NAME:..... INDEX NO:.....

SCHOOL:..... CANDIDATE'S SIGN:.....

DATE:.....

121/1
MATHEMATICS
PAPER 1
JULY/AUGUST - 2014
TIME: 2 ½ HOURS

MERU COUNTY JOINT EVALUATION EXAM - 2014

Kenya Certificate of Secondary Examination K.C.S.E

121/1
MATHEMATICS
PAPER 1
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INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided above.
2. This paper contains two sections. Section I and II.
3. Answer all the questions in section I and ONLY five in section II.
4. All answers and working MUST be written on the question paper in the spaces provided below each question.
5. Marks may be awarded for correct working even if the answer is wrong
6. Negligent and slovenly work will be penalized.
7. Non-programmable silent calculators and Mathematical tables may be used, except where stated otherwise.

FOR EXAMINER'S 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

This paper consists of 16 printed pages.
Candidates must check to ascertain that all pages are printed as indicated and that no question(s) is/are missing.

SECTION I (50 MARKS)

Answer all the questions in this section

1. Evaluate :- (3mks)

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

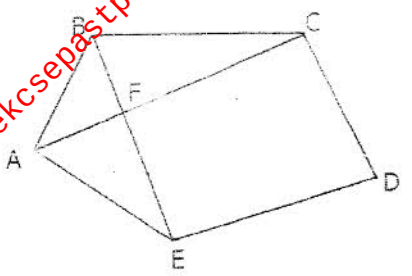
2. Use tables of squares, square roots and reciprocals to evaluate:- (4mks)

$$4.205^2 + \frac{1}{\sqrt{512.4}}$$

3. Simplify the expression (3mks)

$$\frac{3x^2 + 7xy - 6y^2}{9x^2 - 4y^2}$$

4. In the figure below ABCDE is a regular pentagon. F is the point of intersection of line AC and EB.



Find angle

(i) EBC (2mks)

(ii) EFC (2mks)

5. Solve for x and y in the equations (2mks)

$2^x + 3^y = 59$

6. Two tellers from Equity Bank takes 3 minutes and 4 minutes respectively to serve a customer. How long does it take to serve 210 customers given that they started working at the same time. (3mks)

A bus moving at an average speed of 60km/h left Meru for Nairobi at 7.00a.m while a car moving at 100km/h left Meru for Nairobi at 8.30a.m. If the distance between Meru and Nairobi 250km. How far from Nairobi did the car overtake the bus? (3mks)

8. Using a ruler and a pair of compasses only, construct triangle PQR such that PQ = 5cm, PR = 8cm and angle $RPQ = 45^0$. Construct an inscribed circle and measure its radius. (4mks)

9. Given that the position vector of P is $4i - 3j$ and vector of PQ is $5i + 2j$. Find the coordinates of Q. (3mks)

10. Given that $Sin\theta = \frac{5}{13}$, find $\tan(90 - \theta)$ in its simplest form. (2mks)

11. (a) Express the following numbers as a product of their prime factors 1176, 504 and 1225. (2mks)

(b) Hence evaluate:- (2mks)

$$\sqrt{\frac{1176\times504}{\sqrt{1225}}}$$

12. Solve the following inequalities and state the integral values. (3mks)

$x-2\le 3x+1<x+11$

13. The equation of line L_1 is $2x-5y-10=0$. Find the equation of line L_2 perpendicular to L_1 and passing through point (2, -5). (3mks)

14. A commercial bank in Kenya trade in foreign currency as shown in the table below

	Buying (Ksh)	Selling (Ksh)
1 U.S.A dollar	82.40	82.44
1 sterling pound	120.52	120.54

A student who is going for studies in U.S.A had Ksh 1, 236, 600.

(a) Calculate the amount of money in dollars she had to the nearest dollar. (1mk)

(b) His father who works in Britain sent her 4000 sterling pounds, while she was still in Kenya. Find the total amount in dollars she left with to U.S.A. (3mks)

15. A cylindrical can of radius 10.5cm contains some water. A 17.5mm thick circular ring of interval and external diameters 7cm and 14 cm respectively was submerged into the water. Find the change in the height of the water level in the cylinder to the nearest centimeter. (3mks)

16. The mass of 6 identical cylindrical containers and 4 identical rectangular containers is 7.2kg. The mass of 2 such cylindrical containers and 3 such rectangular containers is 3.4kg. Calculate the mass of each type of container.

(3mks)

SECTION II (50 MARKS)

Answer only FIVE questions in this section.

