

Autumn Semester Examination - 2015  
Paro College of Education  
Royal University of Bhutan  
Paro

**Module:** MAT 404 (Mathematics in Upper Pry. II)

**Program:** B.Ed (P)

**Level:** IV

**Writing Time:** 3 hours

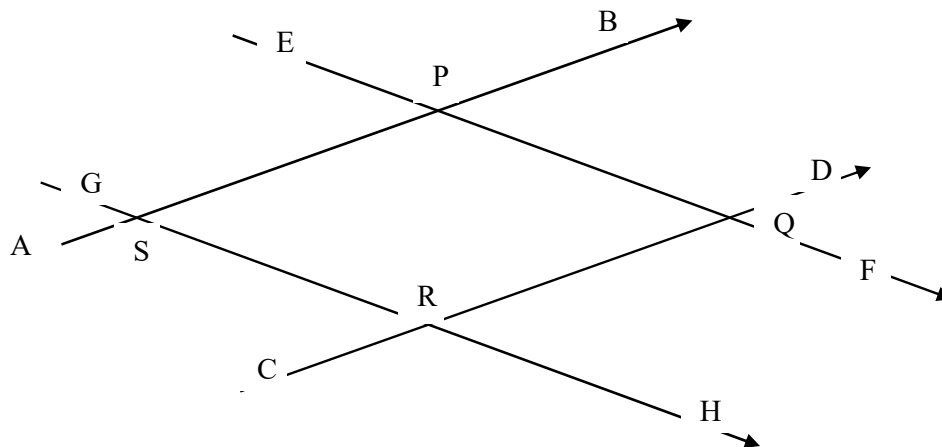
**Full marks:** 100

**Read the following directions carefully:**

1. Do not write during the first 15 minutes. Use this time for reading the questions.
2. You will get full three hours for answering the questions.
3. Write the answers to all the questions in the answer sheets provided by the college.
4. This paper contains **SIX** questions.
5. All questions carry equal marks and the intended marks are given in brackets.
6. Attempt any **FIVE** questions.
7. You are **NOT** allowed to use any electronic devices such as calculators, mobile phones etc.
8. You will be supplied with necessary grid papers such as Square dot grid, Isometric dot grid and Square grid papers to answer some of the questions.
9. Sub-questions must be complete in sequence for every question attempted.

**Question 1**

- a) Three fair coins are tossed. (1+1+2)
- i) List the sample space using tree diagram.
  - ii) Calculate the sample space.
  - iii) Find the probability that one head only is obtained.
- b) Find the values of  $P, Q, R, S$  from the following figure. Show all your explanation and calculation. (6)



- c) Derive a formula to find the area of a right angled triangle. (10)

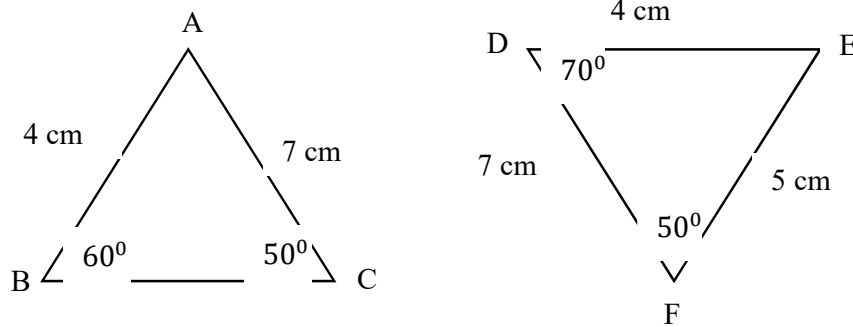
## Question 2

a) Factor  $4x^2 + 4xy - 3y^2$  by using

i) algorithm. (3)

ii) algebra tiles. (4)

b) Prove that  $\triangle ABC \cong \triangle DEF$ . (5)



c) Find the values of ☆, ♥ and ☺. (8)

