

# 7.4 Fibonacci & Other Patterns

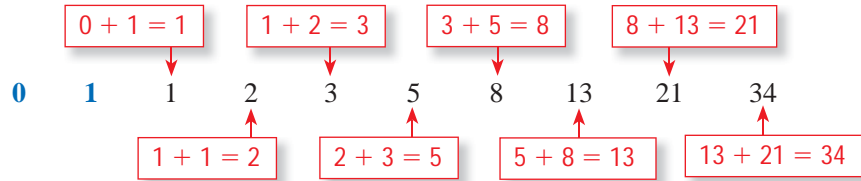
- ▶ Recognize and describe the Fibonacci pattern.
- ▶ Analyze geometric Fibonacci patterns.
- ▶ Recognize and describe other patterns in mathematics.

**Study Tip**

The Fibonacci sequence starts with the numbers 0 and 1. A general Fibonacci sequence can start with other numbers, such as 1 and 3.

### Characteristics of Fibonacci Patterns

In the **Fibonacci sequence** of numbers, each number is the sum of the 2 previous numbers, starting with 0 and 1.



**EXAMPLE 1** Recognizing a Fibonacci Pattern

Consider a hypothetical population of rabbits. Start with one breeding pair. After each month, each breeding pair produces another breeding pair. The total number of rabbits each month follows the exponential pattern 2, 4, 8, 16, 32, . . . Now suppose that in the first month after each pair is born, the pair is too young to reproduce. Each pair produces another pair after it is 2 months old. Describe this pattern.

**SOLUTION**



Leonardo of Pisa was also known as Leonardo Fibonacci. He was an Italian mathematician who is credited with spreading the Hindu-Arabic numeral system in Europe. He did this through his book *Liber Abaci*, in which he used the Fibonacci sequence as an example.

Month		Number of pairs
1	<div style="display: flex; align-items: center;"> <div style="background-color: #ffc107; padding: 2px; margin-right: 5px;">DATA</div> <div style="margin-left: 10px;">Red pair is too young to produce.</div> </div>	1
2	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;">Red pair produces blue pair.</div> </div>	1
3	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Red pair produces green pair</div> <div style="margin-left: 10px;">Blue pair produces purple pair.</div> </div>	2
4	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Red pair produces orange pair.</div> </div>	3
5		5

The number of pairs follows the Fibonacci pattern, not an exponential pattern.

✓ **Checkpoint**

Help at [Math.andYOU.com](http://Math.andYOU.com)

Enter the total number of rabbits for each month in Example 1 (2, 2, 4, 6, 10, . . .) into a spreadsheet. Make a scatter plot of the data. Then compare the scatter plot with the exponential pattern 2, 4, 8, 16, 32, . . .