

Name

Index Number

Class

Adm No

121/1

MATHEMATICS

PAPER 1

JUNE/ JULY 2013

TIME: 2½ HRS

LENOCET EVALUATION TEST
KENYA CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS

PAPER 1

TIME: 2½ HRS

Instructions to candidates

- (a) Write your **Name** and **Index number** in the spaces provided above.
- (b) This paper consists of **TWO** sections: section **I** and section **II**.
- (c) Answer **ALL** questions in section I and only **five** questions from section **II**.
- (d) All answers and working **must be** written on the question paper in the spaces provided **below** each question.
- (e) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- (f) Marks may be given for correct working even if the answer is wrong.
- (g) Non-programmable silent electronic calculators and KNEC mathematical tables **may be** used except where stated otherwise.
- (i) This paper consists of 19 printed pages.
- (j) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

For Examiner's use only

Section I

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

Section II

17	18	19	20	21	22	23	24	TOTAL

**GRAND
TOTAL**

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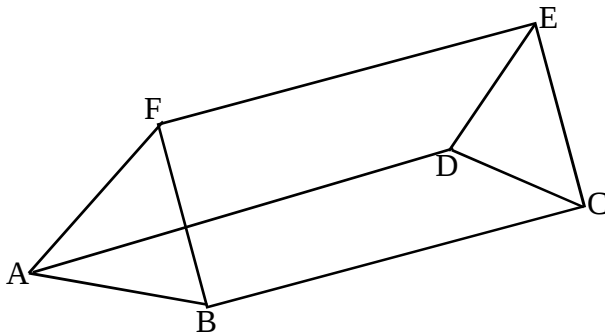
SECTION 1 50 MARKS

Answer all questions in this section in the spaces provided

1. Evaluate without using a calculator (3mks)

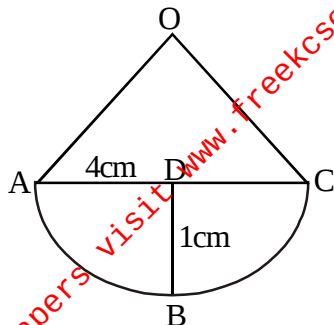
$$\frac{\frac{2}{3} \times \left(1\frac{3}{7} - \frac{5}{8}\right)}{\frac{3}{4} + 1\frac{5}{7} \div \frac{4}{7} \text{ of } 2\frac{1}{3}}$$

2. Name and draw the net of the following figure. (2mks)



3. Given that the ratio $x:y = 3:5$, find the ratio $(5x - 2y) : (x + 2y)$ (3mks)

4. In the figure below, ADC is a chord of a circle with centre O passing through A, B and C. BD is a perpendicular bisector of AC. AD = 4cm and BD = 1cm.



Calculate the radius OA of the circle.

(2mks)

5. Simplify $\frac{9x^2 - 1}{3x^2 + 2x - 1}$

(3mks)

6. John bought five pens and ten books at a total cost of Sh. 400. Ten similar pens and four books cost Sh. 320. Find the total cost of four pens and two books.

(4mks)

7. The size of an interior angle of a regular polygon is 3 times that of its exterior angle. Determine the number of sides of the polygon. (3mks)

8. The mass of a wire m grams (g) is partly a constant and partly varies as the square of its thickness t mm when $t = 2$ mm, $m = 40$ g and when $t = 3$ mm, $m = 65$ g. Determine the value of m when $t = 4$ mm. (3mks)

9. A tourist comes to Kenya with 1940 Euros which she exchanges for Kenya shillings. During her stay she spends Ksh. 75,000 on transport and another Ksh. 50,000 on accommodation. As she leaves, she exchanges the remaining amount to sterling pounds. Given that the exchange rates at the time was as follows.

	Exchange rates	
Foreign currency	Buying	Selling
1 Euro	Sh. 104.51	Sh. 104.79
1 Sterling pound	Sh. 119.96	Sh. 120.28

How much sterling pounds did she have at her departure?

