Name: …… **Index no** ……..…..

School: ……..…. **Candidate's sign** ……..

Date: ……

121/2
MATHEMATICS
PAPER 2
JULY/AUGUST 2011
TIME: 2 ½ HOURS

NYAMIRA DISTRICT JOINT EVALUATION TEST

Kenya Certificate of Secondary Education (K.C.S.E.)

Mathematics
Paper 2

INSTRUCTIONS TO CANDIDATES:

- *Write your **name** ,**index number** , **Signature** and write date of examination in the spaces provided*
- *The paper contains **two** sections. Section **I** and Section **II.***
- *Answer **all** the questions in section I and any **five** questions in section **II.***
- *Answers and working **must** be written on the question paper in the spaces provided below each question.*
- *Marks may be given for correct working even if the answer is wrong.*
- *Non programmable silent electronic calculators and KNEC mathematical table may be used, except where stated otherwise.*

FOR EXAMINERS USE ONLY

SECTION 1

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									

TOTAL MARKS

This paper consists of 12 printed pages. Candidates should check to ascertain that all papers are printed as indicated and that no questions are missing

SECTION A(50 MARKS)
Answer all questions

1. Three fifth of work is done on the first day, On the second day 2/3 of the remainder is completed. If on the third day $7/8^{th}$ of t what remained is done. What fraction of work still remains done. (3mks)

2. Solve the equation (4mks)
$3x - y = 3$
$9x^2 - y^2 = 45$

3. Find, without using mathematical tables the values of x which satisfy the equation (4mks)

$$\log_2 (x^2-9) = 3 \log_2 2+1$$

[

4. Expand and simplify $(3x-y)^4$ hence usethe first three terms of the expansion to approximate the value of $(6- 0.2)^4$ (4mks)

5. The position vectors of points A and B are $\mathbf{a} = -2\underset{\sim}{i} + j - 8\underset{\sim}{k}$ and $\mathbf{b} = -3\underset{\sim}{i} + 2\underset{\sim}{j} - 2\underset{\sim}{k}$ respectively. Find the magnitude of **AB** (3mks)

6. Simplify $\frac{P^2 + 2pq + q^2}{P^3 - pq^2 + p^2q - q^3}$ (4mks)

7. If Z varies jointly as x^2 and the square root of y and z = 18 ¾ when x = 5 and y = 9
Find z when x = 3 and y = 16 (3mks)

8 A stone is thrown vertically upwards from point O. After t seconds, the stone is S metres from O
Given that $S= 29.4t - 4.9t^2$. Find the maximum height reached by the stone. (3mks)

9. Find the rate at which shs. 18,000 invested at compound interest amount to shs 24,870 for 4 years.
(4mks)

10. Ketepa tea worth Kshs 40 per Kg is mixed with Sasini tea worth Ksh 60 per kg in the ratio 3:1. In what ratio should this mixture be mixed with Kericho tea worth Kshs 50 per kg to produce a mixture worth Kshs. 47 per kg. (3mks)

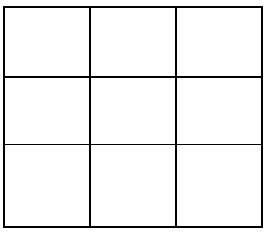
11. The present ages of a farther and his son are in the ratio 7: 2, and the son's age is 14. What will be the ratio of their ages in 6 years time. (3mks)

12. Make P the subject $R = \sqrt{\frac{3T\ (P-T)}{P}}$ (4mks)

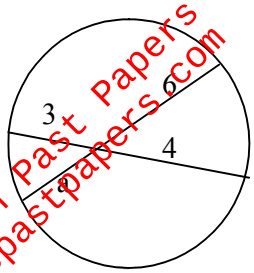
13. Find the value of m in the equation below. $\left[\frac{1}{27}\right]^{m} \times (81)^{-1} = 243$ (3mks)

14. The total marks scored in a test by 6 pupils was 420. If the mean mark for the first 5 pupils was 68, find the marks scored by the sixth pupil. (2mks)