17. The table below shows the marks scored by form 4 students in a certain School.

Marks	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84
Frequency	5	4	8	6	13	4	5	3	2

(a) State (i) the modal class. (1mk)

(ii) the modal frequency (1mk)

(b) By using an assuming mean of 62, calculate:-

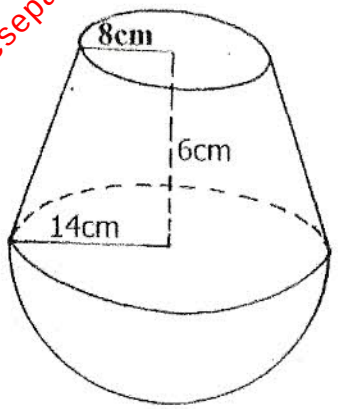
(i) The mean (3mks)

(ii) The variance (3mks)

(iii) The standard deviation. (1mk)

(c) Determine the percentage of students who failed if the pass mark was 55. (1mk)

18. The figure below shows a solid structure in the shape of a frustum of a cone with a hemispherical bottom. The radius of the hemispherical part is 14cm and is equal to the radius of the bottom of the frustum. The frustum has a top radius of 8cm and height of 6cm.



(a) calculate to 2 decimal places:-

(i) The volume of the frustum. (5mks)

(ii) The volume of the solid. (3mks)

(b) Given that the solid has a mass of 1kg. Find it's density in g/cm^3. (2mks)

9. A tea merchant mixes two types of tea A and B costing Ksh. 200 and Ksh. 300 per kg in the ration 3:2 by weight respectively.

(a) Find his percentage profit if he sells the mixture at Ksh 320 per kg. (4mks)

(b) The price of the type A tea goes up by 10% and that of type B goes up by 20%. By selling 3kg of the mixture for sh. 1040 the merchant makes the same percentage profit as before. Find in what ratio he now must mix the two types of tea. (4mks)

(c) If he adds a third type C costing sh. 100 per kg to the mixture in (a)above such that A: C = 2:1. Find the cost per kg of the new mixture to the nearest shilling. (2mks)

20. Members of a young farmers club decided to raise ksh. 63000 towards a quail farming project. Each member was to contribute equal amount. Before the contributions were made, 7 of them pulled out from the project, consequently the remaining members had to pay more.

(a) If y stands for the original number of members, write an expression to show:-

(i) the original contribution per member.

(1mk)

(ii) the new contribution per member .

(1mk)

(b) If the increase in the contribution per member was sh. 100, find the number of members that were originally involved in the project.

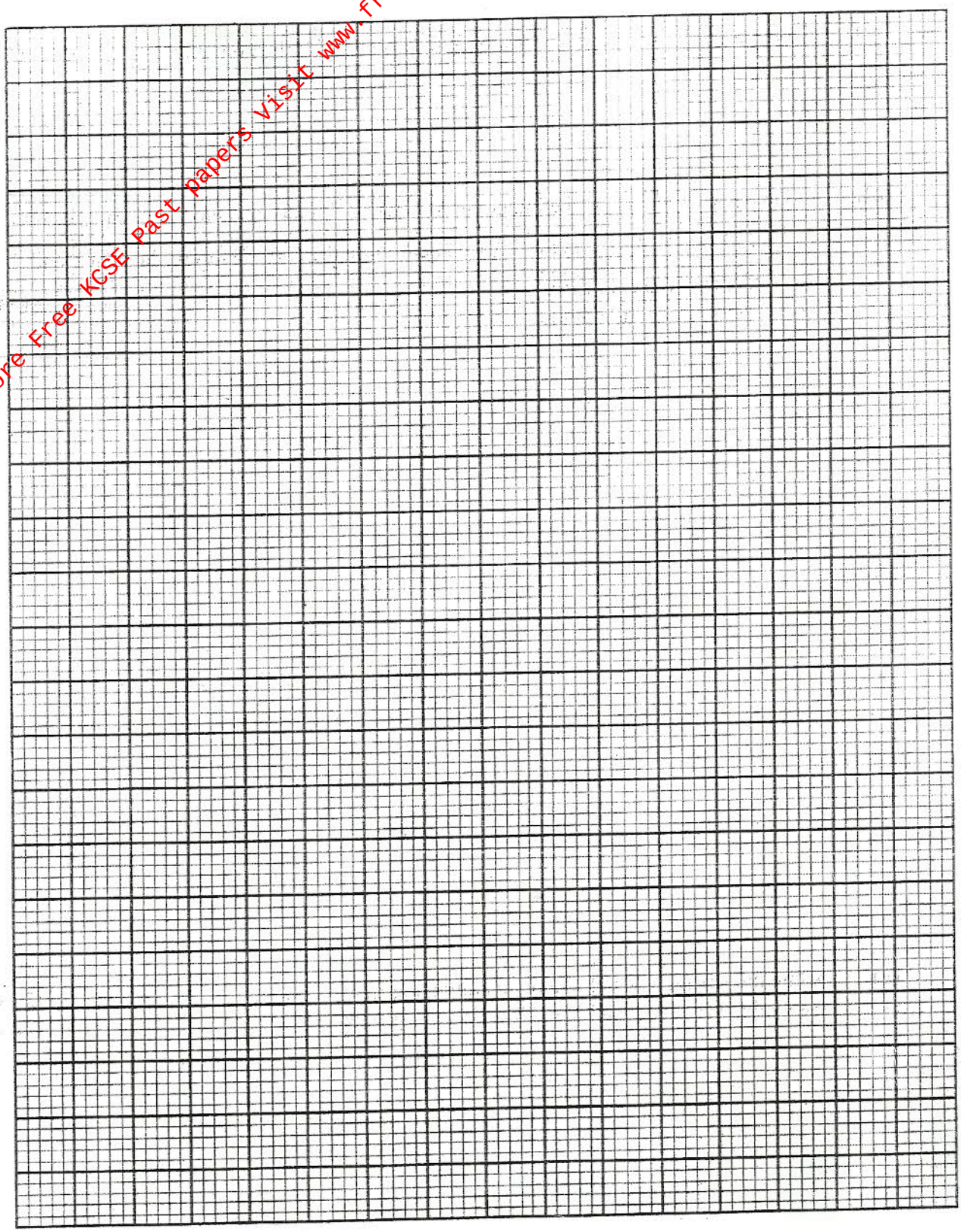
(4mks)

