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FORM 4 ENTRANCE EXAMS 2023

**HOME SCIENCE**

**Name: ……………………………………………….. Index No:………………………………….Candidate’s Sign:…………………………**

**Date: …………………………………………………**

**PAPER 2**

**121/2**

**MATHEMATICS**

**FORM 4**

**TIME: 21/2 HOURS**

**INSTRUCTIONS TO THE CANDIDATES**

* *Write* ***your name*** *and* ***index number*** *in the spaces provided above*
* *This paper contains two sections;* ***Section A*** *and* ***Section B***
* *All workings and answers 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.*
* *Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.*
* ***This paper consists of 15 printed pages.***
* ***Candidates should check carefully to ascertain that all the pages are printed as indicated and no questions are missing.***

**FOR EXAMINER’S USE ONLY**

**Section A**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Total |
| Marks |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Section B** **GRAND TOTAL**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | **Total** |
| Marks |  |  |  |  |  |  |  |  |  |

**Section A. (50mks)**

**Answer all the questions in this section in the spaces provided.**

1. Find the value of x that satisfies the equation. (3mks)

1. The base and the height of a right angled triangle were measured as and respectively. Determine to 1 decimal place the percentage error in calculating the area of the triangle. (3mks)
2. The figure below shows a quadrilateral ABCD in which AB = 8cm, DC =12cm and

D

12cm

A C

8cm

B

1. The length of BD. (1mk)
2. The size of angle . (2mks)
3. Simply the expression leaving the answer in the form where a, b and c are integers. (3mks)
4. (a) Expand 7 up to the 4th term (1mk)

(b)Use the expansion in part (a) above to find the approximate value of 7 to 3 decimal places. (2mks)

1. A variable P varies directly asand inversely as the square root of . When and Determine the equation connecting, and hence find when = 36 and. (3mks)
2. Given that and, Find the values of for which AB is a singular matrix. (4mks)
3. Use completely the square method to solve

Correct to 3 significant figures. (3mks)

1. In the figure below the tangent meets chord. Produced at T. chord passes through the centre of the circle and intersect chord at. Line = and

1. Calculate the length of chord. (1mk)
2. If and . find
3. Make the subject of the formula.

(2mks)

1. The equation of a circle is given by . Determine the centre and radius of the circle.

(3mks)

1. The 5th term of an AP is 82 and the 12th term is 103.

Find

1. The first term and the common difference. (2mks)
2. The sum of the first 21 terms. (2mks)
3. Use matrices to solve the simultaneous equation. (3mks)
4. Solve the following pair of simultaneous inequalities and illustrate the value on a number line. (3mks)
5. A triangle has sides 10cm, 7cm and 9cm. find
6. The area. (2mks)
7. The size of angle (2mks)
8. A plot of land is valued at sh due to increase in demand its appreciates at the rate of every six months. What will be its value after 3 ½ years. (3mks)