15. How many squares are in the figure below. (1mk)



16. In the diagram below find the value of a. (2mks)

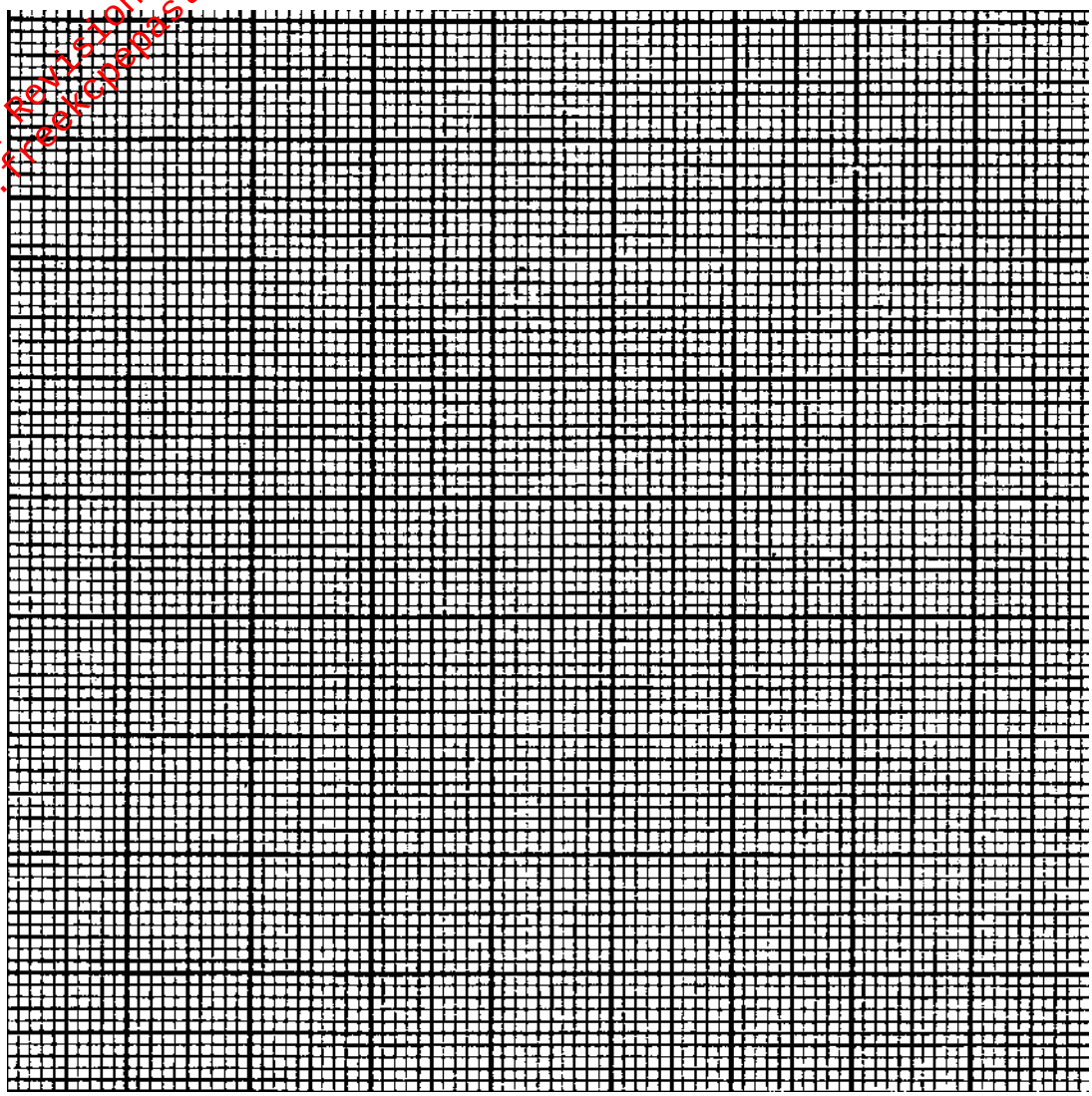


SECTION II (50MKS)

Answer only five questions from this section.

