

Case- Fibonacci Sequence Plan

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Conclusion: The Fibonacci sequence is a sequence number: 0, 1, 1, 2, 3, 5, 8, 13... , i.e.,

$$F(0)=0, F(1)=1, F(n)=F(n-1)+F(n-2) \quad (n \geq 3, n \in \mathbb{N}^*) .$$

Teaching Aim:

Mathematical has the characteristics of symbolization, logicity, preciseness and abstraction. We pay attention to some interesting natural phenomena, we can find mathematics in every where. Students will adapt to the mathematical life with the development of modern science and technology.

Students will improve their mathematical ability, comprehension and expression of mathematical, improve the level of mathematics, and establish a good mathematical system by some interesting examples.

Case Teaching methodology

Fibonacci series is a very beautiful and harmonious sequence. Its shape can be illustrated by a series of squares arranged in a spiral shape (such as the right entry graph). The side length of the starting square (shown in gray in the figure) is 1, and the side length of the square on its left side is also 1, In the following order, the side length is 3, 5, 8, 13... .

Fibonacci sequence appears in flowers, trees, and pictures. Do these plants know the Fibonacci sequence? It should not be. They only evolved according to the laws of nature. This seems to be an "optimal way" for plants to arrange their seeds. It can make all seeds of the same size but with proper density, so as not to squeeze too many seeds at the center of the circle and sparse at the circumference. The same is true of the growth pattern of leaves. For many plants, each leaf grows from the center axis. In order to make the best use of space in the process of growth (considering that the leaves grow gradually, not all at once), the angle between each leaf and the previous leaf should be 222.5 degrees, which is called "Golden angle",

because its ratio to 360 degrees of the whole circumference is the golden section number 0.618033989. And this growth pattern determines the Fibonacci spiral. Sometimes the number of Fibonacci spirals formed by sunflower seed arrangement can reach 89 or even 144.

Mathematical strength often affects the national strength, and the world power is bound to be a mathematical power. Mathematics is very important for the development of a country, and the developed countries often take maintaining the leading position of mathematics as their strategic demand.

China have powerful manufacturing and engineering. We need to combine the theoretical knowledge of mathematics with the practical engineering application . Constantly looking for new problems from the practical application, using mathematical knowledge to solve and construct our motherland.