# LCOL Basic Skills – Pack 8

# Topics

### Patterns – Can I find the general term of a quadratic sequence?

**Last Needed - 2021**

1 ▶ 2015 JCHL Sample Paper 1 – Question 8 (c) ☐

### Algebra – Can I solve a linear inequality?

**Last Needed – 2019**

2 ▶ 2010 LCOL Paper 1 – Question 2 (a) ☐

### Geometry – Can I construct a triangle?

**Last Needed - 2021**

3 ▶ 2014 JCHL Paper 2 – Question 6 ☐

### Differentiation – Can I calculate the maximum and minimum of a function?

**Last Needed - 2023**

4 ▶ 2014 LCOL Sample Paper 1 – Question 9 (a) ☐

### Enlargements – Can I construct centres of enlargements and calculate scale factors?

**Last Needed - 2022**

5 ▶ 2015 LCFL Paper 1 – Question 4 ☐

www.mathspoints.ie for **worked solutions** to these questions.

🗁 LCOL Resources by Topic

🗁 LCOL Revision – 50 Common Questions

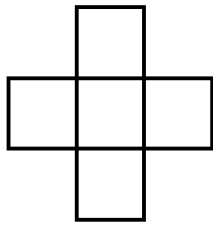**1 ▶ 2015 JCHL Sample Paper 1 – Question 8 (c)**

The first three stages of a pattern are shown below.

Each stage of the pattern is made up of small squares.
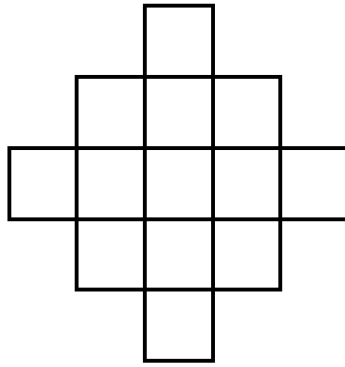
Each small square has an area of one square unit.



