Name .... Index No. ....,,,,,,

121/1

Candidate's signature ....

MATHEMATICS
Paper 1
July/August 2013
Time : 2½ Hours

Date ....

MERU COUNTY FORM 4 JOINT EVALUATION - 2013
Kenya Certificate of Secondary Education

MATHEMATICS
Paper 1
July/August 2013
Time: 2½ Hours

INSTRUCTION TO ALL CANDIDATES

1. Write your name and admission number in the spaces provided.

2. This paper consists of two sections 1 and section II

3. Answer all the questions in section I and only five questions from section II.

4. All answers and working must be written on the question paper in the spaces provided below each question.

5. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.

6. Marks may be given for correct working even if the answer is wrong.
7. Non- programmable silent electronic calculators and KNEC mathematical table may be used except where stated otherwise.

FOR EXAMINERS USE ONLY

Section I	Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
	Marks																	

Section II	Question	17	18	19	20	21	22	23	24	Total
	Marks									

Grand total

1

1. Evaluate without using tables or a calculator. (4mks)

$$\frac{\frac{6}{7} \text{ of } \frac{14}{3} \div 80 \times \frac{-20}{3}}{-2 \times 5 + (14 \div 7) \times 3}$$

2. Use tables of square roots and reciprocals to evaluate correct to four significant figures. (3mks)

$$\frac{3}{\sqrt{0.216}}$$

3. Find the acute angle made between the line whose equation is $2y = 4x + 5$ and the positive direction of the x-axis. (3mks)

4. A train whose length is 86 metres is travelling at 28km/h in the same direction as a truck whose length is 10 metres. If the speed of the truck is 60km/hr and is moving parallel to the train, calculate the time it takes the truck to completely overtake the train. (3mks)

5. Two sides of a parallelogram plot are 240m and 380m respectively. The area of the plot is 5.71 hectares. Find the acute angle between the two sides. (3m

6. In a regular polygon each exterior angle is 90° less than each interior angle. Calculate the number of sides of the polygon. (3mks)

7. The shortest side of a triangle is 12cm and the area of the triangle is 8cm². A similar triangle has an area of 18cm². Calculate the shortest side of this triangle. **(3mks)**

8. The figure below shows a solid prism, with a rectangular base.
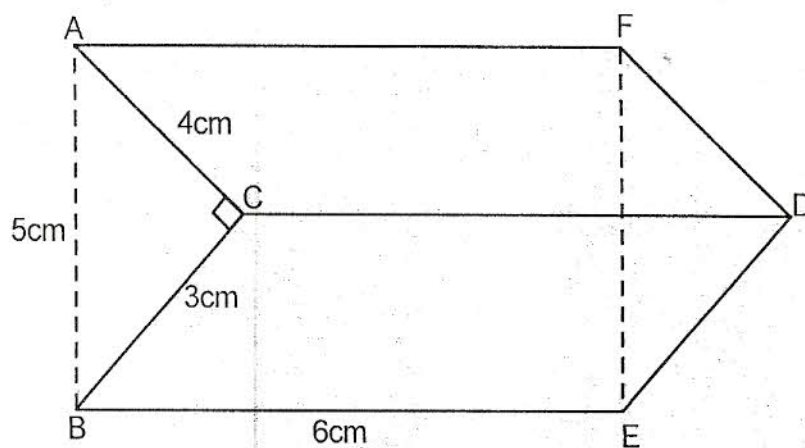
Sketch the net of the prism. **(3mks)**

9. Using a ruler and a pair of compasses only, draw a parallelogram ABCD in which AB=6cm, BC =4cm and angle BAD 75°. By construction, determine the perpendicular distance between the lines AB and CD. (4mks)

(2mks)

10. Solve for x in the equation

$$\frac{x-3}{4} - \frac{x+3}{6} = \frac{x}{3}$$

11. Makena bought 125 scientific calculators at sh. 875 each. She gave four to her children, three to her nephews and two to her nieces. She sold the rest. If she wants to make a 30% profit, how much must she sell each calculator? (3mks)

