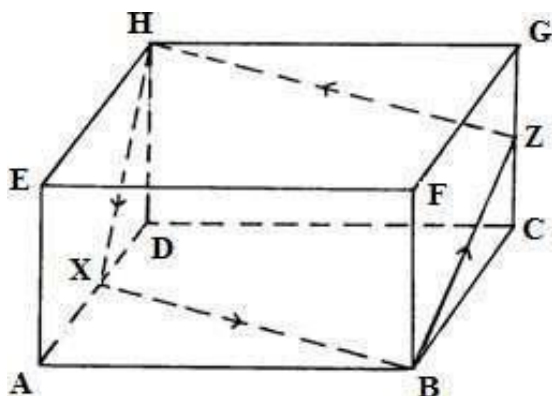
7.	a) In May, an insurance salesman collected sh. 400,000 in premiums. If he earns
6.25% commission. How much will he earn? (1mk)

b) In June he collected the same premiums but earned only sh.20, 000 in commission. What was the

percentage reduction in his commission rate. (2mks)

8.	$A^1B^1C^1$ is the image of ABC under a rotation. By construction, locate the centre and state the angle of rotation.
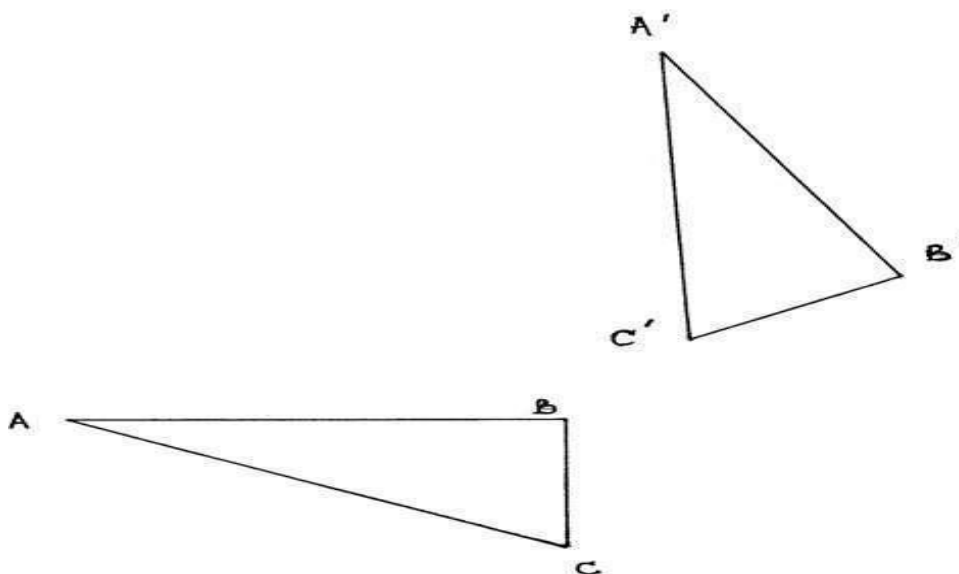

9.	Find the value of x+ y in the figure below.
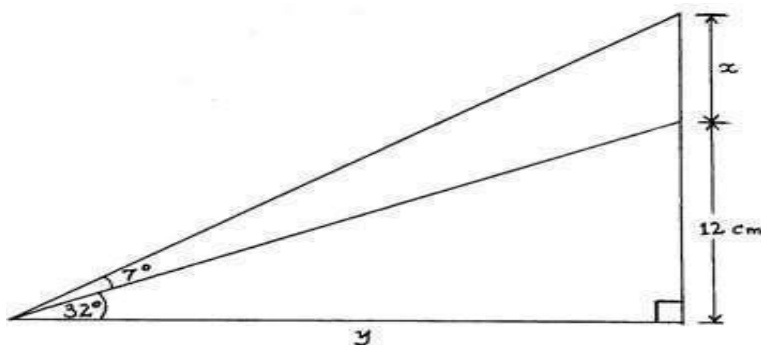
10.	Show that if ,

$OA = i + 7j$, $OB = 3i + 13j$ and $OC = 4j$, then the points A, B and C are collinear.

