Name _____ Admission No. _____Class____

Candidate's signature _____

Date _____

121/1
MATHEMATICS
PAPER 1
JULY/AUGUST 2014
2 ½ HOURS

MAKINDU DISTRICT INTER – SECONDARY SCHOOLS EXAMINATIONS

PRE-KENYA CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS
PAPER 1
JULY/AUGUST 2014
2 ½ HOURS

INSTRUCTIONS TO DANDIDATES

1. Write your name, index number and class in the spaces provided.
2. Sign and write date of the of the examination in the spaces provided.
3. The paper contains two sections: Section I and II
4. Answer ALL questions in section I and **STRICTLY FIVE** questions from section II.
5. All working and answers must be written on the question paper in the spaces provided below each question.
6. Show all the steps in your calculations, giving you're your answers at each stage in the spaces below each question.
7. Marks may be awarded for correct working even if the answer is wrong.
8. Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.

FOR EXAMINER'S USE ONLY
SECTION 1

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

GRAND TOTAL

SECTION II

17	18	19	20	21	22	23	24	25	TOTAL

This paper consists of 21 printed pages. Candidates should check to ensure that all pages are printed as indicated and no questions are missing.

SECTION I:(50 Marks). Answers ALL questions in this section

1. Without using a calculator evaluate (3 Marks)

$$\frac{\left(3\frac{1}{3}+1\frac{1}{9}\right)\div 1\frac{1}{3}}{\left(4\frac{2}{9}-2\frac{5}{9}\right)x\ \frac{2}{3}}$$

2. The number $5.\dot{8}\dot{1}$ contains an integral part and a recurring decimal. Convert the number into an improper fraction and hence a mixed fraction. (3 Marks)

3. The gradient of curve at any point is given by $2x - 1$. Given that the curve passes through point (1, 5), find the equation of the curve. (3 Marks)

4. Simplify: $\frac{9x^2-1}{3x^2+2x-1}$ (3 Marks)

5. A man invests KSh. 24,000 in an account which pays 16% interest p.a. The interest is compounded quarterly. Find the amount in the account after 1 ½ years. (3 Marks)

6. Given that - $\frac{3}{5}$ x + 3y – 6 = 0 is an equation of a straight line, find:
   (i) The gradient of the line (1 Mark)

(ii) Equation of a line passing through point (2,3) and parallel to the given line. (2marks)

7. A two digit number is formed from the first four prime numbers.
   (a) Draw the table to show the possible outcomes. (1 Mark)

   (b) Calculate the probability that a number chosen from the two digit numbers is an even number. (1 Mark)

8. Solve for x given that
   Log (x – 4) + 2 = log 5 + log (2x + 10) (3 marks)

9. The position vectors of A and B are given as $\mathbf{a} = 2\mathbf{i} - 3\mathbf{j} + 4\mathbf{k}$ and $\mathbf{b} = -2\mathbf{i} - \mathbf{j} + 2\mathbf{k}$ respectively.
Find to 2 decimal places, the length of vector **AB**. (3 Marks)