(3mks)

10. Solve for x and y in,

(4mks)

$$2^{2x-3y} = 16$$

$$5^{x-2y} = 1$$

11. A straight line through the points P(2, 1) and Q(4, h) is perpendicular to the line whose equation is $3y + 2x = 5$. Determine the value of h and the equation of line PQ in the form $y = mx + c$

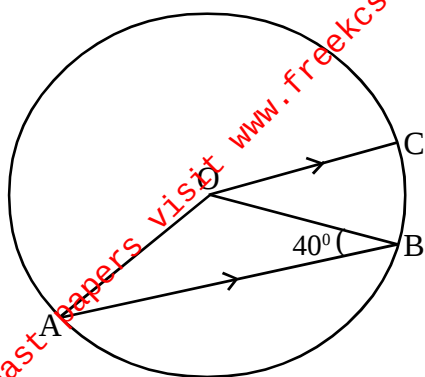
(4mks)

12. Two flag posts A and B stand vertically on a level ground some distance apart. Post A is 12m high. The angle of depression of the foot of post B from the top of post A is 14.3° and the angle of elevation of the top of post B from the top of post A is 33.9° . Calculate the height of post B. (Give your answer to 2 decimal places) (4mks)

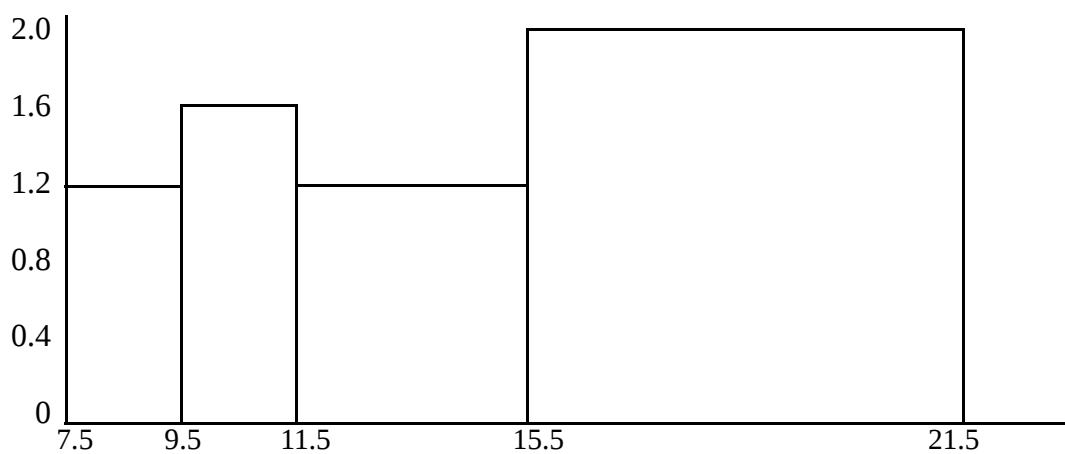
13. Use the reciprocal and square tables to evaluate $\frac{3}{123.4} + 0.9829^2$ (3mks)

14. In the figure below, O is the centre of the circle. $AB \parallel OC$ and angle $ABO = 40^\circ$. Find angle ACO .

(3mks)



15. The figure below shows a histogram.



Complete the frequency distribution table below.

Length x cm	Class width	Frequency density	Frequency
$7.5 \leq x < 9.5$		1.2	24
$9.5 \leq x < 11.5$			
$11.5 \leq x < 15.5$			48
$15.5 \leq x < 21.5$	6		

(4mks)

16. A map is drawn to a scale of 1:50,000. Find the area in cm^2 on the map of a field with an actual area of $60\,000\text{m}^2$.