11. A tourist changes 1500 Euros to Kenya shillings at 1 Euro=Ksh 76.05. He spends Ksh. 79 389, then changes the remaining shillings back to Euro at Ksh.77.05. How many Euros d oes he receive to the nearest Euro?

12. Determine the equation of a straight line which is parallel to the line -5x-2y-9=0 and passes through

the point (-2,-10) in the form $\dfrac{x}{a} + \dfrac{y}{b} = 1$

13. The numbers of sides of two regular polygons are in the ratio 3: 4. The sum of the interior angles of the two polygons are in the ratio 2: 3. Calculate the number of sides of the two polygons.

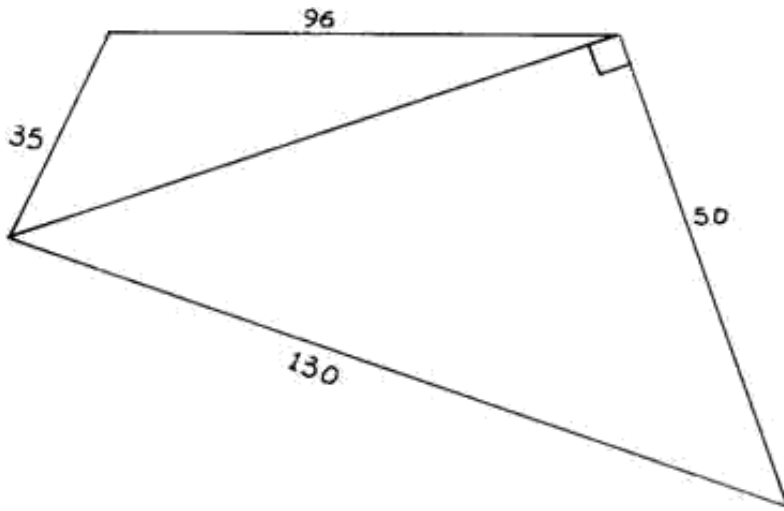14. In the figure below O is the centre of the circle. AO is parallel to BC and angle BOC =96^0
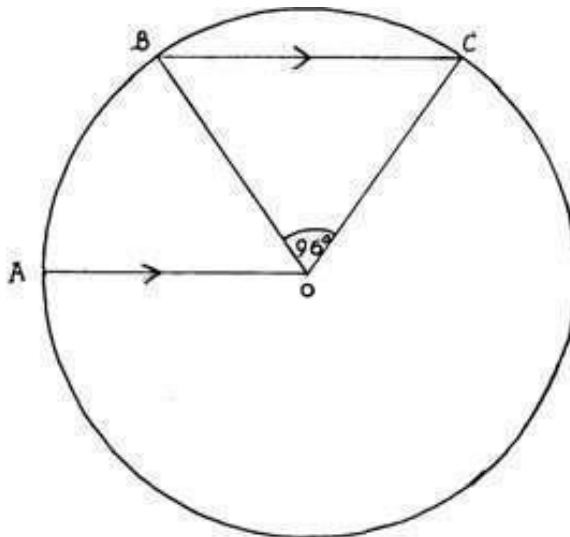
Calculate angle BCA

15. Evaluate:-

$$\int_{-\frac{2}{3}}^{2} \frac{x^2 - 2x - 3}{x + 1}\, dx$$

16. The figure below represents the plan of a plot land. Dimensions are in metres.

Calculate the area of the plot, correct to 2 decimal places, in hectares.

SECTION II (50 Marks)

Answer only five questions in this section in the spaces provided.