Stage 1          Stage 2          Stage 3

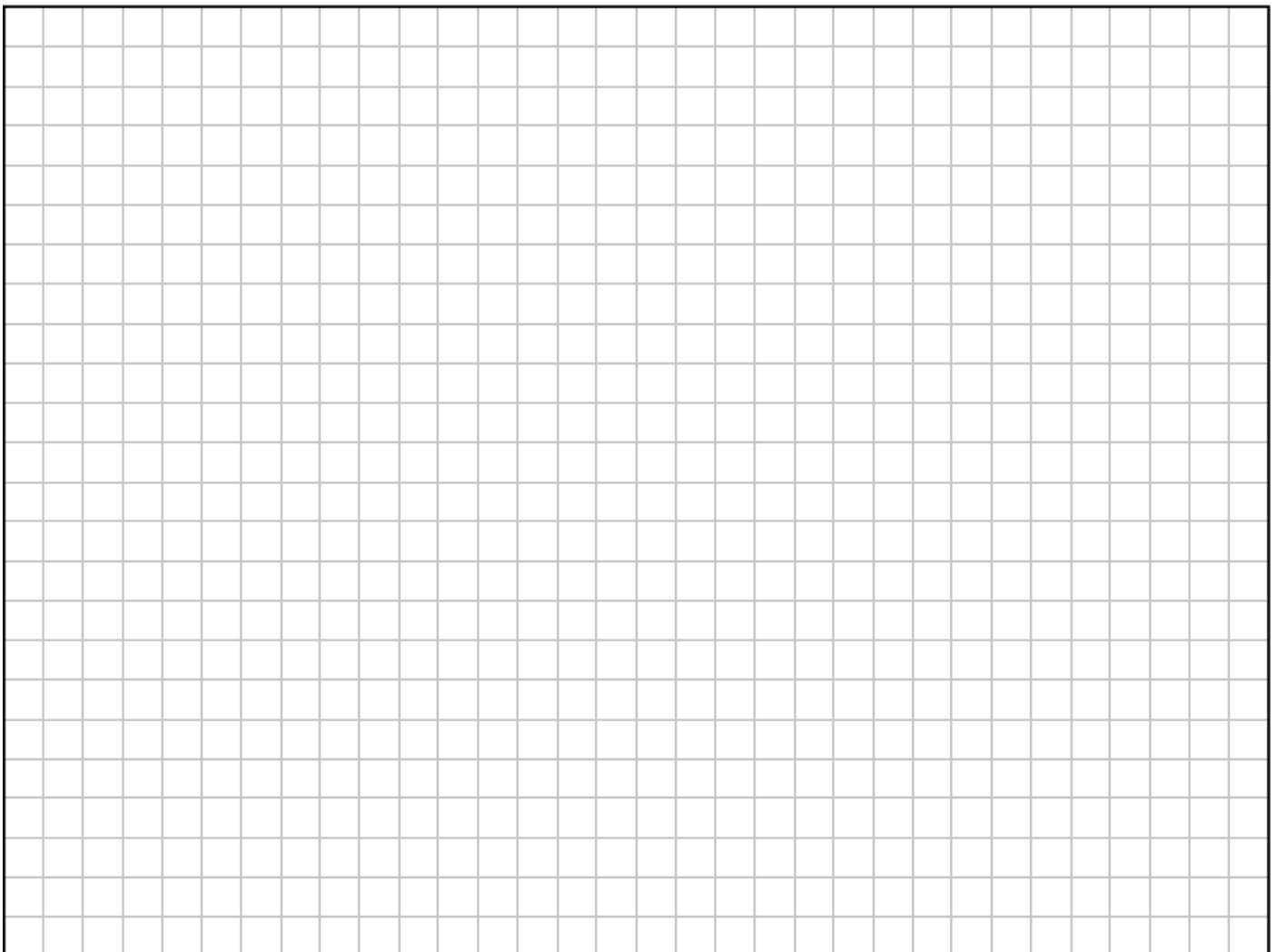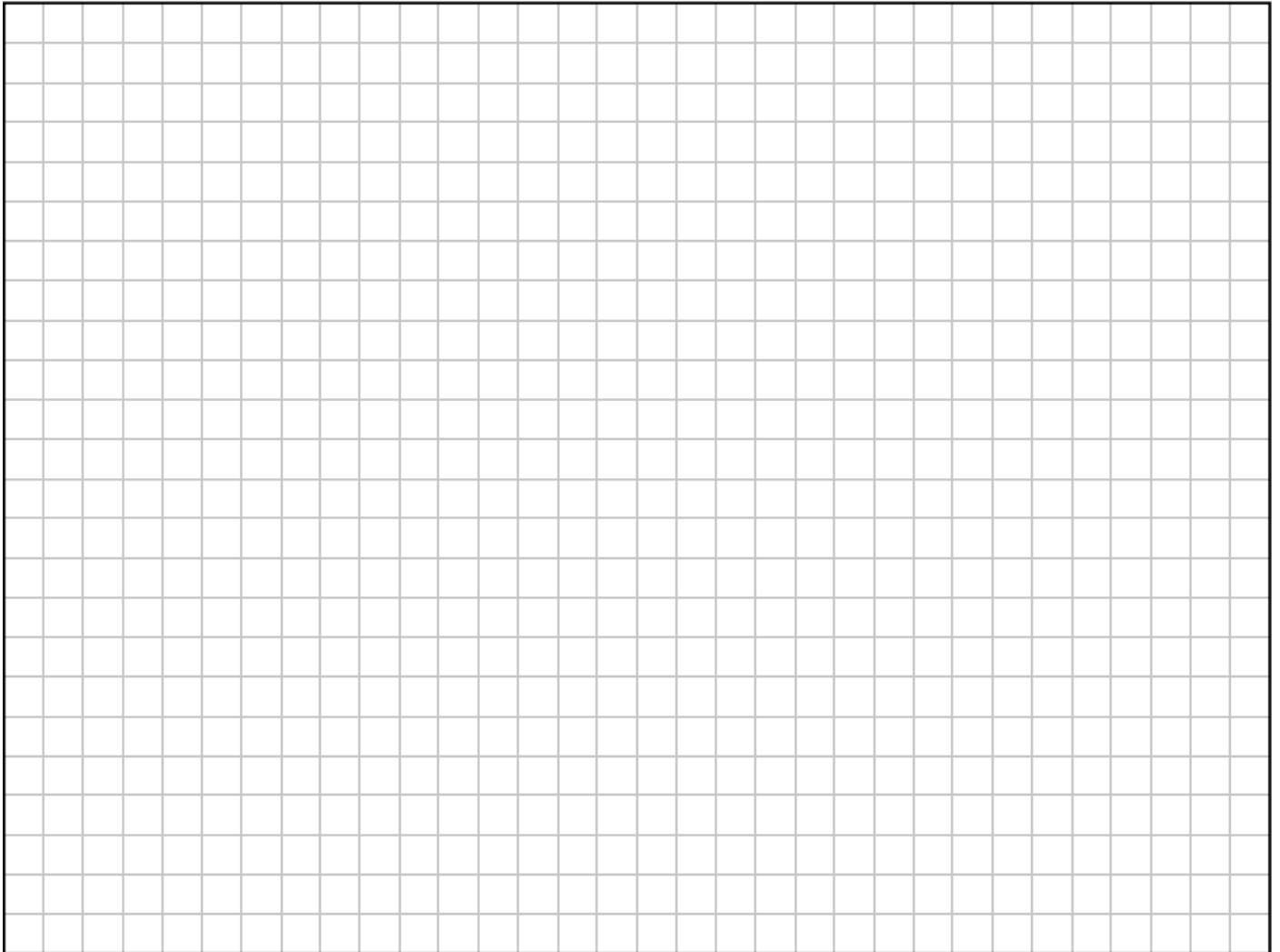Draw the next stage of the pattern.

