

Age 11+ Level ★
Worksheet 1

1. Street Lamps

Walking up a steep hill, I pass 10 equally spaced street lamps.
I take 5 seconds to walk from the first lamp to the second lamp, 6 seconds from the second lamp to the third, and so on, with each time increasing by 1 second as I slow down.

How long do I take to walk from the first lamp to the last?

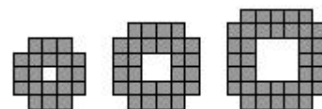
2. Printing Error

A book has 89 pages, but the page numbers are printed incorrectly.
Every third page number has been omitted, so that the pages are numbered 1, 2, 4, 5, 7, 8, ... and so on.

What is the number on the last printed page?

3. Expanding Pattern

The diagram shows the first three patterns in a sequence in which each pattern has a square hole in the middle.



How many small shaded squares are needed to build the tenth pattern in the sequence?

4. Fruit Line-up

A grocer places some oranges, peaches, apples and bananas in a row so that, somewhere in the row, each type of fruit can be found next to each other type of fruit.

What is the smallest possible number of fruits in the row?

5. Many Matildas

The name Matilda is written repetitively like this:

MatildaMatildaMatilda.....

What is the 1000th letter?

These problems are adapted from UKMT (ukmt.org.uk) and SEAMC (seamc.asia) problems.



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Worksheet 2

1. Suit Sequence

A pattern that repeats every six symbols starts as shown below:



What are the 100th and 101st symbols in the pattern?

2. What a Coincidence!

Consider the arithmetic sequences:

1998, 2005, 2012, ... and

1996, 2005, 2014, ...

Which is the next number after 2005 that appears in both sequences?

3. Triangular Clock

Trinni is fascinated by triangular numbers (1, 3, 6, 10, 15, 21...)

She found that she could rearrange the twelve numbers on a clock face 1, 2, 3, ..., 12 so that each adjacent pair added up to a triangular number.

She left the 12 in its usual place; what number did she put where the 6 would usually be?

4. Fibonacci Deduction

Leonard writes down a sequence of numbers. After the first two numbers, each number is the sum of the previous two numbers in the sequence.

The fourth number is 6 and the sixth number is 15.
What is the seventh number in the sequence?

These problems are adapted from UKMT (ukmt.org.uk) and WMC (competition.ac) problems.