**Section B (50mks)**

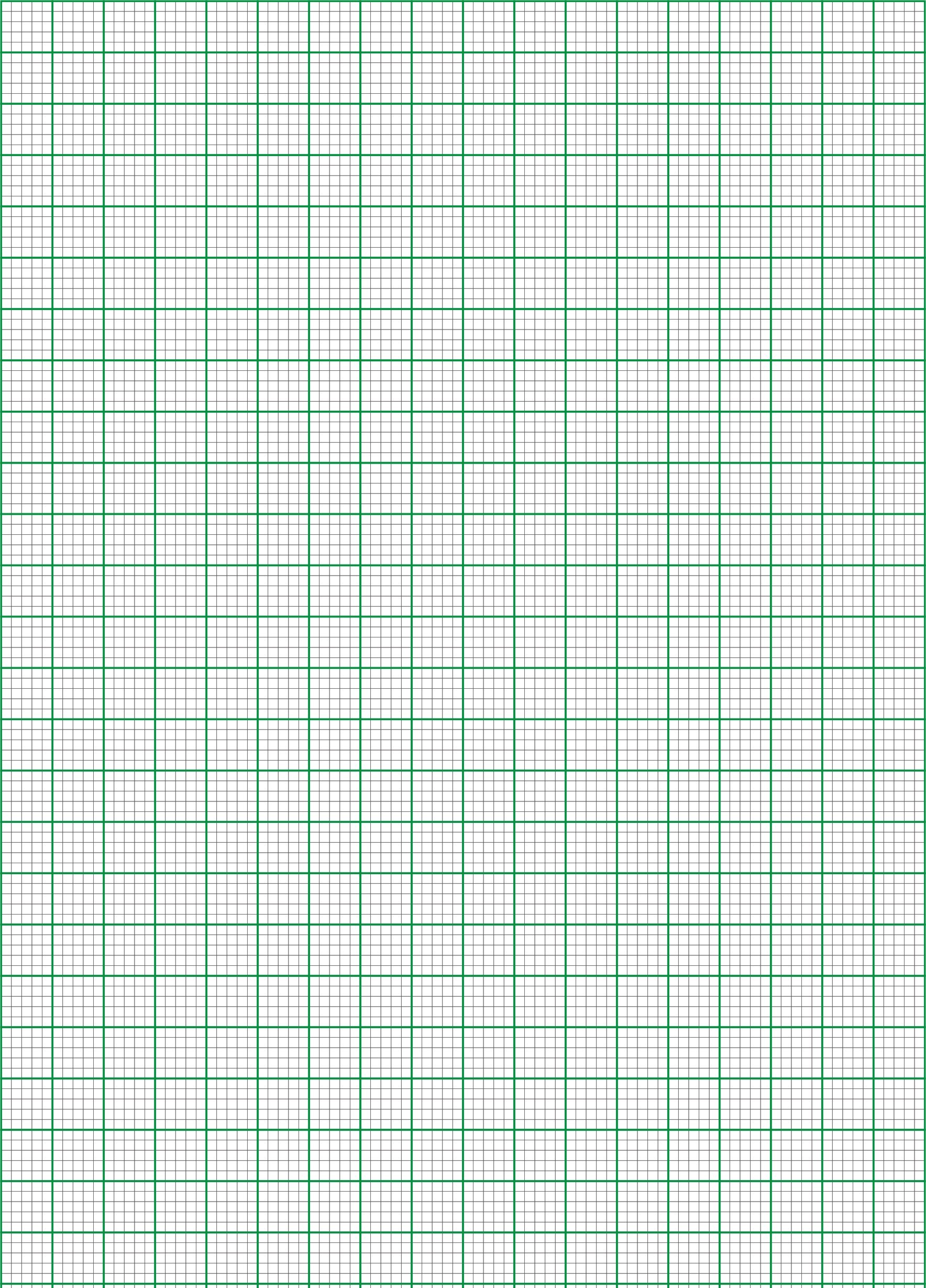
**Answer any five questions from this section on the spaces provided**.

1. In a mixed school there are 420 boys and 350 girls. The probability that a girl passes her exams in the school is while that of a boy passing is . The probability of a girl being made a prefect is while that of a boy is .
2. Find the probability that a student picked at random.
3. Is a boy and passes the exam and is not a perfect. (3mks)
4. Is a girl, a prefect and passes the exam. (3mks)
5. Is not as prefect and passes the exam. (4mks)
6. The table below shows some values of the curves.

and

1. Complete the table for the values of and correct to 1 decimal place. (2mks)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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1. On the grid below draw the graph of and for (5mks)
2. Use the graph to find the values of when (2mks)
3. Find the difference in amplitude of and (1mk)
4. In the figure below , and

R

S

Q

O p T

1. Determine, in terms of and
2. (1mk)
3. (2mks)
4. If = and

Determine.

1. in terms of , and . (2mks)
2. The values of. (5mks)
3. Using a ruler and a compass only construct.
4. Triangle P such that PQ = 6cm , and (4mks)
5. Locate the point A in the triangle when is equidistant from all the three sides of triangle. (3mks)
6. Find the distance of A from the sides of the triangles. (1mk)
7. Drop a perpendicular height to and Measure its height. (2mks)
8. The figure below represents a cuboids EFGHJKLM in which EF= 40cm FG=9cm and GM= 30cm. N is the midpoint of LM.

J M

N

K L 30

H G

9

E 40 F

Calculate correct to 3 significant figures

1. The length of GL. (2mks)
2. The length of FJ. (3mks)
3. The angle between EM and the plane EFGH. (3mks)
4. The angle between the planes EFGH and ENH. (2mks)
5. The table below shows income tax rates for a certain year.

|  |  |
| --- | --- |
| Monthly income in Kshs | Tax rate in each shillings |
|  |  |
|  |  |
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A monthly tax relief of Khs 1172 was allowed. Opunyi’s taxable income in the last band was Ksh 3,200 in month.

