Name: .... Index No. ....

School: ....Date: .... Candidate's Sign ....

121/1
MATHEMATICS
FORM FOUR
PAPER 1
MARCH/APRIL - 2013
TIME: 2 ¹/₂ HRS

BARINGO NORTH TRIAL EXAMINATIONS -2013
Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS

1. Write your name, admission number, name of your school and date in the spaces provided above
3. All working must be clearly shown in the spaces provided
4. Marks may be given for correct working even if the answer is wrong.
5. KNEC Mathematical tables may be used.
6. This paper consists of Two sections I and II
7. Answer **all the questions in section I** and **any five questions from section II**.

FOR EXAMINERS 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	

This paper consists of 16 printed pages.
Candidates should check the question paper and ensure that all the pages are
printed as indicated and no questions are missing.

Answer all the questions

1.   Without using a calculator evaluate   (3marks)

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

2.   Given that $\frac{2x+3y}{3x+4y} = 5$, find the ratio of y:x   (3marks)

3.   A is (4,6) and B is (12,10). Find the equation of the perpendicular bisector of AB. (4marks)

4.   Square paring stones are used to cover an area measuring 16.5m by 12.75m. If the stones are all alike and only one whole ones are used, find:
       i) The greatest size the stones used can be   (2marks)

       ii) The number of paring stones.   (2marks)

5.   Find the value of y in the equation   (3marks)

$$\frac{243 \times 3^{2y}}{729 \times 3^y \div 3^{(2y-1)}} = 81$$

6.   A salesman earns 3% commission for selling a chair and 4% for selling a table. A chair fetches sh.600 and a table goes for sh.1500. One time, he sold 10 more chairs than tables and earned sh.7200 as commission. Find the number of chairs and tables sold.   (4marks)
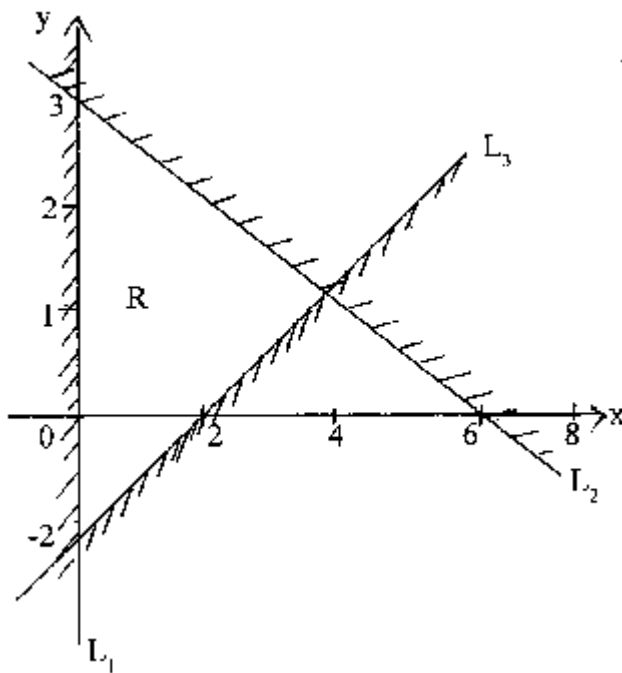
7.   Simplify   (3marks)

$$\frac{18x^2 - 2}{3x^2 + 2x - 1}$$

8.   The Region R in the figure below is defined by the inequalities L_1, L_2 and L_3.
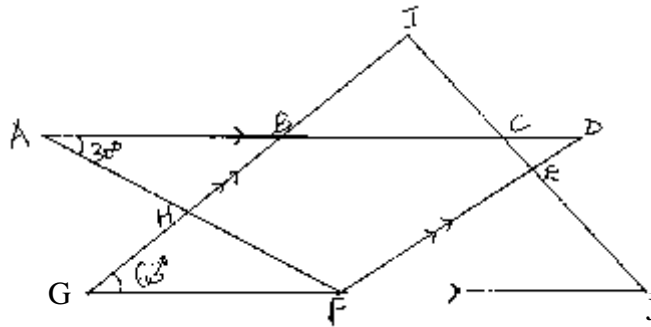

Find the three inequalities.   (3marks)