17. (a) Copy and complete the table below for the equation $y = 4x^3 — 3x^2 —6x$ (2mks)

x	-1¼	-1	- ½	0	½	1	1½	1 ¾
y	-5		1 ¾		-3 ¼		-2 ¼	



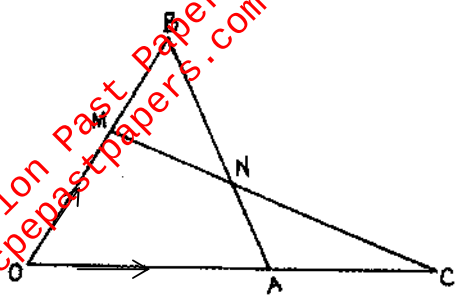
(b) Using a scale of 4cm to represent 1 unit on the x-axis and 2cm to represent I unit on the y-axis draw the graph of $y= 4x^3 — 3x^2 - 6x$ for $1¼ \leq x \leq 1¾$ (3mks)

(c) Use your graph to find the range of values of x for which $y \leq -3$ (1 mk)

(d) i)Use your graph to solve the equation $4x^3 - 3x^2 - 6x = 0$ (2mks)

ii) By drawing a suitable straight line graph on the same axes, solve the equation $- 4x^3 + 3x^2 +7x -1= 0$ (2mks)

18. In the triangle OAB below, **OA** = a **OB** = b and **OC** = $\frac{3}{2}$ **OA.** M divides OB in the ratio 3:2



(a) Express in terms of a and b only, the vectors

(i) $\overrightarrow{\mathbf{AB}}$. (1mk)

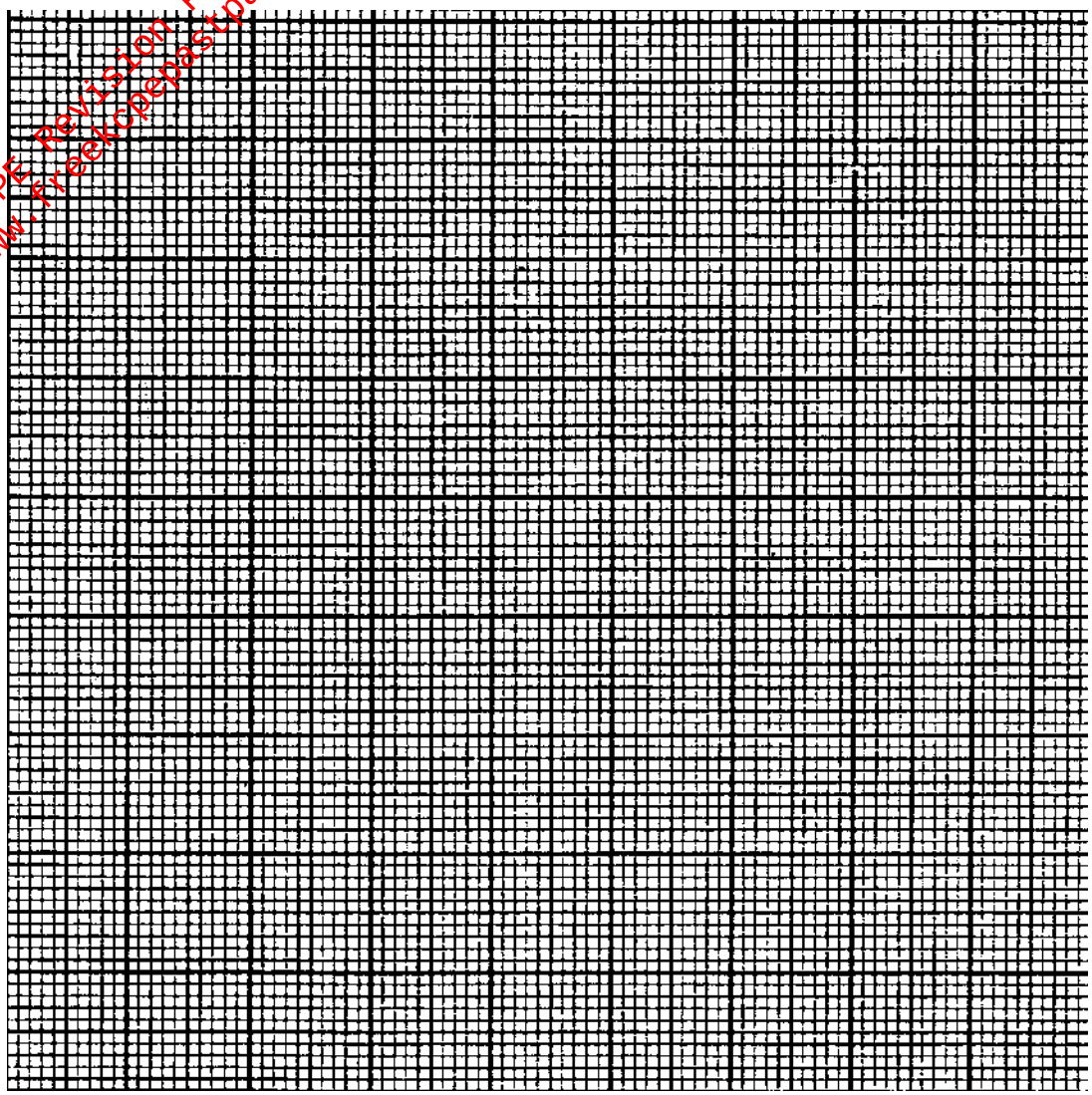
(ii) $\overrightarrow{\mathbf{MC}}$ (1mk)

