

Slumber Theory

Slumber theory is a silly branch of mathematics, which exists only on this page.

Any number can be **sliced** into a sequence of numbers.

Example: 365 can be sliced in four different ways: $3 \mid 6 \mid 5$; $36 \mid 5$; $3 \mid 65$; or 365.

(Note that the slices are indicated by a vertical slash. Note also that in slumber theory, not slicing is considered a form of slicing.)

1. How many ways are there to slice a four-digit number?

A number is **slime** if it can be sliced into a sequence of primes.

Examples: 5 is slime, since it is already prime.

2027 is slime ($2 \mid 02 \mid 7$)

4,155,243,311 is slime ($41 \mid 5 \mid 5 \mid 2 \mid 43 \mid 3 \mid 11$)

- Which one of the following numbers is slime? 12; 345; 6789
- 2 is the only even prime. Find the first three even slimes.
- There are no prime squares. Find the first two slime squares.
- There are no prime cubes. Find the first two slime cubes.
- 2 and 3 are the only consecutive numbers that are both prime. Find the first three pairs of consecutive numbers that are both slime.
- There is no triple of consecutive numbers that are all prime. Find the first two triples of consecutive numbers that are all slime.
- Prove that there are an infinite number of slime numbers.
- Find the smallest number that is slime in more than one way. (In other words, it can be sliced into two different sequences of primes.)
- Find the smallest number that is slime in more than two ways.

A number is a **super-slime** if you get a sequence of primes no matter how you slice it.

Example: 53 is a super-slime since 53 and $5 \mid 3$ are both sequences of primes.

11. Prove that there are only a finite number of super-slimes.