$$\star + \heartsuit + \smiley = 14$$

$$2\star + 3\heartsuit = 18$$

$$\heartsuit + \smiley = 11$$

## Question 3

a) Four dice are thrown simultaneously. Find the probability that all of them show the same face. (4)

b) Divide  $(2x^2 + xy + 10y - 3y^2 + 2)$  by  $(x - y + 2)$  by using

i) algorithm. (3)

ii) algebra tiles. (5)

c) The coordinates of the figure ABCD are A(4, 6), B(-2, 6), C(-5, -4) and D(1, -4). D is translated to the image  $D'(7, 3)$ .

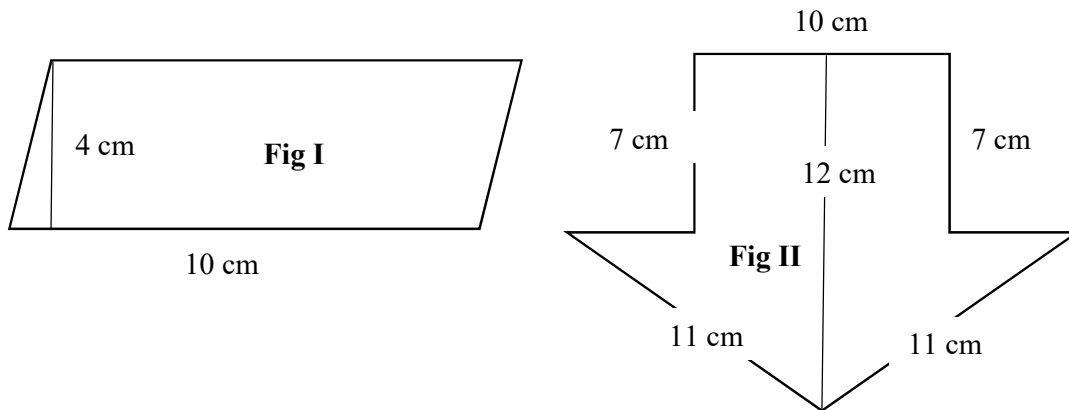
i) Plot the figure ABCD and the image  $A'B'C'D'$  in the graph paper and write the mapping function for this translation. (5)

ii) Reflect the image  $A'B'C'D'$  in the  $-X = Y$  axis. (3)

#### Question 4

a) Find the area of the following figures.

(2+4 = 6)



b) The coordinates of figure ABCD are A(-3, 6), B(-2, 4), C(-4, -4) and D(1, -2).

(3+3 = 6)

i) Reflect the figure ABCD in the  $X = Y$  axis.

ii) Rotate the image  $A'B'C'D'$   $90^\circ$  clockwise.

(Use separate grid paper for each transformation).

c).  $2x + 3y = 1$

(4+4 = 8)

$$x + 2y = -5$$

Solve for  $x$  and  $y$  by using

i) algorithm.

ii) graphs.

#### Question 5

a) Find the factors of  $4x^2 - 4y^2$  by

(3+3 = 6)

i) using algebra tiles.

ii) geometrically, by drawing.

b) Karma is a class five student. She was asked to convert  $5 \text{ km}^2$  to  $\text{m}^2$ .

(1+2+3 = 6)