(2mks)

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SECTION II (50 marks)

Answer only FIVE questions in this section in the spaces provided

17. A bus left Mombasa and travelled towards Machakos at an average speed of 60km/hr. After $2\frac{1}{2}$ hrs, a car left Mombasa and travelled along the same road at an average speed of 100km/h. If the distance between Mombasa and machakos is 500km, determine:
- (a) (i) The distance of the bus from Machakos when the car took off. (2mks)
- (ii) The distance the car travelled to catch up the with the bus. (4mks)
- (b) Immediately the car caught up with the bus, the car stopped for 25minutes. Find the new average speed at which the car travelled in order to reach Machakos at the same time as the bus. (4mks)

18. (a) Given that $y = 7 + 3x - x^2$, complete the table below.

x	-3	-2	-1	0	1	2	3	4	5	6
y		-3						3		

(3mks)

- (b) Using a suitable scale, draw the graph of $y = 7 + 3x - x^2$

(3mks)

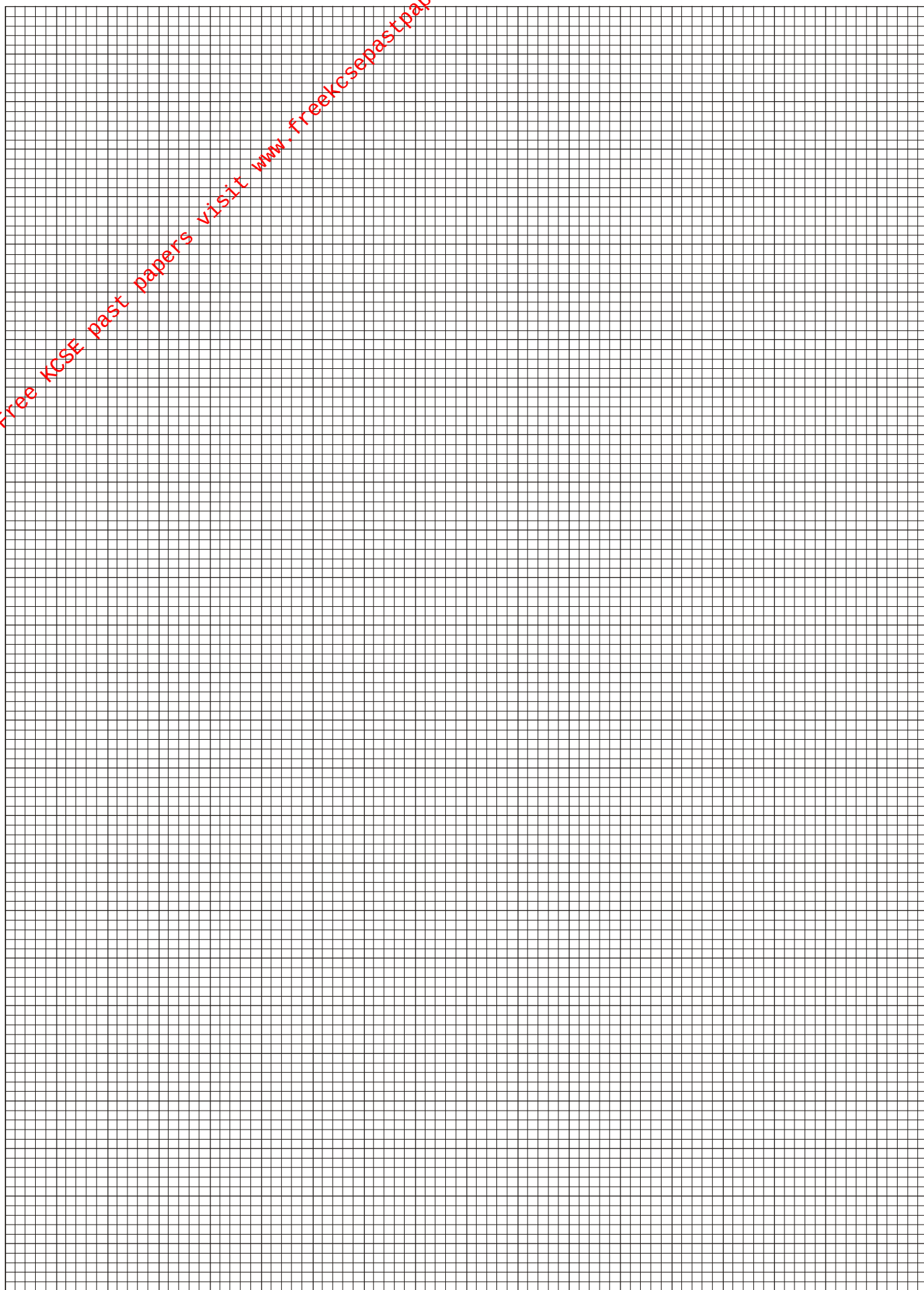
- c) On the same grid draw a straight line $y = 4 - x$