12. State all the integral values which satisfy the inequality. (3mks)

$$\frac{3a+2}{5} \le \frac{2a+3}{5} \le \frac{4a+15}{6}$$

13. Find the value of x and y, given that
$2 \times 5^y \times 16^{2x-1} = 800$. (3mks)

14. Given that $\sin(90-x)^6 = 0.8$ where x is an acute angle. Find without using mathematical tables or calculator the value of tan x. (2mks)

15. Karimi and Mutuma working together do a piece of work in $4^2/_5$ days. Karimi working alone takes 2 days more than Mutuma. How long does it take Mutuma alone to do the work? **(4mks)**

16. Find the inverse of the matrix. **(1mk)**

$$\begin{pmatrix} 2 & 5 \\ 1 & 2 \end{pmatrix}$$

hence solve the simultaneous equation. **(3mks)**

$2x + 5y = 34$

$x + 2y = 21$

17. A CDF sponsored project is meant to supply water to all families in a village. A water pipe of diameter 30cm is used to distribute water to the families. The water supply operates 10 hours per day at a rate of 3.5m/s. Each family consumes 15m³ of water per day.

a) Calculate the amount of water in litres, supplied to the village in one hour. (5mks)

b) Calculate the minimum number of families in that village. (3mks)

c) If each family pays a flat rate of shs 265 per month towards the cost of the water, how much will the villagers pay. (2mks)

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18. A continuous assessment test was marked out of 50 and the marks were recorded as follows.

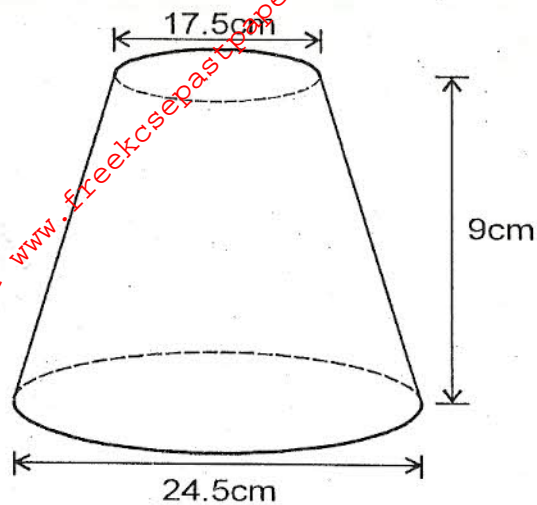| Marks	No of students
3 - 8	1
8 - 12	8
12 - 20	14
20 - 30	5
30 - 45	3
45 - 50	2

a) Calculate

i) The mean mark. (3mks)

ii) The median mark. (3mks)

b) On the grid provided draw a histogram to represent the data above. (4mks)