Karma's solution was:  $5 \text{ km}^2 = 25 \text{ m}^2$

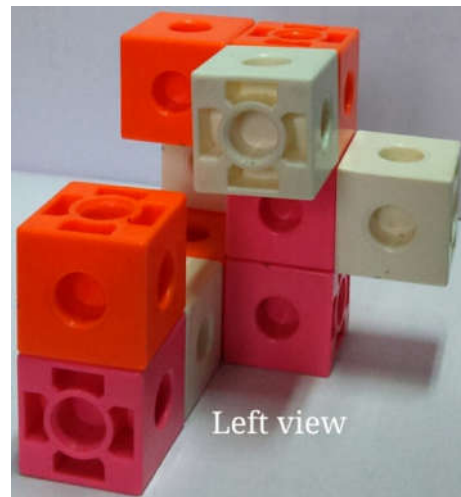
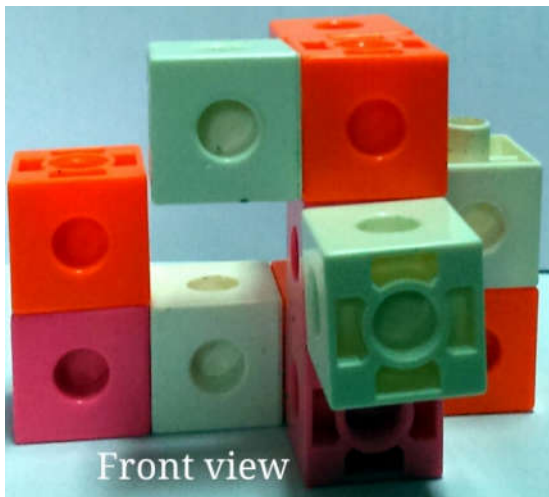
i. Find Karma's mistake(s) and explain.

ii. How will you correct Karma's mistake(s)?

iii. How will you teach Karma the right method to convert from  $\text{km}^2$  to  $\text{m}^2$ . Explain.

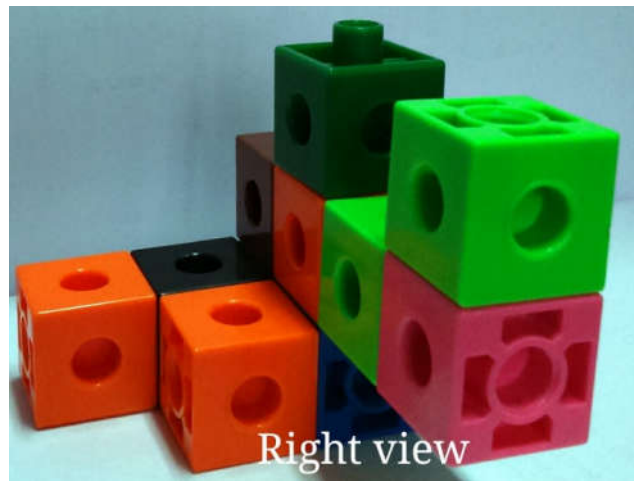
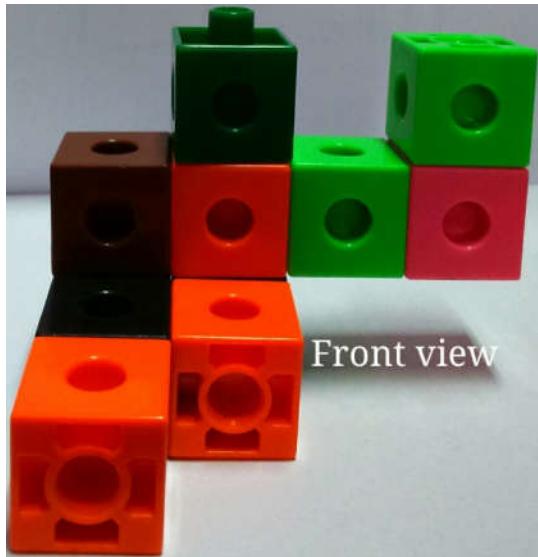
- c) You are given photographs of a structure with different views. Use isometric grid to draw the structure given below.

