

Ada Lovelace Day maths activities for IGCSE and GCSE

IGCSE Math Revision · IGCSE and GCSE (Higher and Extended) · Student sheet

Name _____

Class _____

Date _____

The starter is non-calculator. A calculator is allowed in the main activity.

Starter (5 minutes)

1. Write down the next two terms: 4, 11, 18, 25, ...
2. Find the n th term of 4, 11, 18, 25, ...
3. Input 6 into this machine: square it, subtract 10, then halve the result. What comes out?
4. Write down the first three terms of the sequence with n th term $n^2 + 1$.

Main activity (35 minutes)

Task A: Follow the flowchart

Step 1: start with $n = 1$. Step 2: work out $T = n(n + 1) \div 2$ and write it down. Step 3: if T is more than 50, stop; otherwise add 1 to n and go back to step 2.

- a. Write down the first five numbers the flowchart produces.
- b. What is the last number written down?
- c. How many numbers are written down altogether?

Task B: Loops that print sequences

Program P starts with $x = 7$ and repeats: 'print x , then add 6 to x '. Program Q starts with $x = 2$ and repeats: 'print x , then multiply x by 3'.

- Find an expression for the n th number printed by program P.
- Find the 30th number printed by program P.
- Does program P ever print 400? Explain.
- Find the 7th number printed by program Q.

Task C: Pixel patterns

A computer draws patterns of pixels. Patterns 1 to 5 use 2, 7, 14, 23 and 34 pixels.

- How many pixels does pattern 6 use?
- Find the n th term.
- Which pattern uses 287 pixels?

Extension

- A loop starts with the number 1 and repeats: 'double the number, then add 1'. How many times does the loop run before the number is first more than 1000? What is the number then?
- Find the 100th number the flowchart in task A would produce if it never stopped.