b) Given that **MN**= h **MC** and **BN** = k**BA**, express vector MN in two different ways and hence, find the value of h and k. (6mks)

c) Show that the points M,N and C are collinear. (2mks)

19. Two quantities A and B, are related by the equation $A = kB^n$
The table below shows the corresponding values of A and B from the relation

A	1.2	1.5	2.0	2.5	3.5	4.5
B	1.57	2.26	3.39	4.73	7.87	11.5



a) Determine a linear equation connecting A and B. (1mk)
b) Draw a suitable straight — line graph to represent create a large space this data. (5mks)
c) Use your graph to estimate the values k and n (3mks)
d) Hence write the equation connecting A and B (1mk)

20. An aircraft leaves town P (30^{o}S, 17°E) and moves directly northwards to Q(60°N, 17°E). It then moved at an average speed pf 300 knots for 8 hours westwards to town R. Determine;

a) The distance PQ in nautical miles. (3mks)

b) The position of town R. (3mks)

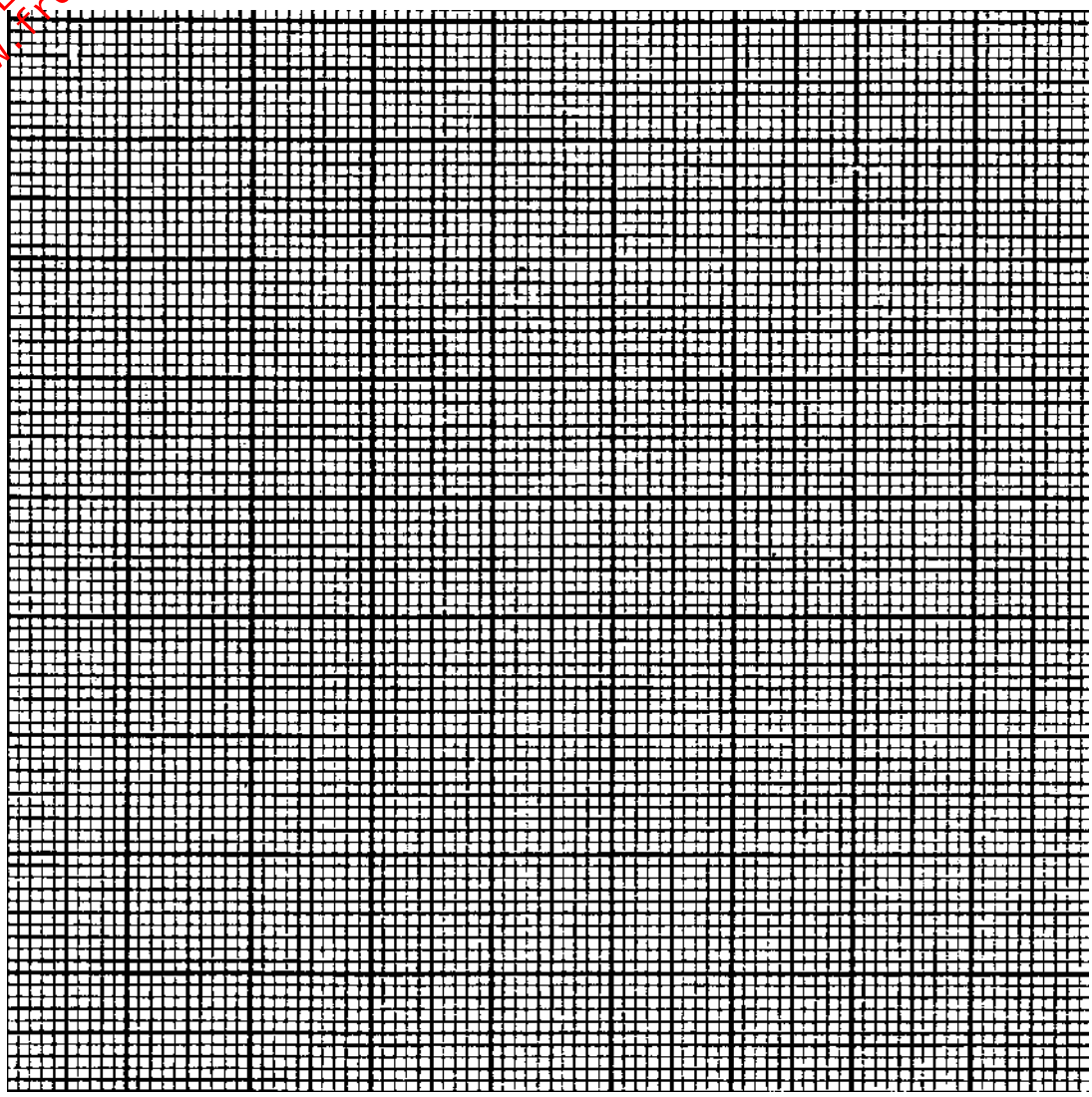
c) The local time at R if local time at Q is 3.12p.m (2mks)