Find a general formula for the **area** of Stage $n$ of the pattern, where $n \in \mathbb{N}$.

## 2 ▶ 2010 LCOL Paper 1 – Question 2 (a)

Find the values of $x$ which satisfy $2(3 + 4x) \leq 22,$ where $x \in \mathbb{N}$.

## 3 ▶ 2014 JCHL Paper 2 – Question 6

Construct a right-angled triangle ABC, where:

$|AB| = 6$ cm

$|\angle ABC| = 90°$

$|AC| = 10$ cm.

## 4 ▶ 2014 LCOL Sample Paper 1 – Question 9 (a)

A farmer is growing winter wheat. The amount of wheat he will get per hectare depends on, among other things, the amount of nitrogen fertiliser that he uses. For his particular farm, the amount of wheat depends on the nitrogen in the following way:

$$Y = 7000 + 32N - 0.1N^2$$

where $Y$ is the amount of wheat produced, in kg per hectare, and $N$ is the amount of nitrogen added, in kg per hectare.

Photo: author: *P177*. Wikimedia Commons. CC BY-SA 3.0

**(i)** How much wheat will he get per hectare if he uses 100 kg of nitrogen per hectare?

**(ii)** Find the amount of nitrogen that he must use in order to maximise the amount of wheat produced.

**(iii)** What is the maximum possible amount of wheat produced per hectare?

A local park has two pitches; one for seniors, the other for juveniles.
The senior pitch is an enlargement of the juvenile pitch. The scale factor is $k(k > 1)$.
**(a)**  Construct the centre of the enlargement on the diagram below and label it $O$.

138 m

81 m

92 m

← w →

**(b)**  Find $k$, the scale factor of the enlargement.

**(c)**  Find the value of $w$, the width of the juvenile pitch.

**(d)**  Find the ratio

$$\frac{\text{area of senior pitch}}{\text{area of juvenile pitch}}$$