

BACCALAURÉAT GÉNÉRAL
ÉPREUVE SPÉCIFIQUE DES SECTIONS EUROPÉENNES
MATHÉMATIQUES – ANGLAIS

SUJET 3

Numbers

Sujet comportant une page. L'usage de tout modèle de calculatrice, avec ou sans mode examen, est autorisé.

Since ancient times, mathematicians have considered integers with special properties. Eratosthenes of Cyrene was a Greek mathematician, geographer, poet and astronomer. He is best known for being the first person to calculate the circumference of the Earth. Eratosthenes proposed a simple algorithm to find the first prime numbers : 2, 3, 5, 7, 11,... This algorithm is known in mathematics as the Sieve of Eratosthenes.

The definition of a perfect number is ancient, appearing as early as the 3rd century in Euclid's books "The Elements". A perfect number is a positive integer that is equal to the sum of its positive divisors, excluding itself ($6 = 1 + 2 + 3$ is a perfect number.)

A number is called a happy number, if replacing the number by the sum of the squares of its digits, and repeating this process, you eventually get 1. If it loops endlessly in a cycle that does not include 1, the number is said to be unhappy.

I. Explain what the text deals with and comment on it.

II. Exercise.

1. 6 is a perfect number, according to the text. Is 36 a perfect number?
2. Is 28 a perfect number?
3. Can a prime number be a perfect number?
4. Is 19 a happy number?
5. Check if 4 is an unhappy number
6. Can you give a number that is both perfect and happy?