(c) Calculate the percentage increase in the contribution due to the withdrawal of some members to two decimal places.

(4mks)

21. Triangle ABC is such that the coordinates are A (3, 4), B (1, 3) and C (2, 1)

(a) Draw triangle ABC. (1mk)



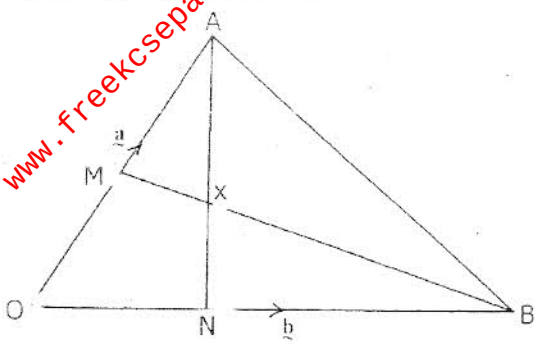
(b) Draw $\Delta A^1B^1C^1$ the image of ΔABC under rotation of $+90^0$ about (0, 0) (2mks)

(c) Draw $\Delta A^{11}B^{11}C^{11}$ the image of $\Delta A^1B^1C^1$ under a reflection in the line $y = x$. (2mks)

(d) Triangle $A^{111}B^{111}C^{111}$ is the image of $\Delta A^{11}B^{11}C^{11}$ under and enlargement. Given that A^{111} (7,-3) B^{111} (3,-1) and C^{111} (5, 3) determine the coordinates of the centre and the scale factor of the enlargement. (3mks)

(e) Name the triangles which are oppositely congruent. (2mks)

22. In triangle OAB, OA = a, OB = b. M is a point on OA such that 3OM = 2MA and N divides OB in the ratio 1:3. Lines AN and BM intersect at X.



(a) Express the following in terms of a and b

(i) AB (1mk)

(ii) MB (1mk)

(iii) AN (1mk)

(b) Given that AX = KAN and MX = PMB where k and p are constants; Express OX in terms of

(i) a , b and k (1mk)

(ii) a , b and p (1mk)

Hence find the numeric values of k and p. (4mks)

(c) Determine the ratio AX: XN (1mk)

23. Four hospitals P, Q, R and S are such that Q is 25km on a bearing of 060^0 from P. The bearing of S from P is 220^0 a distance of 7.5km. The bearing of R from S is 135^0 a distance of 50km. use a scale of 1cm to represent 5km.

(a) Draw a diagram to show the relative positions of the four hospitals. (4mks)

(b) Use your diagram to find:-

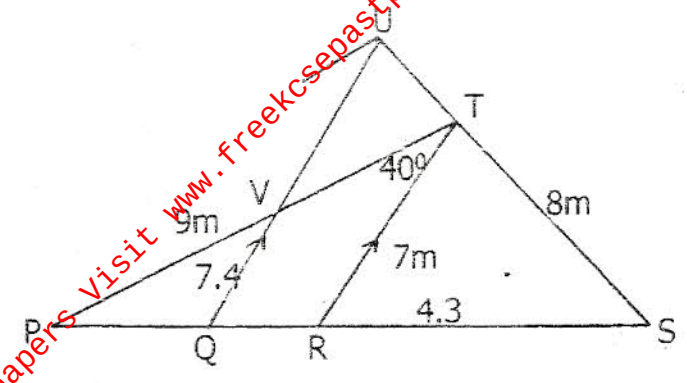
(i) The distance of R from Q (2mks)

(ii) The bearing of R from Q (1mk)

(iii) Distance of Q from S. (2mks)

(iv) The bearing of Q from S. (1mk)

24. The figure below shows the truss of a roof of a building. PT = 9m, TS = 8m, TR = 7m, QU = 7.4m, RS = 4.32m. Angle PTR = 40^0.



(a) Calculate to 2 decimal places:-

(i) PR (2mks)

(ii) Angle TPR (3mks)

(iii) Angle RTS (2mks)

(b) Given that QU is parallel to RT

(i) State the triangles which are similar. (1mk)

(ii) Hence find UT (2mks)