

# Esame di Lingua Inglese (1.5 ore)

## Prime numbers

A prime number is a positive integer  $p > 1$  that has no positive integer divisors other than 1 and itself. For example, the only divisors of 13 are 1 and 13, making 13 a prime number, while the number 24 has divisors 1, 2, 3, 4, 6, 8, 12, and 24, making 24 not a prime number. Positive integers other than 1 which are not prime are called composite numbers.

The number 1 is a special case which is considered neither prime nor composite. A good reason not to call 1 a prime number is that if 1 were prime, then the statement of the fundamental theorem of arithmetic would have to be modified since unique factorization into a product of primes would fail.

With 1 excluded, the smallest prime is therefore 2. However, since 2 is the only even prime (which, ironically, in some sense makes it the “oddest” prime), it is also somewhat special, and the set of all primes excluding 2 is therefore called the “odd primes”.

Twin primes are pairs of primes of the form  $(p, p + 2)$ . The first few twin primes are  $n \pm 1$  for  $n = 4, 6, 12, 18, 30, \dots$ . Explicitly, these are  $(3, 5)$ ,  $(5, 7)$ ,  $(11, 13)$ ,  $(17, 19)$ ,  $(29, 31)$ ,  $\dots$ . All twin primes except  $(3, 5)$  are of the form  $6n \pm 1$ .

It is conjectured that there are an infinite number of twin primes, but proving this remains one of the most elusive open problems in number theory.

## ESERCIZI

### 1. SELEZIONARE IL CORRETTO COMPLETAMENTO

1. A gigantic prime is a prime with 10000 or (less) (more) (many) decimal digits.
2. There are infinitely (much) (more) (many) primes.
3. When written in base 10, (all) (a few) (some) prime numbers except 2 and 5 end in 1, 3, 7 or 9.
4. The Electronic Frontier Foundation has offered a US\$100.000 prize to the first discoverers of a prime with (at most) (at least) (at less) 10 million digits.

### 2. TRADURRE IN INGLESE LE FRASI SEGUENTI

1. I numeri primi sono di importanza fondamentale per la crittografia.
2. Come si genera un numero primo?
3. Un intero positivo è primo se e solo se ha esattamente due divisori positivi.
4.  $(19, 29)$  non sono primi gemelli.

### 3. TRADURRE IN ITALIANO IL TESTO