AGORO OYOMBE SECONDARY SCHOOL EXAMINATIONS

Name:…… **Adm No:**…….…..**Class:**……..…...

FORM 4 FEBRUARY MATHEMATICS EXAMINATION

TIME: 2 ½ HOURS

Instructions to candidates

- Write your Name, Admission Number, Class, Signature and Date of the Examination on the spaces provided at the top of this page.
- This paper consists of two sections: **Section I** and **Section II**. Answer **All** questions in **section I** and **ONLY FIVE** questions in **section II**.
- Show **All** the steps in your calculations, giving your answers at each stage on the spaces below each question.
- Marks may be given for correct working even if the answer is wrong.
- KNEC Mathematical tables & Silent Non-Programmable Calculators may be used except where stated otherwise.

For Examiner's 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

SECTION 1(50MARKS)

Answer all questions in this section

1. Without using tables or calculators evaluate; (3marks)

$$\frac{0.1 + 0.45 \div 0.5}{-4.5 \times 0.2 - 0.1}$$

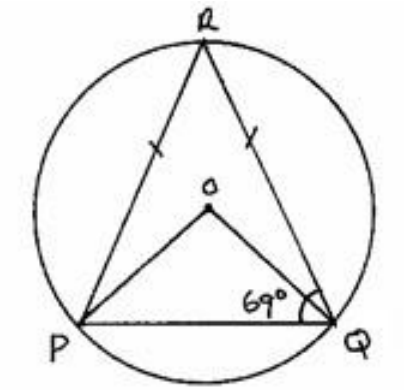
2. Three signals have been set to flash at intervals of 15min, 24min and 36min. If they flash at 8.13am, when will they flash together again? (3marks)

3. A man purchases a bull at sh. 50,000 and later sells it at sh. 55,000. find his percentage profit. (2marks)

4. Under a shear with x-axis invariant a square with vertices A (1, 0), B (3, 0), C (3, 2) and D (1, 2) is mapped onto a parallelogram with vertices A^1 (1, 0), B^1 (3, 0), C^1 (7, 2) and D^1 (5, 2). Find the shear matrix. (3marks)

5. Find the mean of the data below 2, 4, 6, 8, 10, 5, 6, 9, 4, 6. (2 marks)

6. In the figure below, O is the centre of the circle. Given that PR = QR and angle PQR = 69°.



Find; (giving reasons)

i) Angle RPQ (2marks)

ii) Angle POQ. (3marks)

7. Expand $(1 - 2x)^6$ upto the term containing x^3. Hence use the expansion to estimate 0.98^6 to four decimal places. (3marks)

8. An exterior angle of a regular polygon is sixty times the sum of its interior angles. Find the number of sides of the polygon. (3marks)

9. Find the centre and radius of a circle whose equation is $x^2 + y^2 - 4x + 6y + 4 = 0$. (3marks)

10. John spent $\frac{2}{3}$ of his salary on food $\frac{1}{3}$ of the remainder on rent and saved the rest. What fraction of his salary did he save? If he spent Sh.12000 on food, how much did he spend on rent. (3marks)

11. A ladder 8m long is leaning on against a vertical wall, with its foot 2m from the wall. Calculate the angle the ladder makes with the floor. (3marks)

12. The radii of two similar cylinders are in the ratio $1:4$. Find the ratio of their surface areas. Hence determine the surface area of the larger cylinder if the radius of the smaller one is 10cm. (3marks)

13. Factorise completely $\dfrac{x^2-6x+8}{x^2-16}$ (4marks)

14. A train moving at an average speed of 72km/hr takes 15 sec to completely cross a bridge that is 80m long. Find the length of the train (3marks)

15. Evaluate (3marks)

$$\frac{\frac{1}{2}\ of\ 3\frac{1}{2}+(2\frac{1}{2}-\frac{2}{3})}{\frac{3}{4}of\ 2\frac{1}{2}\ \div\frac{1}{2}}$$

16. Given the matrix P as $\begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$, find its inverse and hence solve the simultaneous equation (3marks)

$$\begin{aligned} 2x\ -3y\ &= 5 \\ -x\ +2y\ &= -3 \end{aligned}$$

SECTION B (50MARKS)

Attempt ALL in the spaces provided

17. The points X (4, -3) and Y (-3, -2) are on a straight line.
Find ;

a) The gradient of line XY (2marks)