17. A coffee plantation has four main boundaries WX, XY, YZ and WZ which are straight lines. X is 16km on a bearing of 040^0 from W, Y is directly South of X and East of W. Z is 12km on a bearing of 120^0 from Y.

    a) Using a scale of 1cm to represent 2km, show the above information in a scale drawing. (3mks)
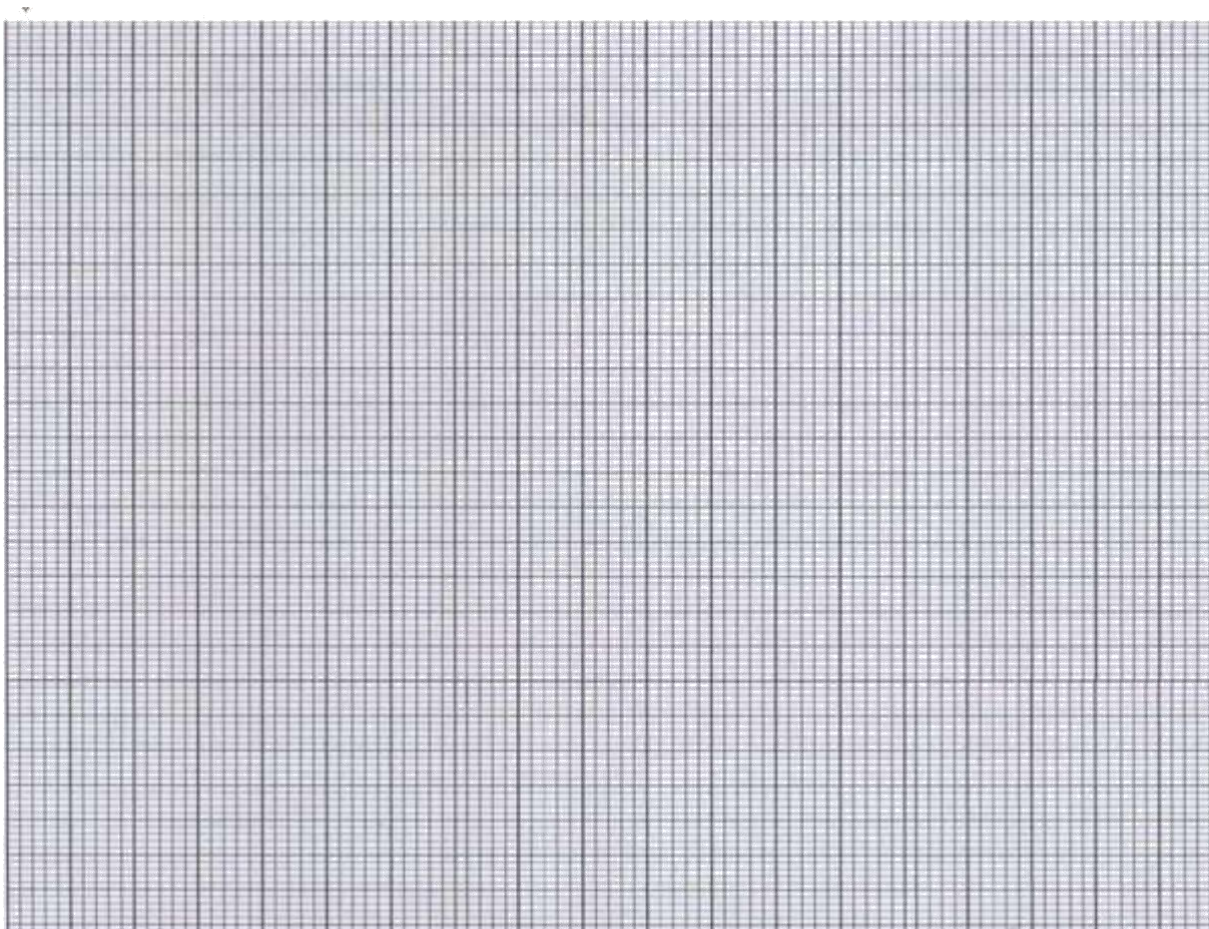   b) From the scale drawing, determine

       The distance, in km, of W from Z. (2mks)
    ii) The bearing of W from Z. (2mks)
    c) A worker intends to move from point Z to X directly at a speed of 3m/s. Find the time he would take (to the nearest minute). (3mks)

