

## A Number Called $e$

The number  $e \approx 2.718281827 \dots$  is an irrational number and is the limit

$$e = \lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n.$$

$e$  is a transcendental number, which means it is not the root of any single-variable polynomial equation with integer coefficients.

The number  $e$  was discovered in the 17<sup>th</sup> century by a swiss mathematician **Jacob Bernoulli**, while he was studying compound interest.

The number  $e$  is also the sum of the infinite series:

$$e = \sum_{n=0}^{\infty} \frac{1}{n!} = \frac{1}{0!} + \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots$$

However, it was **Leonhard Euler** who gave it the name  $e$  and made it a famous number. Number  $e$  is also called the **Euler's Number**.

The number  $e$  is part of the most famous formula  $e^{\pi i} + 1 = 0$ . The number  $e$  appears as well in the formula for continuous compounding  $P = e^{rt}$ .

Nobody knows the exact value of number  $e$ , but the first 20 digits are  $2.71828182845904523536 \dots$

The number  $e$  is called the **natural base**, and the function  $f(x) = e^x$  is called the **natural exponential function**.