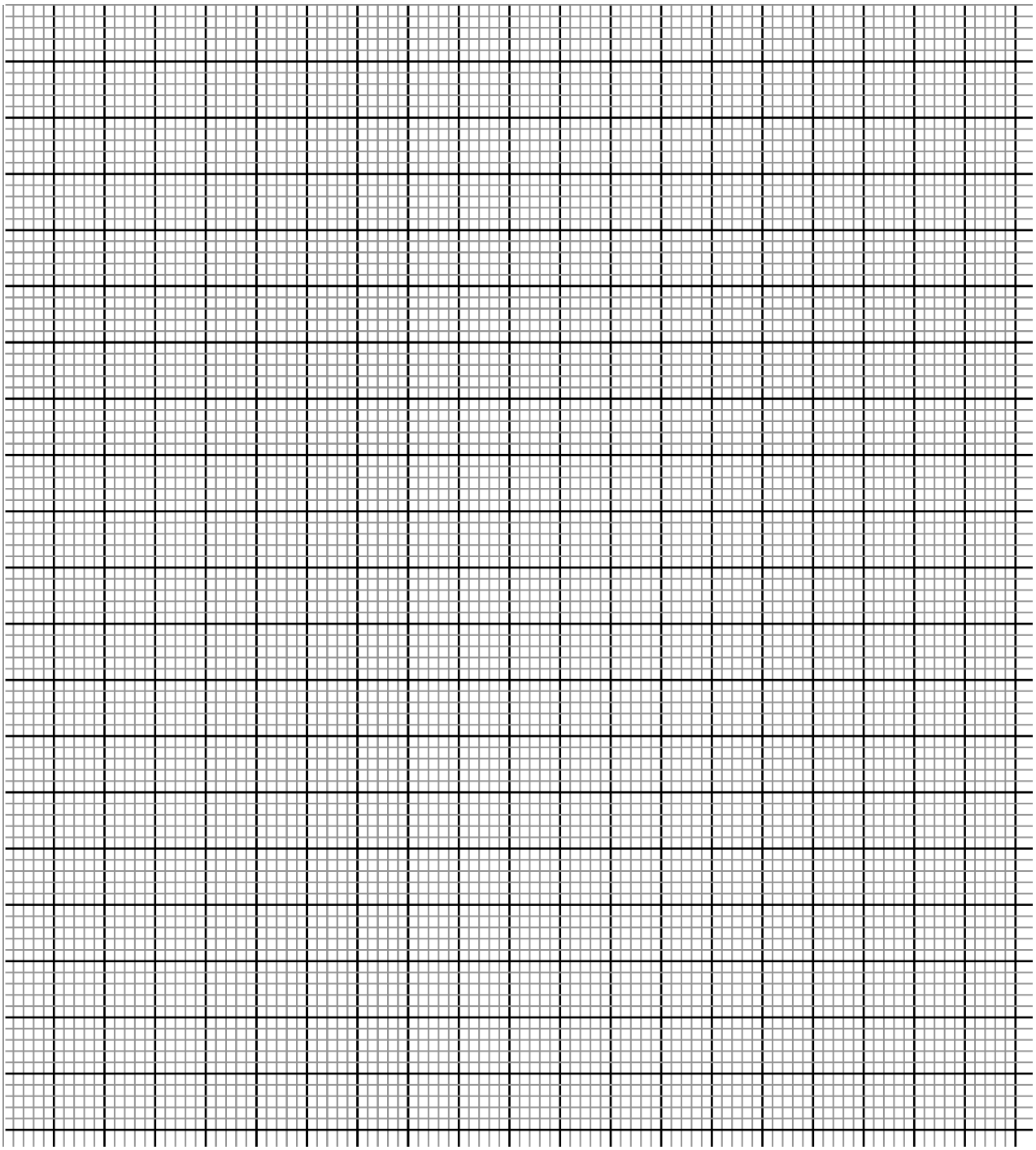
b) The coordinates of the mid point of line XY. (2marks)

c) the equation of the perpendicular bisector of line XY, write your answer in the form $y = mx + c$ (4marks)

d) the length of line XY, correct to 4 significant figures. (2marks)

18. A triangle has vertices A (1, 2), B (4, 4) and C (6, 2).

a) Draw triangle ABC on the grid provided.



b) Construct the image triangle $A^1B^1C^1$ image of triangle ABC under a rotation of 90° clockwise about the origin. State the coordinates of $A^1B^1C^1$ (3marks)

c) Draw triangle $A^{11}B^{11}C^{11}$ the image of triangle $A^1B^1C^1$ under a reflection in line $y = x$. State the coordinates of $A^{11}B^{11}C^{11}$ (3marks)

d) Draw triangle $A^{111}B^{111}C^{111}$ the image of triangle $A^{11}B^{11}C^{11}$ under a reflection in the line $y = x$ and state the coordinates of its vertices. (2marks)

e) Describe a single transformation that maps triangle $A^{11}B^{11}C^{11}$ onto triangle ABC. (1mark)