18. a)i) Draw the graph of $v = 2x^2 - 3x - 5$ for $-2 \le x \le 3$
    i)

ii) Use the graph to solve the equation $2x^2 - 3x - 5 = 0$ (1mk)

b) Using the same axes, draw the graph of y=-2x-2 (1mk)

c) From your graphs, find the values of x which satisfy the simultaneous equation. (1mk)

$$y = 2x^2 - 3x - 5$$
$$y = -2x - 2$$

d) Write down the quadratic equation which is satisfied by the values of x where the two graphs intersect. (2mks)

19. A particle moving at a velocity of 20m/s decelerates uniformly for 5 seconds to a velocity of 10m/s. It then moves at this velocity for the next 10 seconds. It accelerates uniformly in the next 15 seconds to a velocity of 30m/s before coming to rest in the next 20 seconds.

a) Draw a velocity – time graph to represent this information. (2mks)
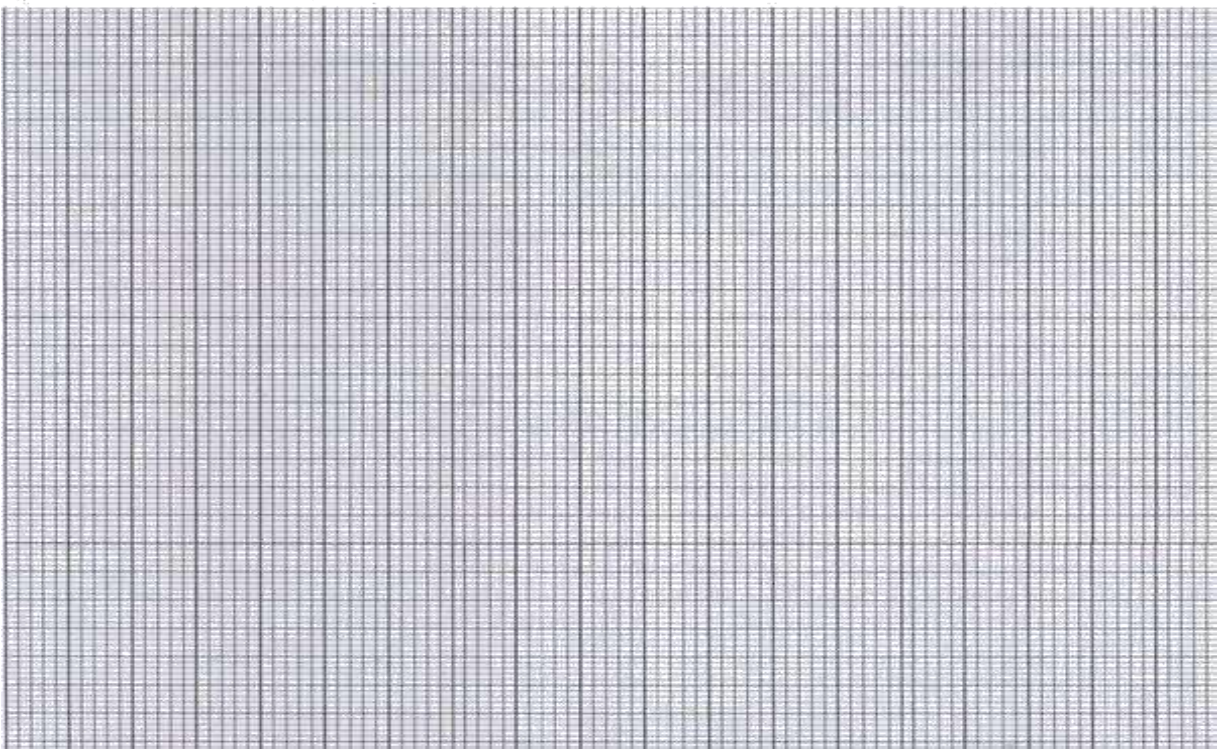
b) Use your graph to determine

i) Deceleration in the first 5 seconds. (2mks)

ii) Acceleration between 15 seconds and 30 seconds. (2mks)

iii) Total distance covered. (2mks)

iv) Average speed for the whole journey. (2mks)