10. A regular polygon has internal angle of 150^0 and side of length 10cm.

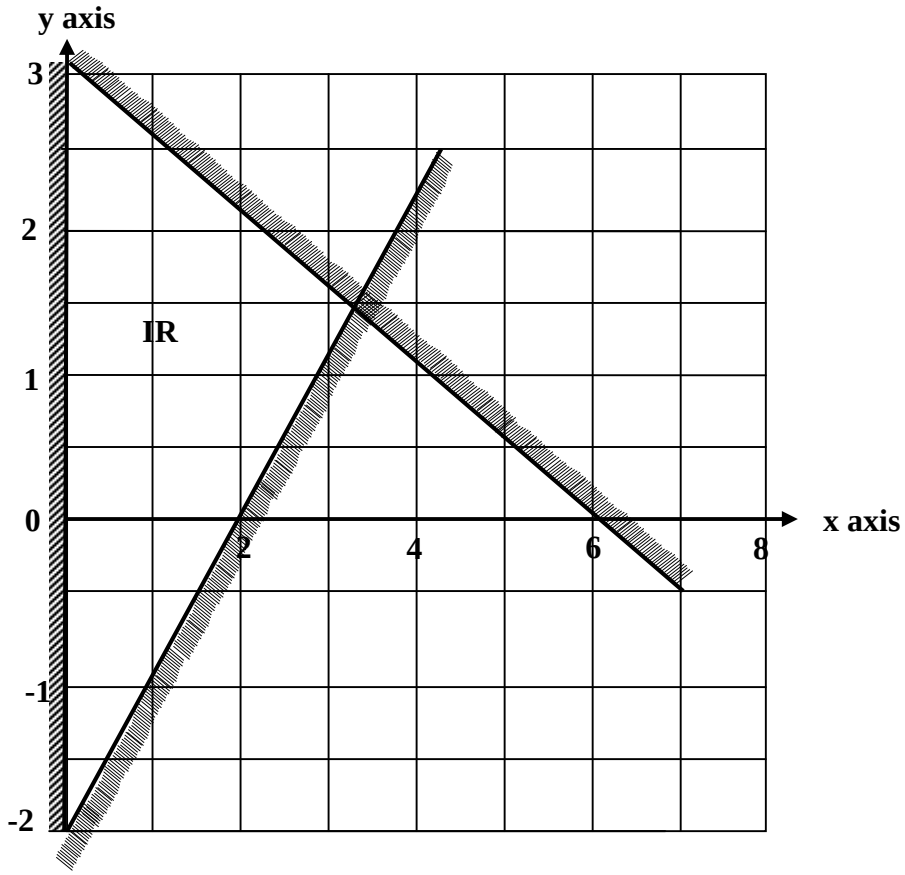
(a) Find the number of sides of the polygon. (2 Marks)

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

11. Solve for x in the equation. (3 Marks)

$$9^{(2x-1)} \times 3^{(2x+1)} = 243$$

12. The region R in the figure below is defined by the inequalities L1, L2 and L3.



Find the three inequalities (3 Marks)

13. Two boys and a girl shared some money. The elder boy got $\frac{4}{9}$ of it, the younger boy got $\frac{2}{5}$ of the remainder and the girl got the rest. Find the percentage share of the younger boy to the girl's share.

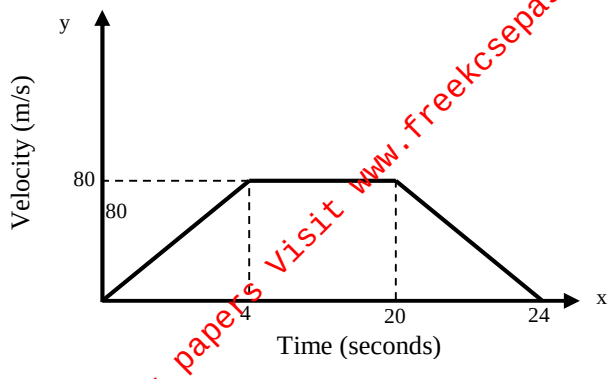
(4 Marks)

14. Use tables of reciprocals only to find the value of

$$\frac{5}{0.0829} - \frac{14}{0.581}$$

(3 marks)