(2mks)

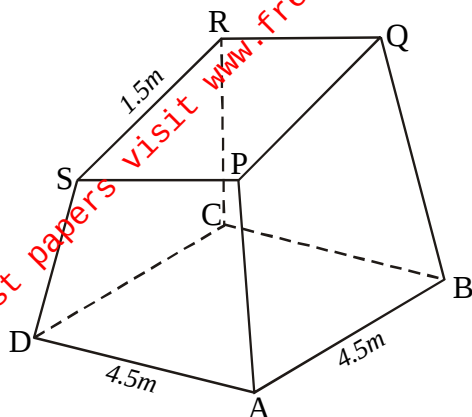
- (d) Use the graph to solve the equation $x^2 - 4x - 3 = 0$

(2mks)

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19. Nanyuki Municipal Council intends to introduce open litter bins of the shape shown in the diagram below. Each bin is a frustum of a right pyramid standing on a square base ABCD of side 4.5m. The plane PQRS is parallel to the plane ABCD and is $\frac{2}{3}$ up the vertical height of the original pyramid. $PQ = QR = 1.5\text{m}$ and the height of the frustum is 1.5m.



- (a) Calculate the total surface area of the frustum.

(4mks)

- (b) Paint is sold in two litres container which cost Sh. 375 each. $\frac{1}{4}$ litre of paint is adequate for painting 5m^2 surface. Find the cost of painting the external surface of ten such bins.

(4mks)

- (c) Calculate the volume of one bin.

(2mks)

20. A school planned to buy y textbooks for a total cost of Ksh. 7500. A discount of Ksh. 50 per textbook was given and the school was able to get five extra textbooks for the same amount of money.

(a) Write an expression in terms of y , for the

(i) original price of each textbook

(1 mk)

(ii) price of each textbook after the discount.

(1mk)

(b) Form an equation in y and hence determine the number of textbooks the school bought.

(5mks)

(c) Calculate the discount offered to the school as a percentage.

(3mks)

21. Four towns X, T, Y and Z are such that T is 84km directly to the North of X and Y is on a bearing of $N65^{\circ}W$ from X at a distance of 60km. Z is on a bearing of 340° from Y and at a distance of 30km.

(a) Using a scale of 1cm represent 10km, make an accurate scale drawing to show the relative positions of the towns.

(3mks)

(b) From your scale drawing, find
(i) the bearing and distance of T from Y.

(2mks)

(ii) the bearing and distance of X from Z.

(2mks)

(c) Calculate the total area covered by the quadrilateral ZTXY in square kilometres.

(3mks)

22. The table below shows distribution of marks for 100 candidates in a mathematics test.

Marks	0 - 9	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 - 89	90 - 100
No. of candidates	5	9	9	11	X	15	11	9	7	5

- (a) Find the value of x. (1mk)