20. The figure below represents a cross-section of a concrete prism whose length is 3m. AB= FE and AGF is a semi-circle.
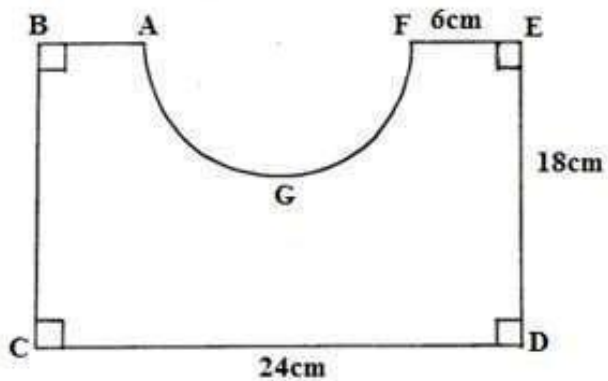

a) Find the perimeter of the cross-section. (2mks)

b) Find the area of the cross-section. (2mks)

c) Hence or otherwise, calculate the total surface area of the prism. (2mks)

d) Determine the volume of the concrete used to make the prism. (2mks)

e) Given that 1cm^3 of concrete weighs 6.8g, find the mass of the prism in kg. (2mks)

21. The table below shows the distribution of marks scored in an exam by a class in a certain school.

Marks	$50 \leq x < 55$	$55 \leq x < 65$	$65 \leq x < 80$	$80 \leq x < 85$	$85 \leq x < 95$
No. of students	2	11	18	5	4

a) State the modal frequency. (1mk)

b) Calculate the mean score for the class (5 marks)

