

Fibonacci Numbers

History: -named after **Fibonacci** (= filio Bonacci) or **Leonardo da Pisa** (1170?-1240?), who wrote the book **Liber Abbaci** (= book of computation) in **1202**.

Definition: -via the (2^{nd} order) **recursion relation**:

$$a_{n+2} = a_{n+1} + a_n, \quad a_0 = 0, a_1 = 1.$$

\Rightarrow the first few numbers are 0, 1, 1, 2, 3, 5, 8, 13, 21, ...

Original Problem (Fibonacci, 1202): How many pairs of rabbits can be produced from a single pair in a year if each pair begets a new pair each month, which from the 2^{nd} month on becomes productive, and if death does not occur?

Notes: 1) **Fibonacci numbers** have fascinated many people throughout the ages (particularly non-mathematicians). There is a whole journal devoted to them (**Fibonacci Quarterly**).

2) **Fibonacci numbers** are closely related to phenomena involving the **golden ratio/section**.

3) **Fibonacci numbers** have **botanical applications** in the phenomenon called **phyllotaxis** (= leaf arrangement).