d) The total distance moved from P to R in kilometers. Take 1 nautical; = 1.853 kilometres. (2mks)

21. A tailor is required to make two types of skirts. Type A and type B. The total number of skirts must not exceed 500. Skirts of type B must not be less than skirts of type A. The tailor must make at least 200 skirts of type A. Let x represent the number of skirts of type A and Y represent the number of skirts of type B.

a) Write down the inequalities that describe the given conditions above. (3mks)

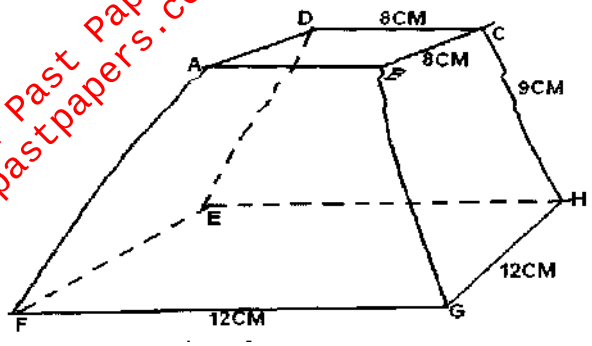
b) On the grid provided, draw the three inequalities and shade the unwanted regitrns. (3mks)



(c) Profits were as follows: (4mks)

Type A, Kshs. 900 per skirt
Type B, Kshs. 700 per skirt
Determine the maximum possible profit.

22. The figure below shows solid frustum of pyramid with a square top of side 8cm and a square base of side 12cm. The slant edge of the frustum is 9cm



(a) Calculate the total surface area of the frustum. (4mks)