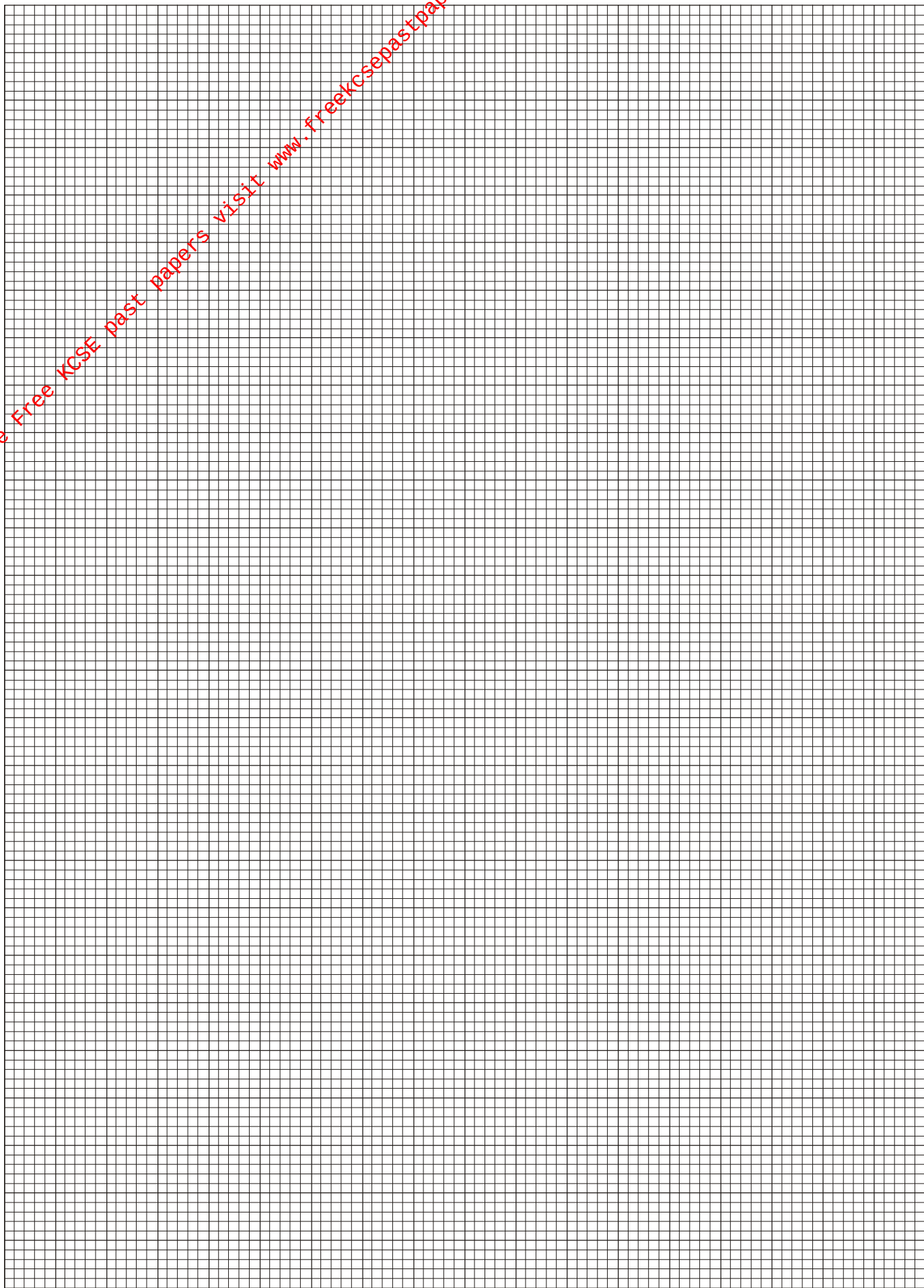
- (b) Using a scale of 1cm to represent 10 marks and 1cm to represent 5 students, draw a cumulative frequency curve. (4mks)

- (c) Use your graph to estimate,
(i) the median (1mk)

- (ii) the quartile deviation (2mks)