15. The figure below is a velocity – time graph for a car. (not drawn to scale).



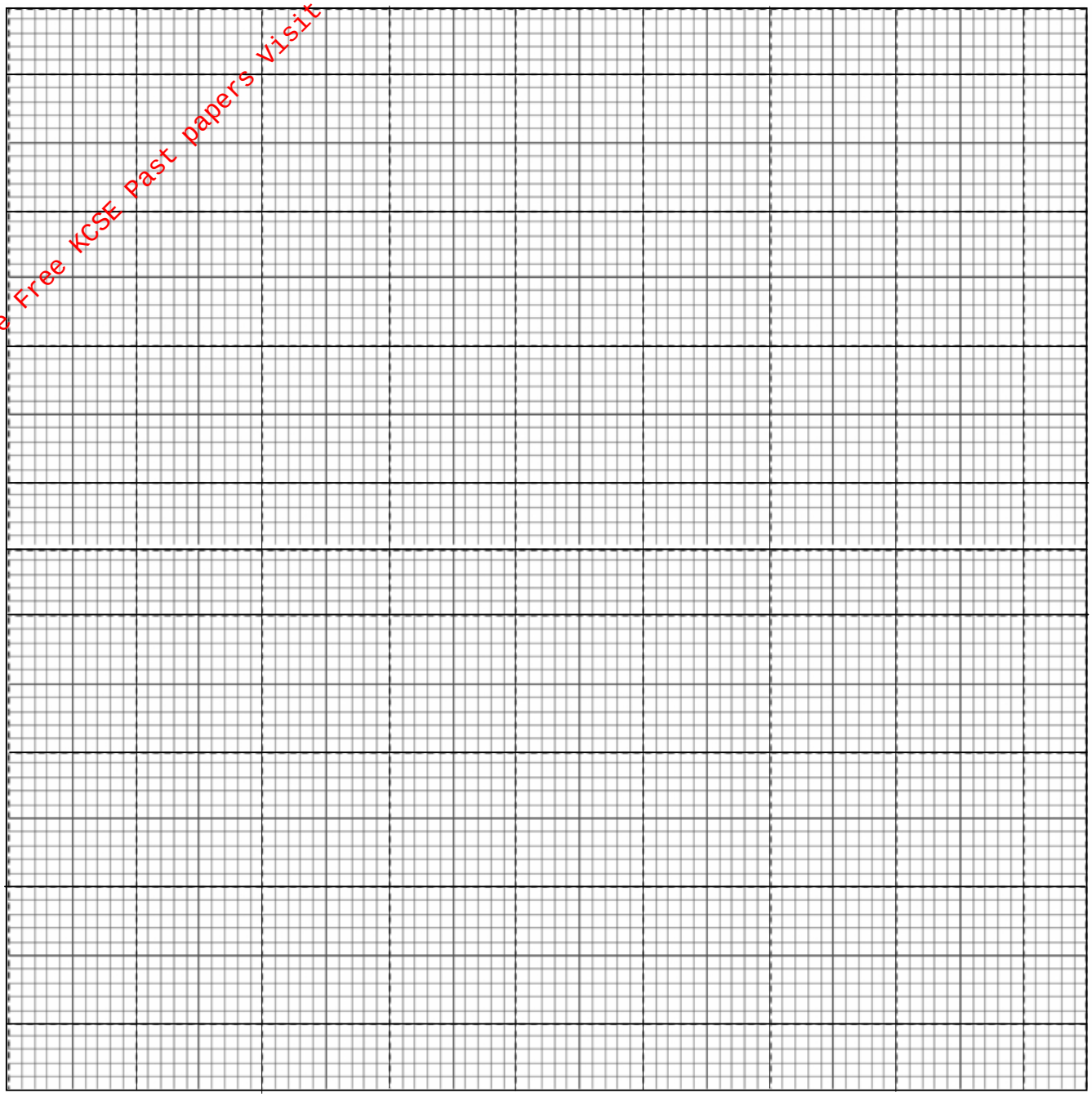
(a) Find the total distance traveled by the car? (2 Metres)

(b) Calculate the deceleration of the car. (2 Marks)

16. The table below shows marks obtained by a form four class in a certain school.

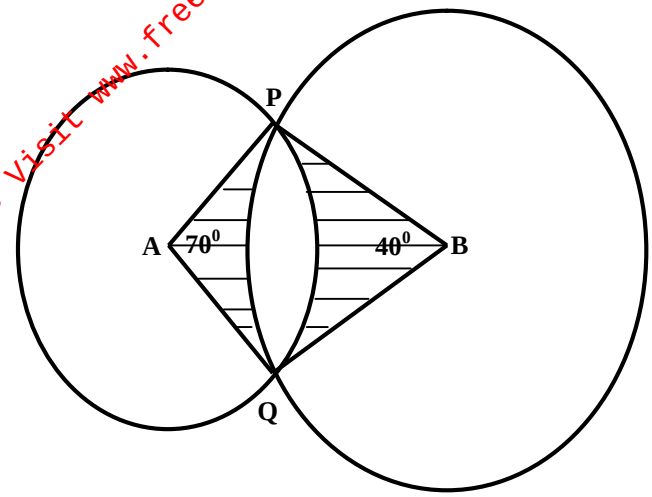
Marks (x)	8≤X<9	9≤X<11	11≤X<13	13≤X<16	16≤X<20	20≤X<21
No. of contents y	2	6	8	3	2	1

Use the table to represent the information on a histogram. (3 Marks)



SECTION II (50 MARKS): Answer any five questions in this section.

17. The diagram below shows two circles, centre A and B which intersect at points P and Q. Angle PAQ = 70^0, angle PBQ = 40^0 and PA = AQ = 8cm.



