Age 11+ Level ★★★
Worksheet 1

1. **Colossal Sum**
   What is the units digit of $9^{2015} + 9^{2016}$?

2. **Seven from Nine**
   In how many different ways can seven different numbers be chosen from the numbers 1 to 9 so that the seven numbers have a total which is a multiple of 3?

3. **17s and 23s**
   How many 2010-digit numbers are there in which every pair of consecutive digits forms a two-digit number that is divisible by 17 or 23?

4. **Cinema Costs**
   At a cinema a child's ticket costs £4.20 and an adult's ticket costs £7.70. When a group of adults and children went to see a film, the total cost was £C, where C is a whole number greater than 90 and less than 96.

   What is the value of C?

5. **Missing Digit**
   The 8-digit number 1234_678 is a multiple of 11.

   What is the missing digit?

6. **Big Blackboard**
   The whole numbers from 1 to 2016 are written on a blackboard.

   Moritz underlines all the multiples of two in red, all the multiples of three in blue, and all the multiples of four in green.

   How many numbers does Moritz underline exactly twice?

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