(8)



### Question 6

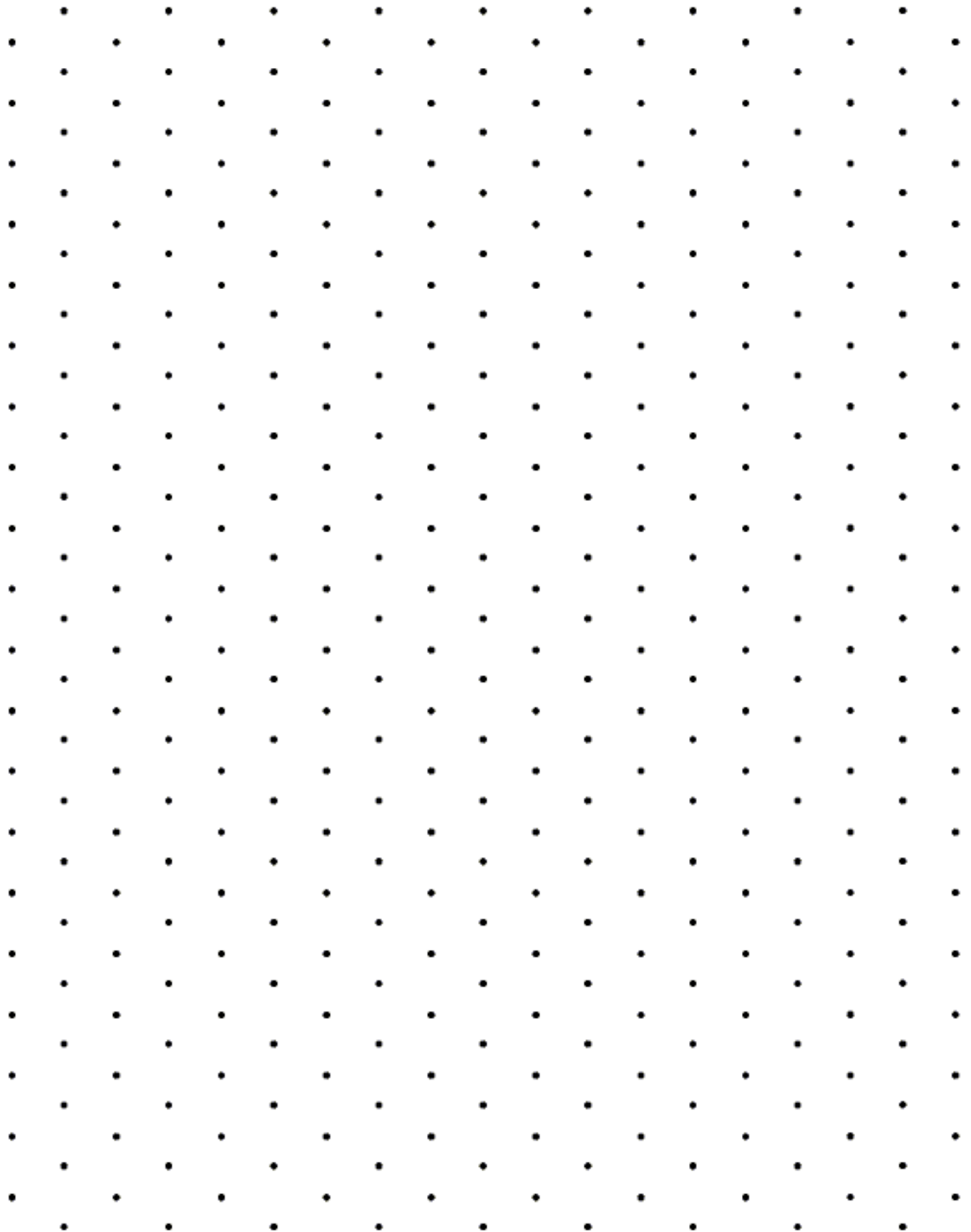
- a) The following are photographs of an object taken from different views. Draw this structure using isometric dot paper. (8)