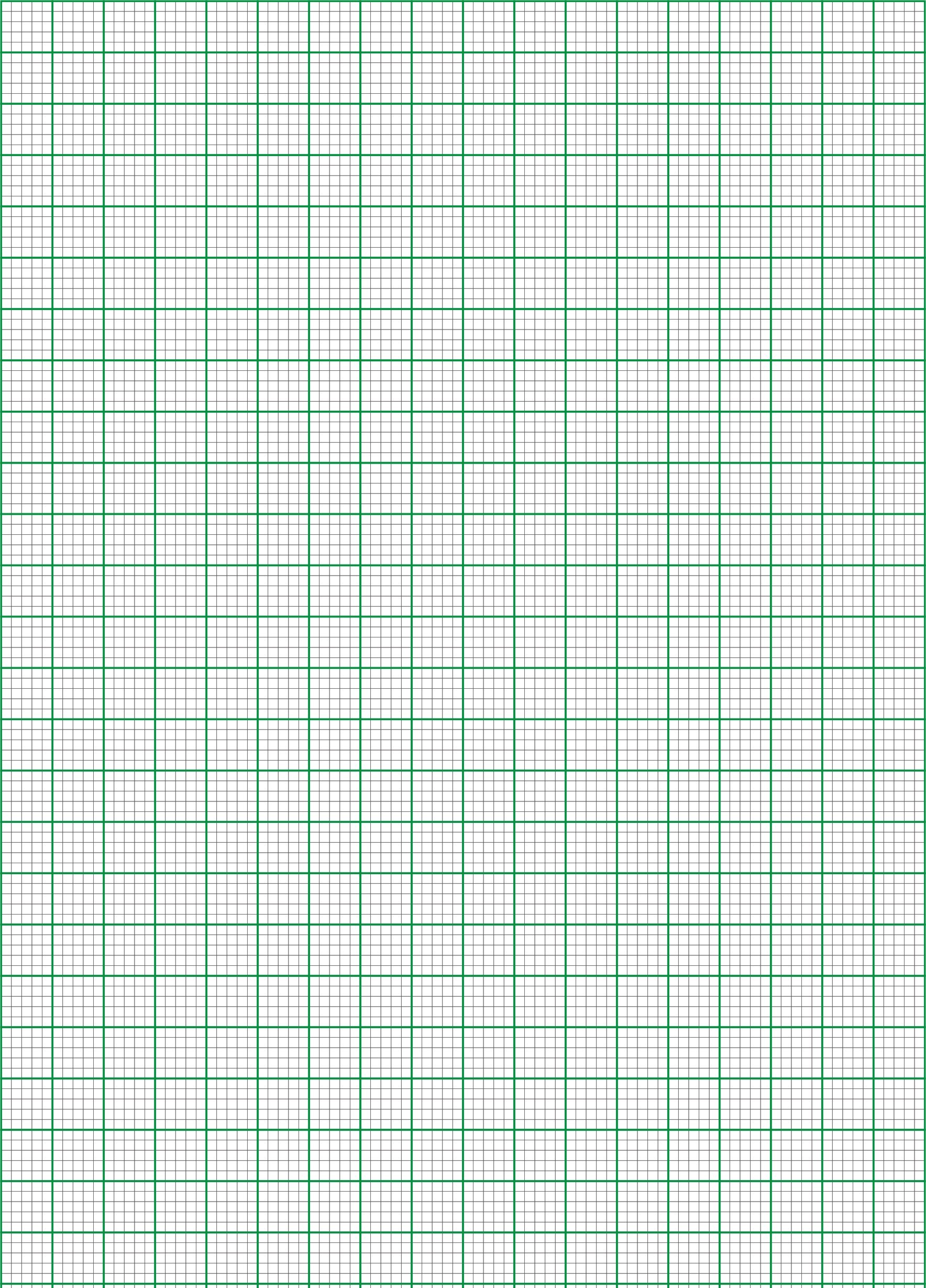
1. Calculate
2. His taxable income per month. (2mks)
3. The amount of tax he paid in a month. (5mks)
4. Opunyi’s salary included a medical allowance of Shs 8000. He contributed 6% of his basic salary to a sacco. Calculate his net pay. (3mks)
5. The masses of 100 patients in a hospital were distributed as shown in the table below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mass (Kg) | 0 – 9 | 10 – 19 | 20 – 29 | 30 – 39 | 4 0 – 49 | 50 – 59 | 60 – 69 | 70 – 79 | 80 – 89 | 90 – 99 |
| Frequency | 3 | 7 | 8 | 9 | 12 | 18 | 25 | 10 | 6 | 2 |

1. State the modal class. (1mk)
2. Calculate
3. The mean mass of the patients. (3mks)
4. The standard deviation of the distribution. (3mks)
5. Find the interquartile range for the data. (3mks)
6. OABC is a parallelogram with vertices O (0, 0) A (2, 0) B (3, 2) and C (1, 2).

is the image of OABC under transformation matrix

1. Find the co-ordinates of . (2mks)
2. On the grid provided draw OABC and (2mks)



1. Find the image of under the transformation matrix (2mks)
2. On the same grid draw . (1mk)
3. Find the single matrix that map onto OABC. (3mks)