c) Calculate the median score (4 marks)
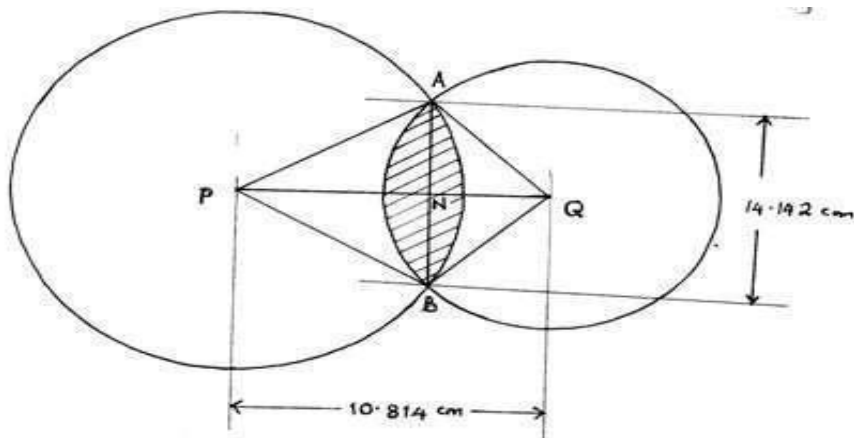
d) Complete the histogram for the data.
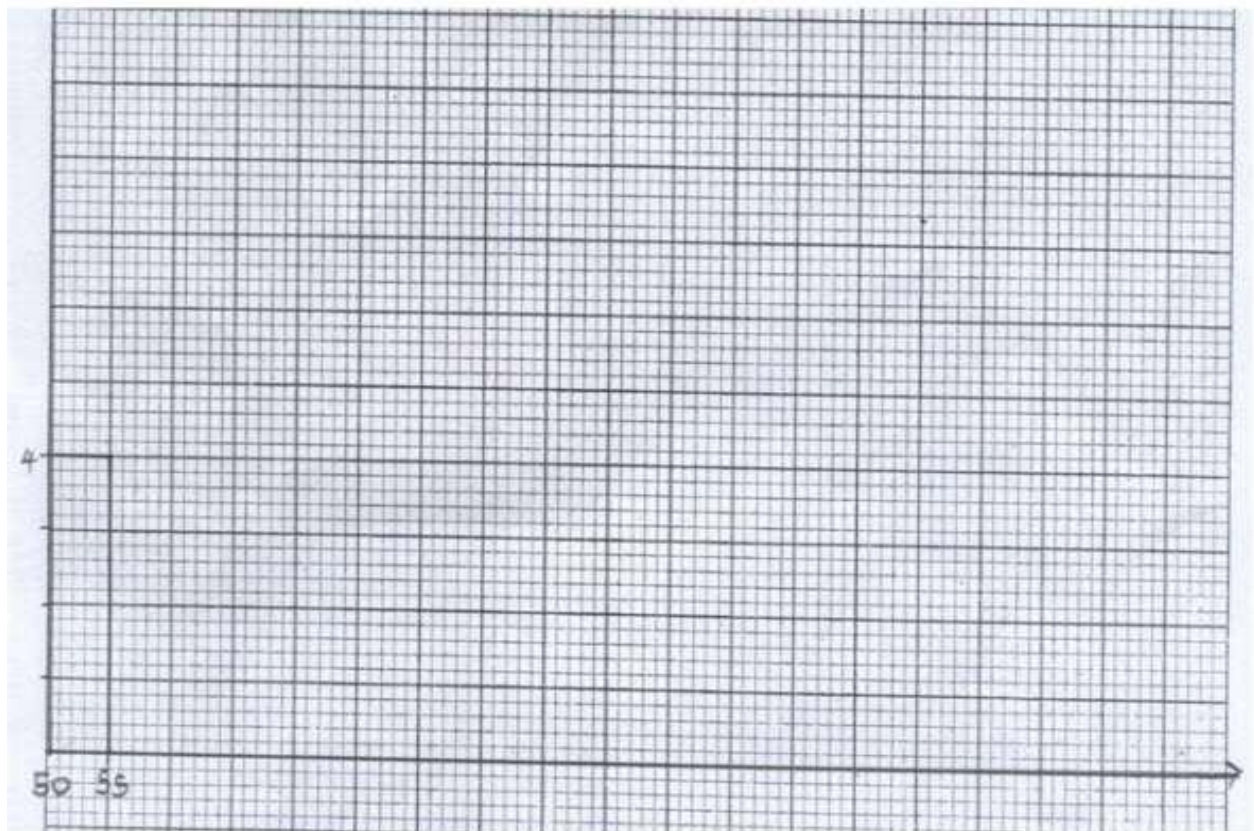
22. The figure below shows an open tank with cylindrical and frustrum parts.
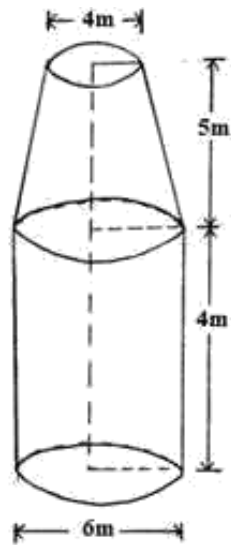
Find, using $\pi = \dfrac{22}{7}$ the:

a) Curved surface area of the frustrum (3mks)

b) Curved surface area of the cylindrical part. (2mks)

c) Surface area of the tank. (2mks)

d) Capacity of the tank in litres. (3mks)

23. Two circles intersect as shown in the figure below.

a) Given that AP=AN, Calculate the size of angles APB and ABQ (4mks) i. APB

ii. ABQ

b) Calculate the radius of each circle. (2mks)

c) Calculate the area of intersection. (4mks)

24.   The equation of a curve is given as

$$y = (x-1)(x^2 + x - 2)$$

a) Find i) The y-intercept of the curve. (1mk)

ii) The x- intercepts of the curve. (2mks)

b) i) Find the stationary points of the curve. (3mks)

ii) Determine the nature of the stationary points. (2mks)

c) Hence sketch the curve. (2mks)