19. A solid candle stand is in the shape of a frustum as shown below.

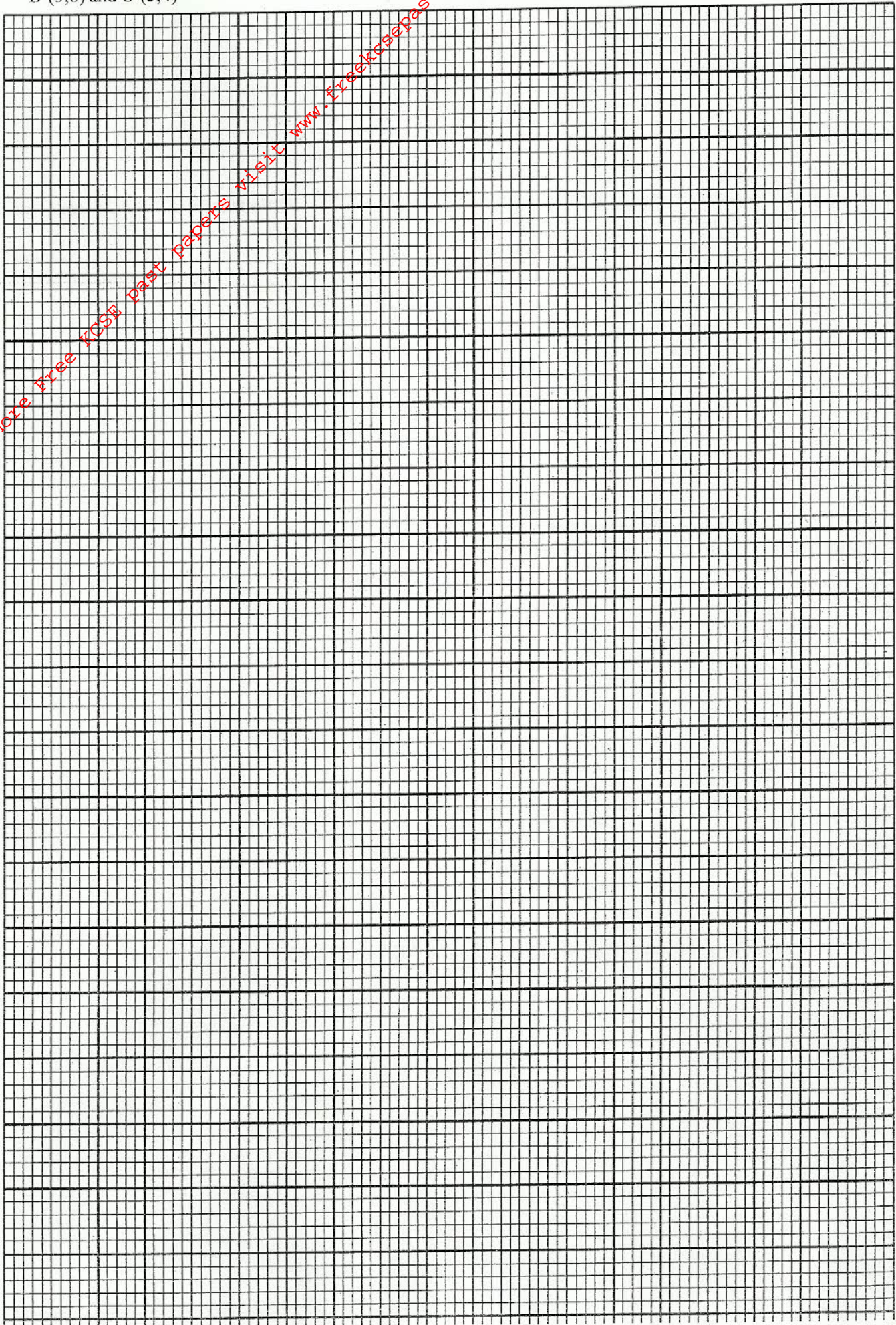a) Calculate the height of the cone from which the stand was cut off. (2mks)

b) Calculate the volume of the candle stand. (4mks)

c) Given that the density of the solid is 240g/cm³, find the mass of the stand in kilograms. (3mks)

20. Triangle ABC has vertices A (1,4), B(2, 6) and C(2, 5). Its image under an enlargement has vertices A'(3,2), B'(5,6) and C'(5,4)

a) On the grid provided find the centre and scale factor of the enlargement. (4mks)

b) Triangle ABC is given a rotation of -90° about the origin to get A''B''C''. Draw triangle A'''B'''C''' and write the coordinates of A''B''C''. (2mks)

c) A''B'C''2 is reflected on the line $y + x = 0$ to get A'''B'''C'''. Draw triangle A'''B'''C''' and with the coordinates of A'''B'''C'''. (2mks)

d) Describe a single transformation that maps triangle A''' B'''C''' onto ABC. (2mks)