Use the diagram to calculate

(a) PQ to correct to 2 decimal places (2 Marks)

(b) PB to correct to 2 decimal places (2 Marks)

(c) Area of the minor segment of the circle whose centre is A (2 Marks)

(d) Area of shaded region (4 Marks)

18. The income tax rates in a certain year are as shown below.

Income (k£ – p.a	Rate (KSh. per £)
1 – 4200	2
4201 – 8000	3
8001 – 12600	5
12601 – 16800	6
16801 and above	7

Omar pays Sh. 4000 as P.A.Y.E per month. He has a monthly house allowance of KSh.10800 and is entitled to a personal relief of KSh. 1,100 per month. Determine:

(i) his gross tax per annum in Kshs (2 Marks)

(ii) his taxable income in K£ per annum (2 marks)

(iii) his basic salary in Ksh. per month (2marks)

(iv) his net salary per month (2 marks)

19. A straight line passes through the points (8, -2) and (4,-4).

(a) Write its equation in the form ax + by +c = 0, where a, b and c are integers. (3 Marks)

(b) If the line in (a) above cuts the x-axis at point P, determine the coordinates of P. (2 Marks)

(c) Another line, which is perpendicular to the line in (a) above passes through point P and cuts the y axis at the point Q. Determine the coordinates of point Q. (3 Marks)

(d) Find the length of QP (2 Marks)

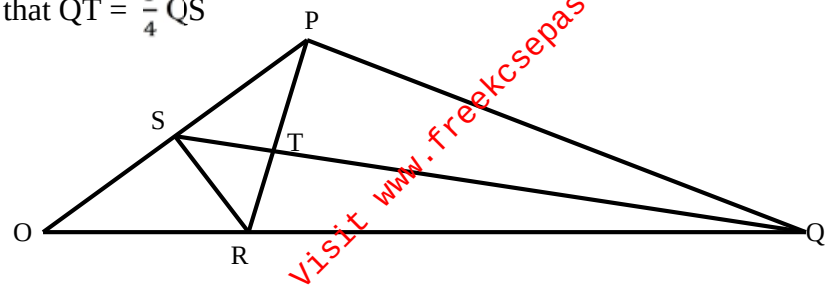
20. A bus and a Nissan left Nairobi for Eldoret, a distance of 340 km at 7.00 a.m. The bus travelled at 100km/h while the Nissan travelled at 120km/h. After 30 minutes, the Nissan had a puncture which took 30 minutes to mend.

(a) Find how far from Nairobi the Nissan caught up with the bus (5 Minutes)

(b) At what time of the day did the Nissan catch up with the bus? (2 Marks)

(c) Find the time at which the bus reached Eldoret (3 Marks)

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



(a) Given that OP = p and OQ = q, express the following vectors in terms of p and q.