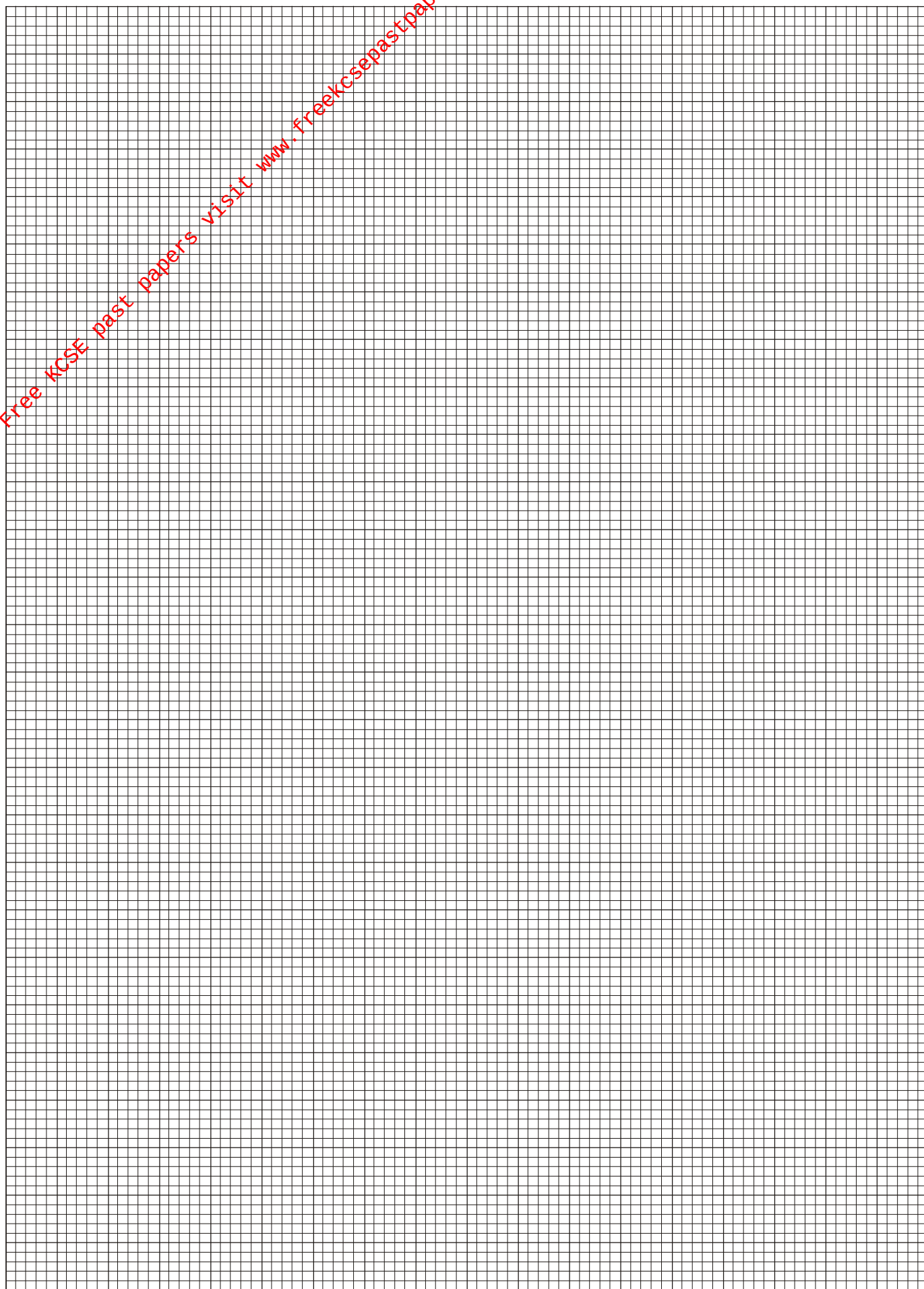
- (iii) the number of students who passed if the pass mark is 45%. (2mks)

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23. Draw triangle ABC with A(3, 4) B(1, 3) and C(2, 1)
- (a) Draw triangle $A^I B^I C^I$, the image of triangle ABC under a rotation of positive 90° about (0, 0) (2mks)
- (b) Draw triangle $A^{II} B^{II} C^{II}$ the image of triangle $A^I B^I C^I$ under a reflection in the line $y = x$ (2mks)
- (c) Draw triangle $A^{III} B^{III} C^{III}$ the image of triangle $A^{II} B^{II} C^{II}$ under a translation $T = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$ (2mks)
- (d) Describe a single transformation that maps $\triangle ABC$ onto $\triangle A^{III} B^{III} C^{III}$ (3mks)
- (e) State the type of congruence between the object and the final image. (1mk)

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24. In a college there are fewer than 40 students who can play either football or basketball but not both. The football team comprises more than eleven players while the basketball team comprises more than six players. There are more than three times as many football players as basketball players.

(a) Taking the number of football players and basketball players to be x and y respectively, write down four inequalities representing the above information.

(4mks)

(b) On the grid provided, draw the inequalities in (a) above

(4mks)

(c) Find the maximum possible number of;
(i) basketball players

(1mk)

(ii) football players

(1mk)

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