21. In the triangle ABC shown below, point P divides AC into the ratio 2:1 and point Q divides BC in the ratio 1:3. PQ produced meets AB produced at R. Vector AB = b and AC = c.
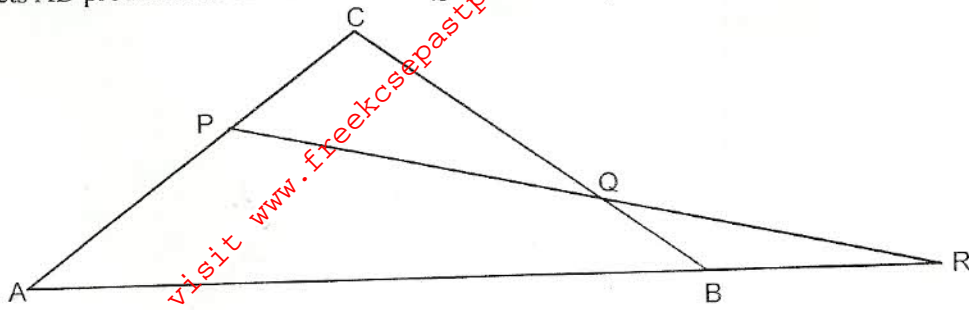
a) Find in terms of b and c vectors   (1mk)
   i) CB

   ii) PQ   (2mks)

b) Given that PR = KPQ and AR = nAB, where K and n are constants. Express   (1mk)
   i) AR in terms of n, b and c

   ii) AR in terms of k, b and c   (1mk)

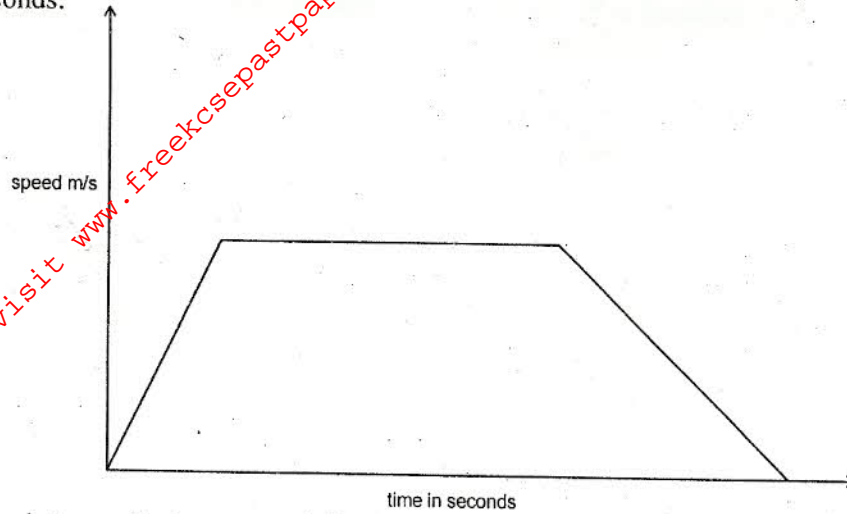c) i) Find the constants n and k.   (4mks)

   ii) Hence find the ratio in which R divides AB.   (1mk)

22. The diagram below shows the speed-time graph for a bus travelling between two towns. The bus starts from rest and accelerates uniformly for 50 seconds. It then travels at a constant speed for 150 seconds and finally decelerates uniformly for 100 seconds.

Given that the distance between the two towns is 2700m, Calculate the:-

a) Maximum speed in km/h the bus attained. (3mks)

b) Acceleration. (2mks)

c) Distance the bus travelled during the last 50 seconds. (2mks)

d) Time the bus takes to travel the first half of the journey. (3mks)

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23. Four ships are at sea such that a streamliner S is 150km on a bearing of 025⁰ from cargo ship C. A trawler T is 300km on a bearing of 145⁰ from Cargo ship C and a Yacht Y is due West of C and on a bearing of 300⁰ from T.
a) Using a scale of 1cm to represent 50km, draw an accurate scale drawing showing the relative positions of s, c, t and y. **(4mks)**

b) From the scale drawing, determine:-
 i) the distance SY. **(2mks)**

 ii) the distance ST. **(2mks)**

 iii) the bearing of Y from S. **(1mk)**

 iv) the bearing of T from Y. **(1mk)**

24. A particle moving in a straight line passes through a fixed point P. Its velocity Vms^{-1} after t seconds after passing through P is given by $V = 3t^3 + 5t^2 + 4$.

Calculate:

a) Its velocity when t = 2 seconds. (2mks)

b) Its acceleration when t = 2 seconds. (3mks)

c) Its distance from P after 4 seconds. (3mks)

d) The distance travelled by the particle in the 3rd second. (2mks)