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

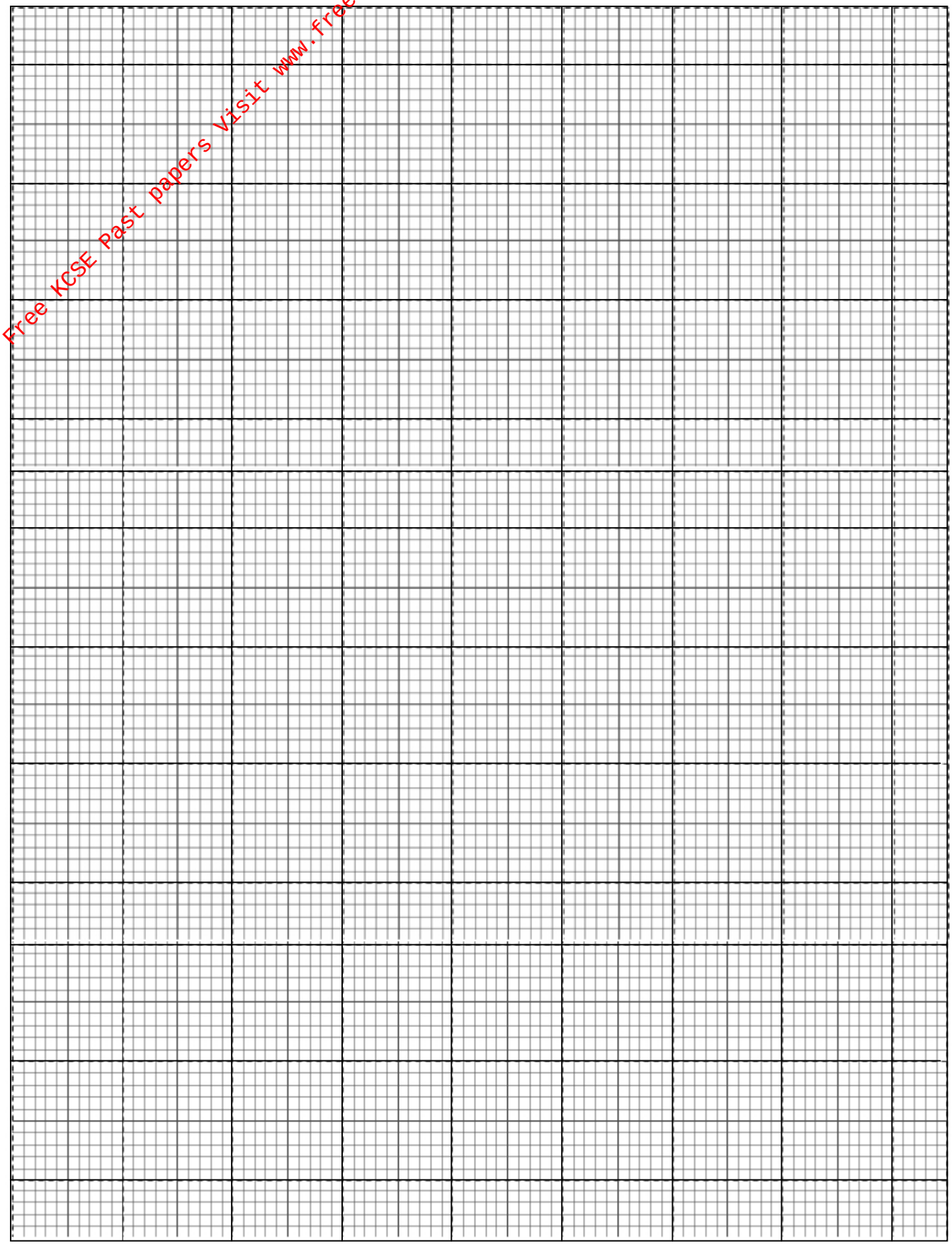
(ii) $\underset{\sim}{QS}$ (2 Marks)

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

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

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

22. On the grid provided below:
    (a) Draw triangle ABC whose coordinates are A (8,6), B(6,10) and C(10,12) and its image A'B'C' after undergoing a reflection in the line y = x. Write the co – ordinates of A' B' C' (4 Marks)



(b) Triangle A'B'C' undergoes an enlargement centre (0,0) scale factor ½ to form triangle A''B''C''. Draw triangle A''B''C''. (3 Marks)

(c) Triangle ABC is stretched with y – axis invariant and stretch factor of ½ to obtain triangle A'''B'''C'''. Draw triangle A''B''C'''. (3 Marks)

23. Three Kenyan warships A, B and C are at sea such that ship B is 450km on a bearing of 030^0 from ship A. Ship C is 700km from ship B on a bearing of 120^0. An enemy ship D is sighted 1000km due south of ship B.

(a) Taking a scale of 1cm to represent 100km locate the position of the ships A, B, C and D. (4 Marks)

(b) Find the compass bearing of:

(i) Ship A from ship D (1 Mark)

(ii) Ship D from ship C (1 Mark)

(c) Use the scale drawing to determine

(i) The distance of D from A (1 Mark)

(ii) The distance of C from D (1 Mark)

(d) Find the bearing of:

(i) B from C (1 Mark)

(ii) A from C (1 Mark)

24. (a) Fill the table below for the function $y = 2x^2 + 6x - 5$, for $-4 \leq x \leq 3$ (2 Marks)

X	-4	-3	-2	-1	0	1	2	3
Y								

(b) (i) Draw the curve for $y = 2x^2 + 6x - 5$, for $-4 \leq x \leq 3$ on grid given (1 Mark)

(ii) On the same axes, draw line $y = 7x + 1$ (1 Mark)

(c) Determine the values of x at the points of intersection of the curve $y = 2x^2 + 6x – 5$ and line $y = 7x + 1$ (1 Mark)

(d) Find the actual of the region bounded by the curve $y = 2x^2 + 6x – 5$ and line $y = 7x + 1$ (4 Marks)