Fibonacci Numbers: The Classic Problem (page 25)

A certain man puts a pair of rabbits in a place surrounded on all sides by a wall. How many pairs of rabbits can be produced from that pair in a year if it is supposed that every month each pair begets a new pair, which from the second month become productive?

Fibonacci rabbits, the first few months

1^{st} month

2^{nd} month

3^{rd} month

4^{th} month

5^{th} month

Fibonacci Numbers

Let f_n be the number of pairs of rabbits after n months.

Fibonacci Numbers

The Fibonacci Numbers are the numbers in the sequence defined by

$$f_1 = 1 \quad f_2 = 1$$

$$f_n = f_{n-1} + f_{n-2}$$

Binet's formula for Fibonacci numbers

$$f_n = \frac{(1+\sqrt{5})^n - (1-\sqrt{5})^n}{2^n\sqrt{5}}$$

Given that $f_{19} = 4181$ and $f_{16} = 987$,
what are f_{17} and f_{18}?

Ratios of Fibonacci Numbers

$$\frac{f_2}{f_1} =$$

$$\frac{f_3}{f_2} =$$

$$\frac{f_4}{f_3} =$$

$$\frac{f_5}{f_4} =$$

$$\frac{f_6}{f_5} =$$

$$\frac{f_7}{f_6} =$$

$$\frac{f_8}{f_7} =$$

$$\frac{f_9}{f_8} =$$

Fibonacci Spiral