19. The following table shows heights of 100 seedlings each measured to the nearest cm.

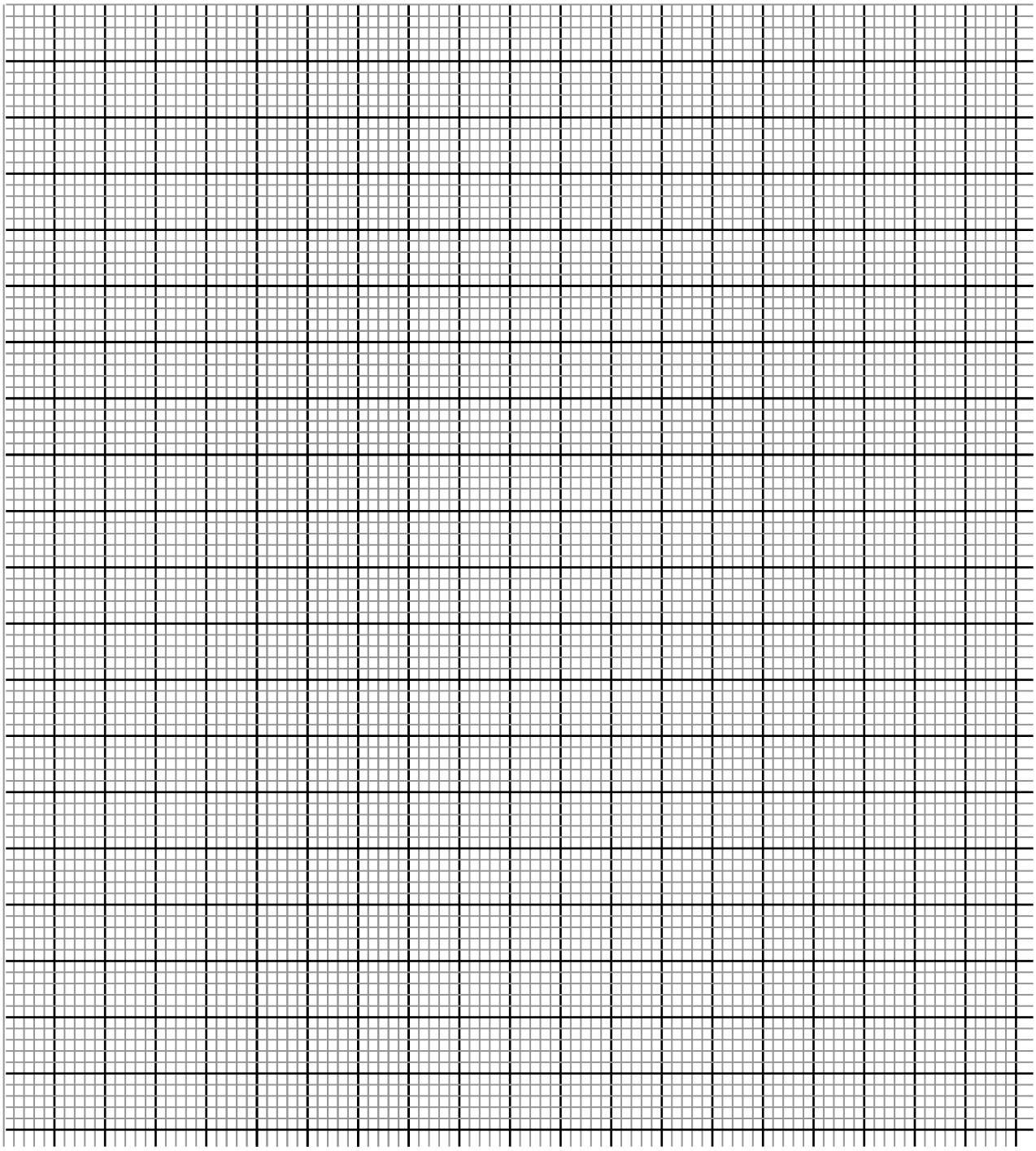
Height (cm)	**frequency**			
70-79	14			
80-84	16			
85-89	18			
90-94	20			
95-99	17			
100-109	15			

a) Calculate the

i) mean height. (2marks)

ii) median height. (3marks)

b) On the grid provided draw the cummulative frequency curve for the information above.
(4marks)



From your graph,determine the 40^{th} percentile. (1mark)

20. Two bags X and Y contains 10 green and 8 balls respectively. Bag X has 6 green balls and 4 red balls while bag Y has 3green balls and 5 red balls. A bag is selected at random and 2 balls selected without replacement.
    a) Draw a tree diagram to represent the above information. (4marks)

    b) Find the probability of selecting a green ball the first time. (2marks)

    c) What is the probability of selecting at most one red ball? (2marks)

    d) Find the probability of selecting two green balls. (2marks)

21. Ship A is 38km from harbour H on a bearing of N67^{0}E. Ship B is 83km from the same harbour on a bearing of S41^{0}E, while ship C is 24km from the harbour on a bearing of S52^{0}W.
    a) Use appropriate scale drawing to show the loactions of Ship A,B and C. (6marks)

    b) Calculate;
        i) Distance from ship B to ship C (2marks)

        ii) The distance from ship A to ship B (2marks)