9.   Peter paid shs.180 for a shirt after getting a discount of 10%. The shopkeeper made a profit of 20% on the sale of this shirt. What percentage profit would the shopkeeper have made if no discount was allowed?   (3marks)
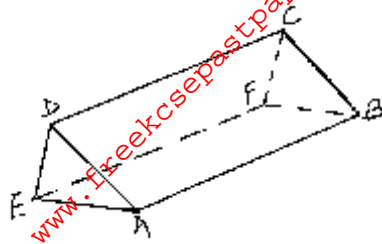
10.   In the figure below, AD is parallel to GJ and GI is parallel to FD. Angle BAH = 30⁰ and angle BGF = 63⁰. Find angle AFD.   (3marks)

11.   Without using mathematical tables or a calculator, evaluate: (2marks)

$$\frac{0.18 \times 4}{\sqrt{3.24 \times 4}}$$

12. The diagram below represents a prism of length 30cm whose cross section is an equilateral triangle of side 4cm. Draw a labeled sketch of the net of the prism. (3marks)

13. Kibet ,Tanui and Yegon are three casual workers in a tea factory. Tanui earns twice as much as Kibet and Yegon earns shs.70 more than Tanui. If their total earnings is shs.1120, express the ratio of their earnings, Kibet: Tanui: Yegon in its simplest form. (3marks)

14. A map is drawn to scale of 1:50,000. Find the area in cm² on the map of a field with an actual area of 60,000m². (2marks)

15. A regular polygon has an internal angle of 150° and a side length 10cm.
   a) Find the number of sides of the polygon. (2marks)

   b) Find the perimeter of the polygon. (2marks)

16. Two similar solids have surface areas of 48cm^2 and 108cm^2 respectively. Find the volume of the smaller solid if the bigger one has a volume of 162cm^3. (3marks)

Attempt only FIVE questions.

17. a) Find the equation of a straight line passing through the points (3,2) and (-3,6) giving your

    answer in the form $\frac{x}{a} + \frac{y}{b} = 1$ where a and b are constants. (4marks)

    b) State the coordinates of point A and B, at which the line in (a) above crosses the x-axis and y-axis respectively. (2marks)

    c) Using the information in (a) and (b) above, find the area of triangle AOB, where O is the origin. (2marks)

    d) Find the acute angle the line in (a) above makes with the x-axis. (2marks)

18.   Triangle PQR has vertices at P(2,3) Q(1,2) and R(4,1), while triangle P¹Q¹R¹ has vertices at
       P¹(-2,3), Q¹(-1,2), R¹(-4,1).
       a)   i) Draw triangle PQR and P¹Q¹R¹ on the grid provided below.   (2marks)
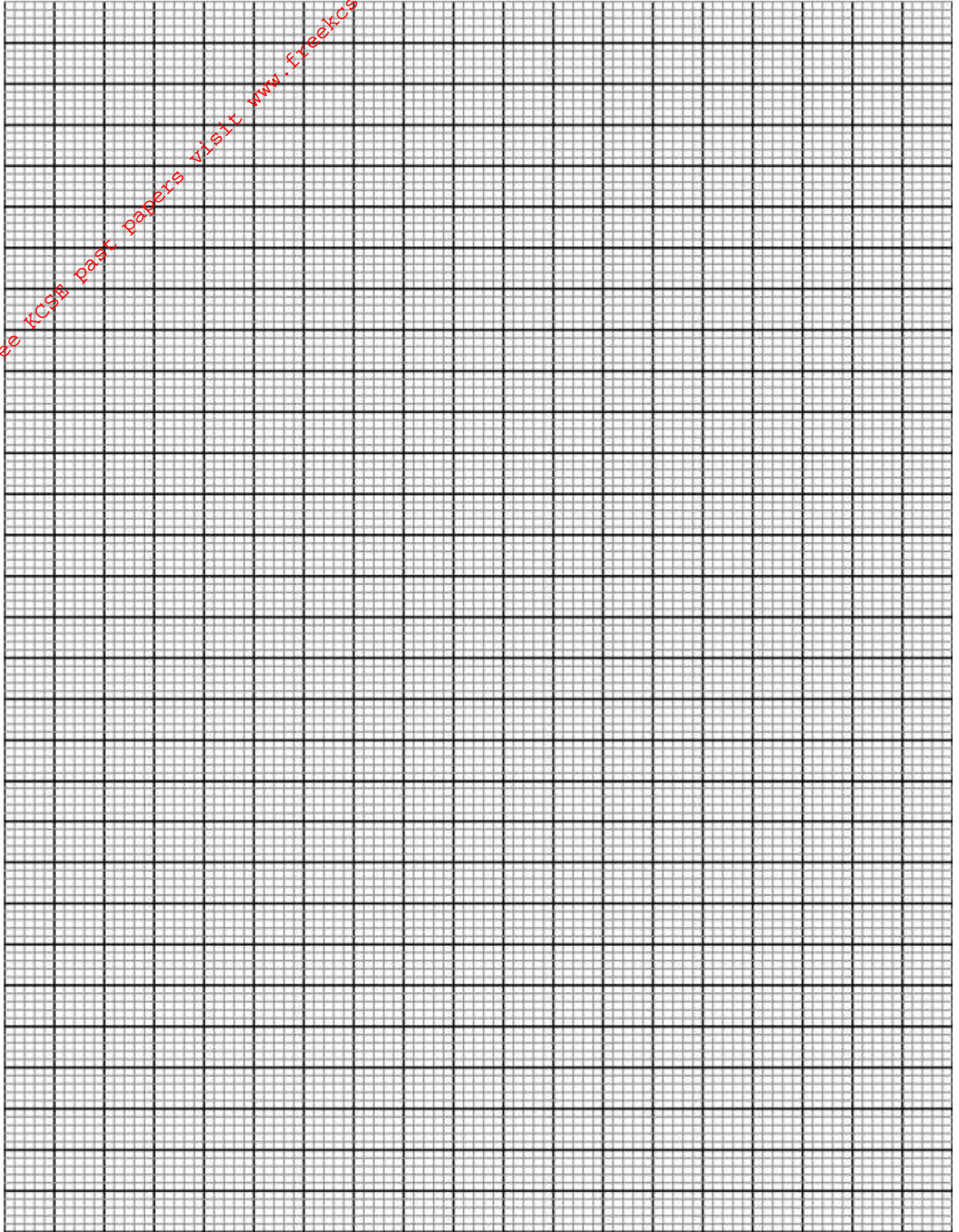
ii) Describe fully a single transformation which maps PQR onto triangle $P^1Q^1R^1$.

