

Math exercises

Exercise 1. Pandigital primes - Project Euler Problem 41

We shall say that an n -digit number is pandigital if it makes use of all the digits 1 to n exactly once. For example, 2143 is a 4-digit pandigital and is also prime.

What is the largest n -digit pandigital prime that exists?

Exercise 2. Consecutive prime sum - Project Euler Problem 50

The prime 41, can be written as the sum of six consecutive primes:

$$41 = 2 + 3 + 5 + 7 + 11 + 13$$

This is the longest sum of consecutive primes that adds to a prime below one-hundred. The longest sum of consecutive primes below one-thousand that adds to a prime, contains 21 terms, and is equal to 953.

Which prime, below one-million, can be written as the sum of the most consecutive primes?

Exercise 3. Prime summations - Project Euler Problem 77

It is possible to write ten as the sum of primes in exactly five different ways:

$$7 + 3$$

$$5 + 5$$

$$5 + 3 + 2$$

$$3 + 3 + 2 + 2$$

$$2 + 2 + 2 + 2 + 2$$

What is the first value which can be written as the sum of primes in over five thousand different ways?

Exercise 4. Prime box spacing

Boxes are placed at integer spaces along number line from 0 to 1000, possibly stacked atop each other. Moving one box to the adjacent space along the number line costs 1 unit. What is the minimum cost of moving the boxes from the initial spacing so that each box not in its stack is placed a prime distance away from every other box? There are up to 1000000 boxes.