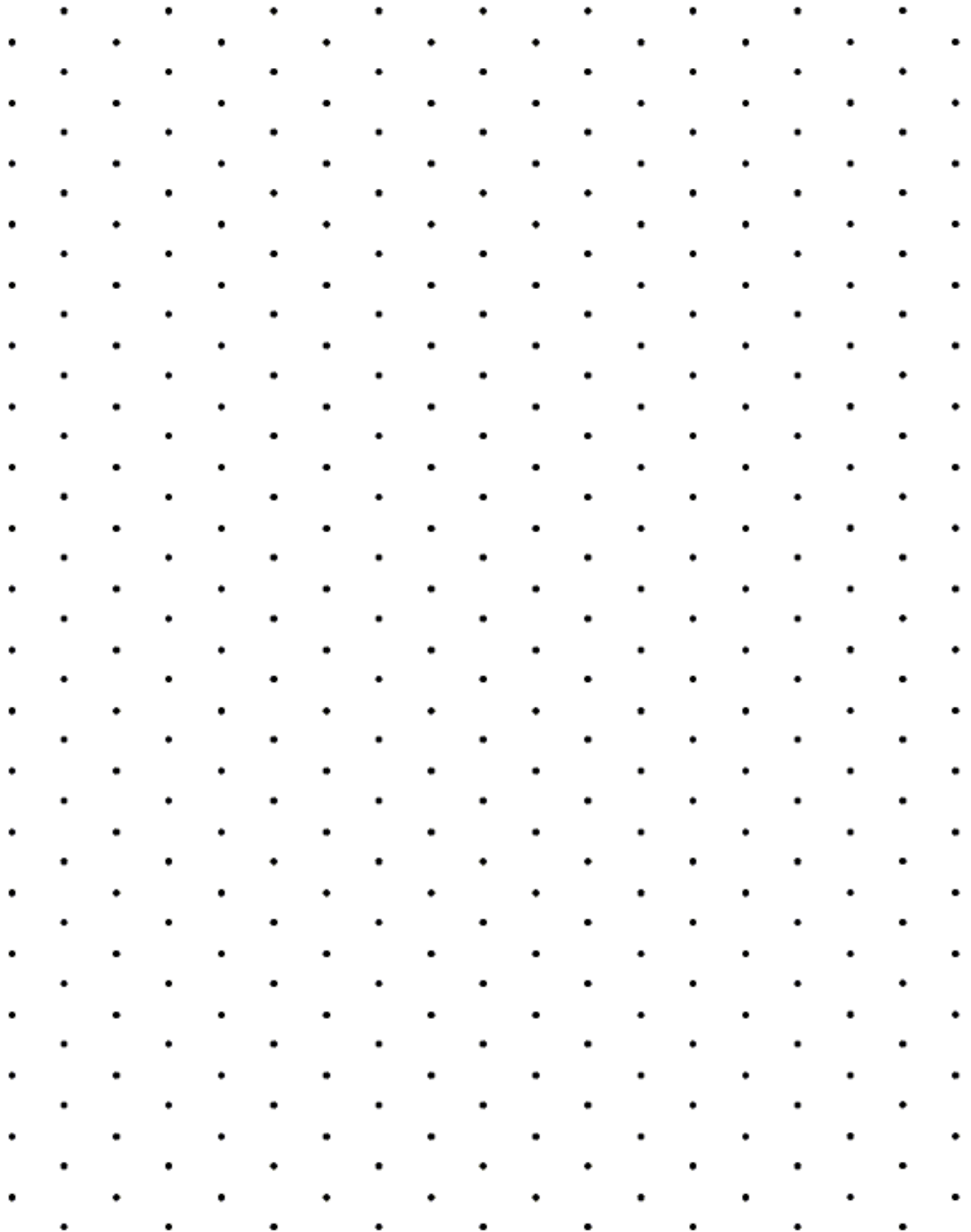
- b) Construct a rectangle ABCD where  $AB = 6$  cm and  $BC = 4$  cm and write a set of instructions to construct the rectangle ABCD. (6)
- c) Derive a formula to find the sum of the first  $n$ -odd numbers by (2+4 = 6)
- calculating.
  - drawing.