(1mark)

b)   i) On the same plane, draw triangle $P^{11}Q^{11}R^{11}$ the image of PQR under reflection on line $y + x = 0$. (2marks)

ii) Describe fully a single transformation which maps triangle $P^{11}Q^{11}R^{11}$ onto triangle $P^1Q^1R^1$. (1mark)

c) Draw triangle $P^{III}Q^{III}R^{III}$ such that it can be mapped onto triangle PQR by positive quarter turn about the origin. (2marks)

d) State all pairs of triangles that are oppositely congruent. (2marks)

19.   A bus and a Matatu left Nairobi for Eldoret a distance of 340km at 7.00am. The Bus travelled at 100km/h while the Matatu at 120km/h. After 30 minutes, the Matatu had puncture which took 30 minutes to repair.
a) Find how far from Nairobi did the Matatu catch up with the Bus. (5marks)
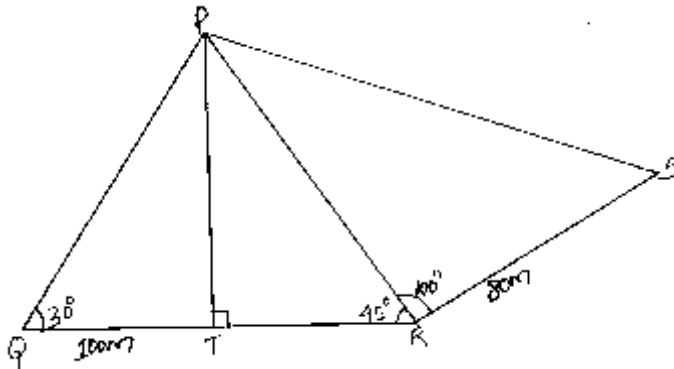
b) At what time of the day did the Matatu catch up with the Bus.? (2marks

c) At what time did the Bus reach Eldoret? (3marks)

20. The figure below represents a quadrilateral piece of land PQRS divided into three triangular plots. The length QT and RS are 100m and 80m respectively. Angle PQT = 30⁰, angle PRT = 45⁰ and angle PRS = 100⁰.

a) Find to four significant figures
   i) The length of PT. (2marks)

ii) The length of PS   (3marks)

iii) The perimeter of the piece of land.   (2marks)

b) The plots are to be fenced with five strands of barbed wire leaving an entrance of 2.8m wide to each plot. The type of barbed wire to be used is sold in rolls of length 480m. Calculate the number of rolls of barbed wire that must be bought to complete the fencing of the plots.
(3marks)