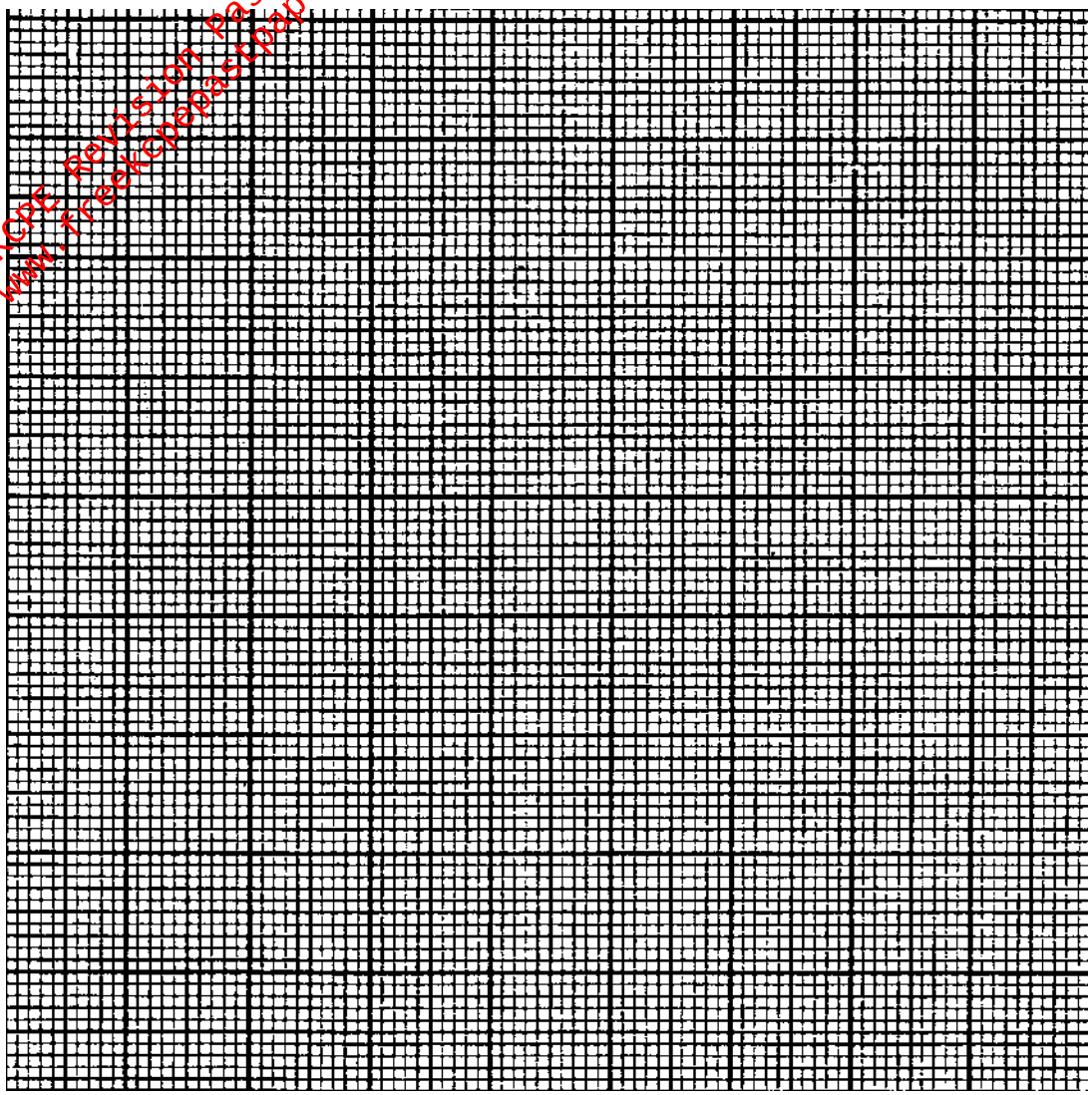
(b) Calculate the volume of the solid frustum. (4mks)

(c) Calculate the angle between the planes BCHG and the base EFGH. (2mks)

23. The data below shows the masses in grams of 50 passion fruits.

Mass (g)	25-34	35-44	45-54	55-64	65-74	75-84	85-94
No. of passion fruits	3	6	16	12	8	4	1

a) On the grid provided, draw a cumulative frequency curve for the data. (4mks)



b) Use the graph in (a) above to determine

(i) The 64^{th} percentile (1 mk)

(ii) The quartile deviation (3mks)

(iii) The percentage of passion fruits whose masses lie in the range 41g to 89g. (2mks)

24. The diagram below shows a triangle ABC with A(3,4) ,B(1,3) and C (2,1)

Diagram

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

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

(c) Draw $\Delta A^{111}B^{111}C^{111}$, the image of $\Delta A^{111}B^{111}C^{111}$ under a rotation of 90° about (0,0). (2mks)

(d) Describe a single transformation that maps ΔABC onto $\Delta A^{111}B^{111}C^{111}$. (2mks)

(e) Write down the equations of the lines of symmetry of the quadrilateral $BB^{111}A^{111}C^{111}$ (2mks)