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## Isometric Dot Paper

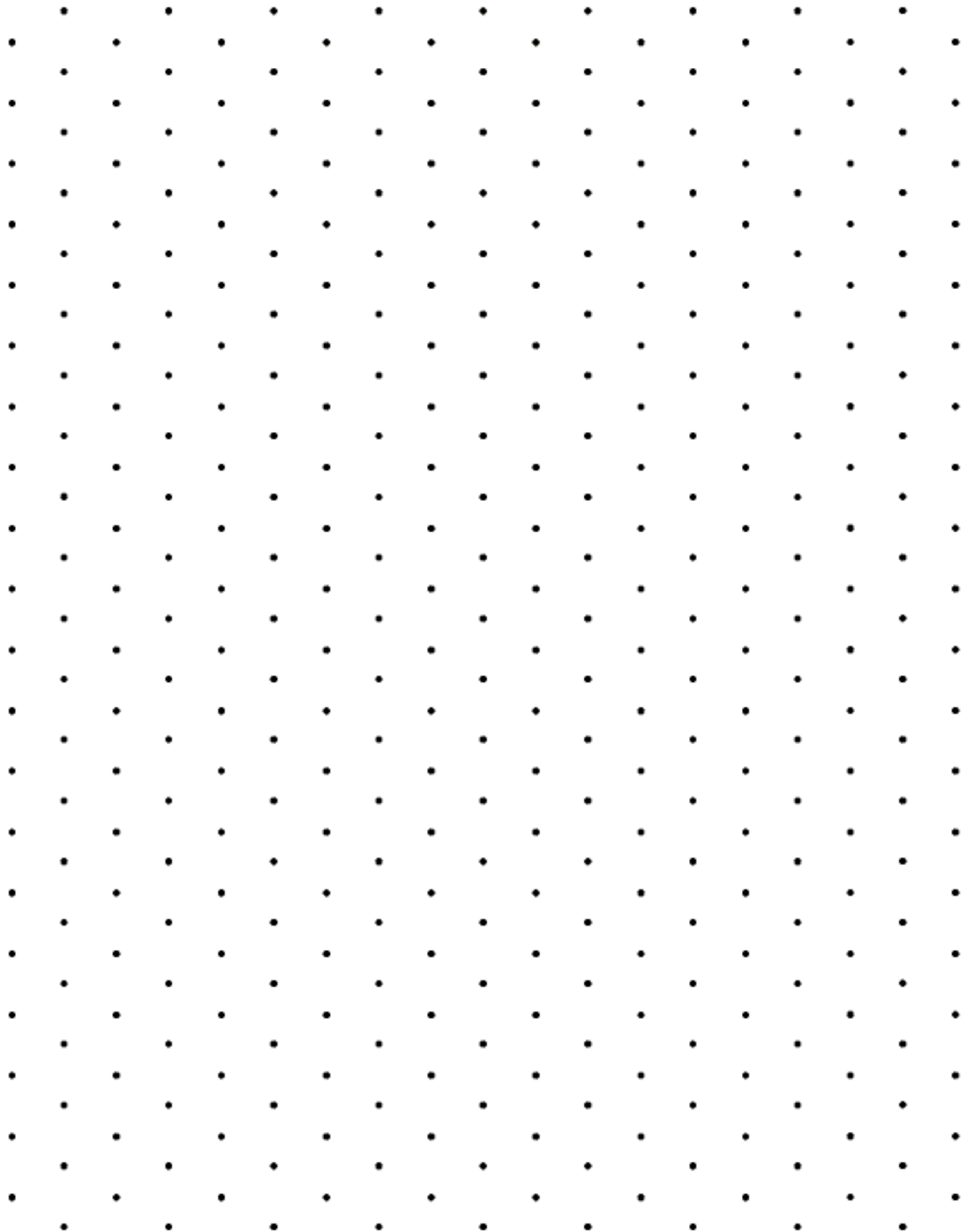