21.   The figure below shows a circle centre O in which QOT is a diameter. Angle QTP = 46⁰, angle TQR = 75⁰ and SRT = 38⁰, PTU and RSU are straight lines.
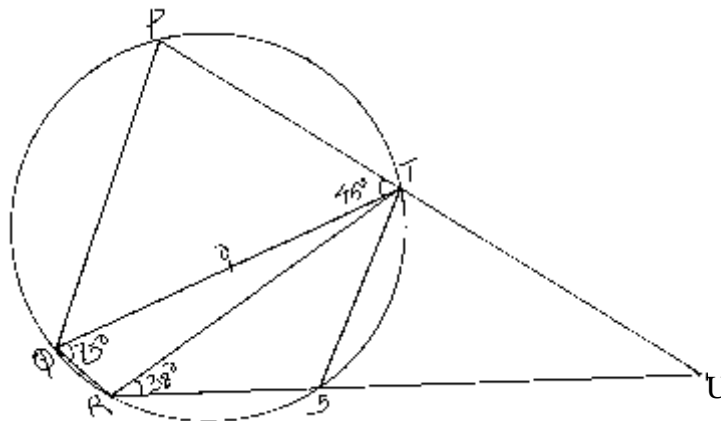
Determine the following, giving reason in each case.

a)   Angle RST   (2marks)

b)   Angle SUT   (2marks)

c)   Angle PST   (2marks)

d)   Obtuse angle ROT   (2marks)

e)   Angle SQT   (2marks)

22.   a) Use scale drawing with a scale of 1cm to represent 30km to answer this question. Three towns X, Y and Z are such that Y is 150km from X on a bearing of 060^0. The bearing of Z from X is 125^0. The bearing of Z from Y is 160^0. Determine the distance of X from Z.

(5marks)

b) A plane flies from town X on a bearing of 340^0 at 300km/h. After 40 minutes of flying, the pilot decides to fly directly to town Z. Determine the time it would take to reach Z and the bearing to which it would fly.   (5marks)

23.   The diagram below shows two circles, centre A and B which intersect at points P and Q. Angle PAQ = 70⁰ and PBQ = 40⁰ and PA = AQ = 8cm.
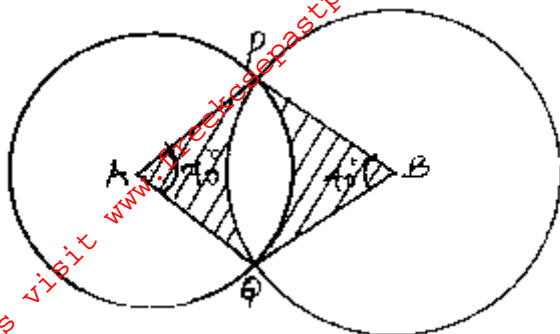
Use the diagram to calculate to two d.p

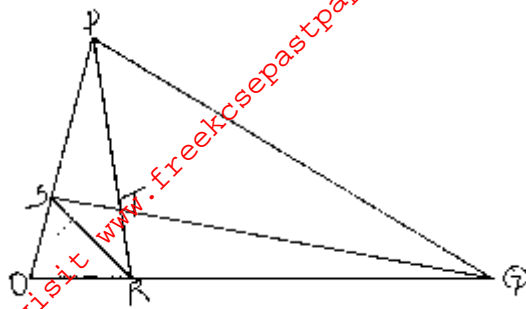a)   The length PQ   (2marks)

b)   The length PB   (2marks)

c)   Area of minor segment circle centre A.   (2marks)

d)   Area of the shaded region.   (4marks)

24.   The figure below shows triangle OPQ in which $OS = \frac{1}{3} OP$ and $OR = \frac{1}{3} OQ$.
       T is a point on QS such that $QT = \frac{3}{4} QS$.

a)   Given that $OP = \underset{\sim}{P}$ and $OQ = \underset{\sim}{q}$: express the following vectors in terms of $\underset{\sim}{p}$ and $\underset{\sim}{q}$.

       i) $\underset{\sim}{SR}$ (1mark)

       ii) $\underset{\sim}{QS}$ (2marks)

       iii) $\underset{\sim}{PT}$ (2marks)

       iv) $\underset{\sim}{TR}$ (2marks)

b) Hence or otherwise show that the points P, T and R are collinear.   (3marks)