## Isometric Dot Paper

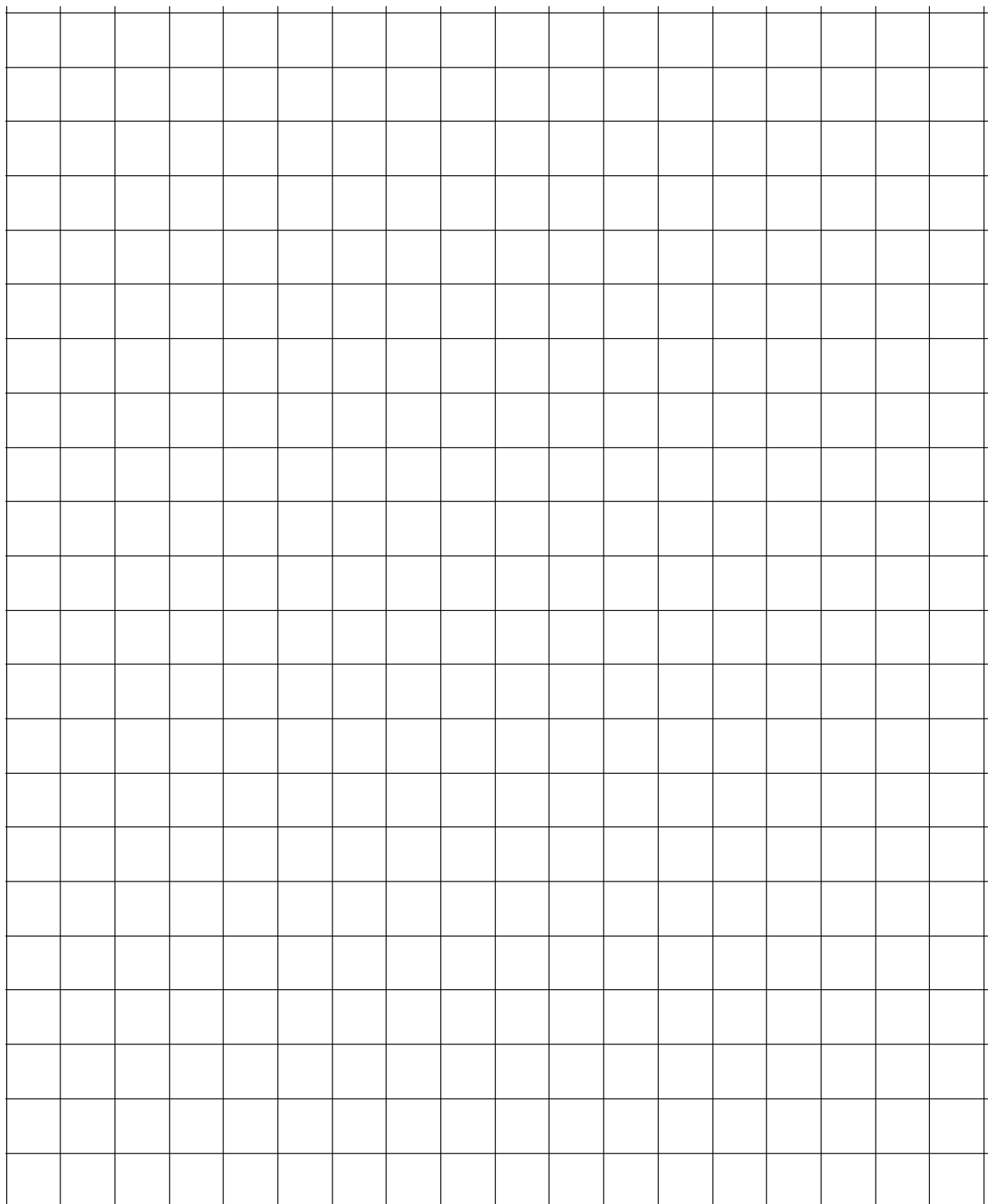




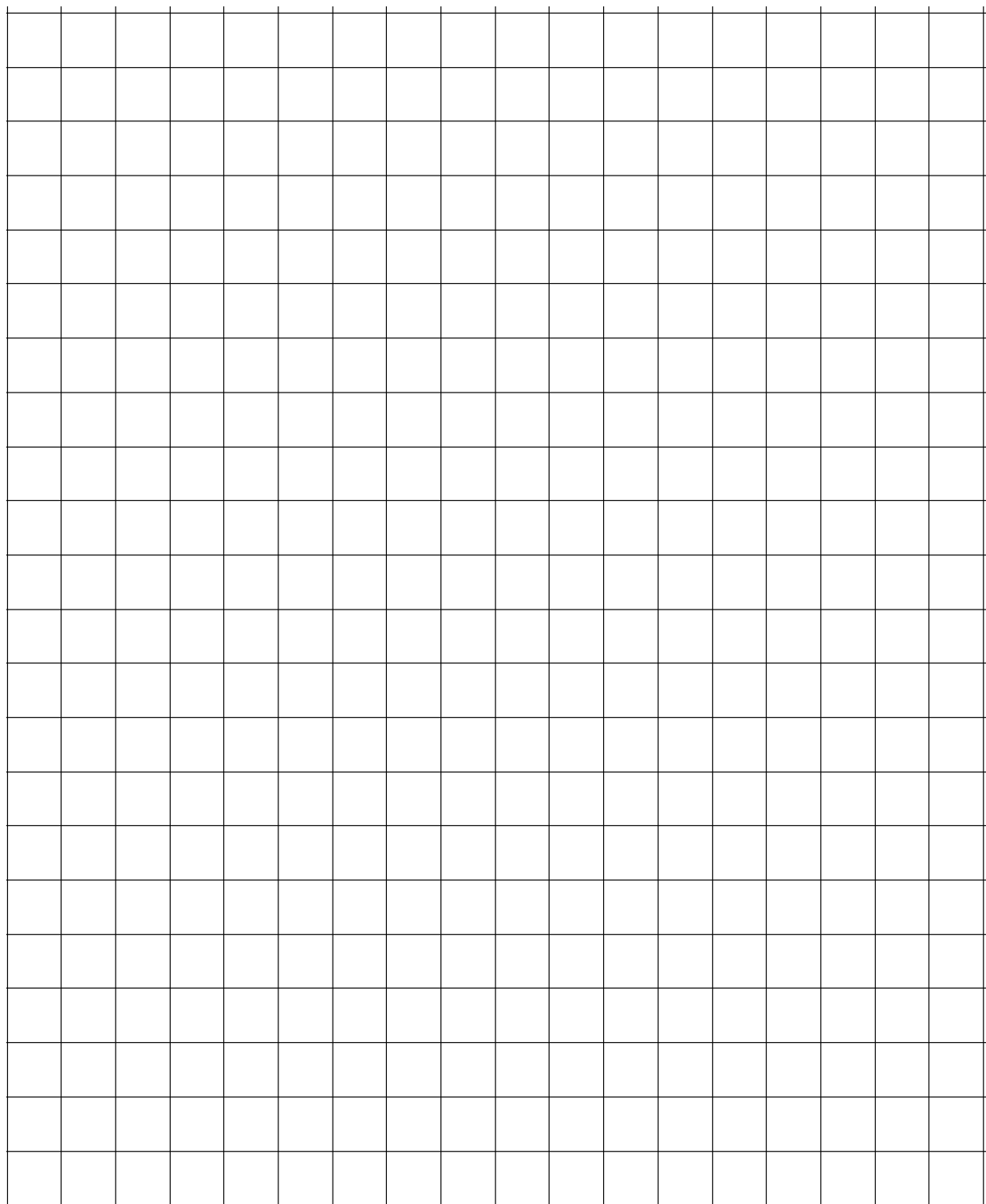
## Isometric Dot Paper



## Centimetre Grid Paper



## Centimetre Grid Paper



## Centimetre Grid Paper

