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THE GOLDEN RATIO

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In the history of mathematics there are such important values asLeonardo da Vinci, Fibonacci Sequence, pentacle, sacred numbers or "Golden Ratio" and they are compared with one of the most important and fundamental values in art, with the number of PHI. However, what does mean the number of PHI? [1]

The number PHI is approximately equal to the number 1.618 and it is one of the most important and significant numbers. In addition, considered that the number is "the most beautiful figure" in the world.

The number PHI originates from Fibonacci Sequence, which is the type of progression, where each number is the sum of the two preceding ones. Another properties is that the ratio of each successive pair of numbers in the sequence approximates Phi (1.618.)

This figure is similar to the foundation of a brick, where build the foundation of all living things on earth. The whole plants, animals even people intheir physical properties is related to the proportion which is the base of the PHI.

The existence of re shows phi in natural there is a connection between all living things on earth.

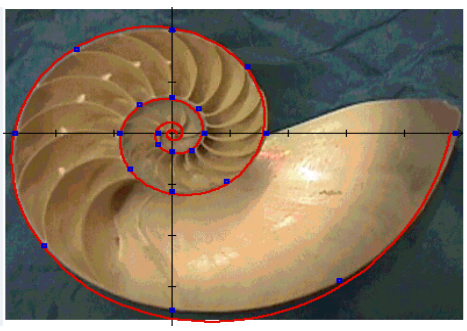
It used to be the belief that the creator of the whole world himself introduced this number.

Here is an example of this proportion from nature: the number of females more than the number of males in a hive. (1st picture).

If we will divide the number of females to males, we will have PHI number, about 1. 618. Here is another example:

Let's take a look at the Nautilus cylinder, which is a spiral-shaped marine mollusk that fills the gas and fills its head in order to have a floating character.

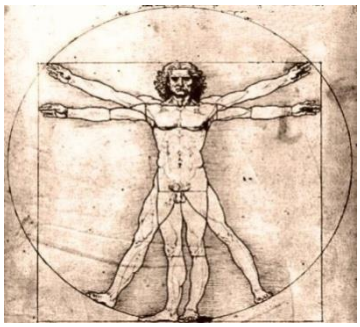
The ratio of each of its spiral rolls to the next round of the shell reaches the same number of phi, ie 1,618.(1,2-pictures)



1-picture 2- picture

Similarly, the ratio of the diameter of the winding diameters along the spiral axis of the fresh grains of sunflower seeds in the direction opposite to the diameter of the next pack is about 1,618, the leaves of the corn stem, the leaves of the leaves on the stems of the plants, the segmental parts of the insect body, etc. all this is theirs.

Leonardo da Vinci and Vitruvium [2]. Let's look at how it all depends on architecture. In his work titled "The Ten Books of Architecture" by Leonardo da Vinci, the portrait of a naked man in a circle dedicated to the Roman architect Marcus Vitalywi who praised the "god created" proportion.In order to improve his knowledge, Leonardo da Vinci studied the human anatomy and measured the proportion of dead bones. It was for the first time that the human body consists of "building blocks" and that proportion of their relation is equal to the "sacred number" we say.It can be divided into lengths of the length of the body from the core to the sole of the foot, or from the longest to the ends of the fingers, and the elbows to the length of the fingernails. (3,4 - pictures)



3 - picture 4- picture

All of the above is read as a valuable material in the history of mathematics. The reason is that the "golden cross" constant still surprises us with the wonderful qualities [3].

As a proof, it is referenced in this sacred number in the most important architectural works of the capital of Kazakhstan - Astana.And the main idea creator of these works - the Head of State N.A. Nazarbayev. Below are some of those works that tell us how the "golden curves" stand out. [3]

Monument of the White Horde (Figure 4): The height of the main part of this monument, whose height is 80 m, is equal to the altitude of the "golden section".

Baiterek monument (5 –picture): total height - 97 m. The height of the main part is 86 m. Height, including the outer fence, is 105 m. Among these numbers there is a repeat of 1, 1, which is considered to be "excellent".

5 –picture

6- picture

Palace of Peace and Reconciliation (6 –picture): All in all, the eighth eighth of the world is 62 meters in height and the width based on the same pyramid shape. The architectural culinary object that is similar to the Palace of Peace and Reconciliation in Astana is not so vivid. This is the basis of scientific research that begins with the theory of natural sequences. Let's talk about the sequence of natural chains and the theorems that prove them.

Two derivatives of $a_1<a_2<a_3<$….and we consider one of the methods for classifying $b_1<b_2<b_3<$… in the intersecting chains where $b_n=a_n+n$ satisfies the condition for any natural condition.

Moving through the natural row, we can gradually calculate the members of the two chains.

b_1 b_2 b_3 b_4 b_5 b_6 b_7 b_8 b_9 b_{10} b_{11}

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

a_1 a_2 a_3 a_4 a_5 a_6 a_7 a_8 a_9 a_{10} a_{11} a_{12} a_{13} a_{14} a_{15} a_{16} a_{17}

Since $b_n> a_n$ is a condition, then the smallest integer equals $1 – a_1$.

Here

$b_1=a_1+1=1+1=2$

and so on. Thus, when choosing the smallest integer, we assume that a_n is equal, and form the chains by b_n of

$b_n=a_n+n$.

These chains have created an interest in the theory of natural numbers of mathematicians and have led many uses.

For example, in Rival's Theory of Sounds, in 1877, he wrote: "If x is an irrational number with a smaller number, then it is possible to create two rows of n / x and n / (x-1), where n = 1,2,3; each number corresponding to one of the series is within the range of two natural numbers only".

That is, a_n = [n / x] and b_n = [n / (1-x)], if 0 <x <1 and x¢Q, fill the entire natural sequence.

I.F.TheAkulich hypothesis: The ratio of the number of a-numbers to the b-number tends to the "golden cross-section"

((1 + √5) / 2)

(where a is the number corresponding to the sequence of the sequence b, corresponding numbers in the chain B). [5]

$a_n=[(1+\sqrt{5})n/2]$

$b_n=a_n+n=[(1+\sqrt{5})n/2]+n=[(3+\sqrt{5})n/2]$

We prove the hypothesis of the shrimp using the above formulas.

α=(1+√5)/2 to equal β=(3+√5)/2 .

If chains:

a_n=[αN]; b_n=[βN] subject to the formulas.

Let's estimate how many a-numbers and b- numbers exist for the first N natural numbers.

a*n≤N the inequality of the integral part of the definition is a

n<N+1

equal to the inequality equal to

n<(N+1)/a

inequality. Consequently, a is the number

[(N+1)/a]

of the first N natural numbers. Similarly, the b-number

[(N+1)/β].

So, the ratio of the a-numbers to the b-number ratio

$\frac{[(N+1)/\alpha]}{[(N+1)/\beta]} = \frac{\beta}{\alpha}$. Striving

N to infinite:

$\lim_{N\to\infty} \frac{[(N+1)/\alpha]}{[(N+1)/\beta]} = \frac{\beta}{\alpha} = \frac{(3+\sqrt{5})*2}{2(1+\sqrt{5})} =$

$\frac{(3+\sqrt{5})(1-\sqrt{5})}{1-5} = \frac{3-3\sqrt{5}+\sqrt{5}-5}{-4} = \frac{-2-2\sqrt{5}}{-4} = \frac{1+\sqrt{5}}{2}$

We made sure that the a_n and b_n chains of the hypothesis are correctly given by the formulas.

a_n=[(1+√5)n/2]

b_n=[(3+√5)n/2]

However Akulich was not the first who knew that a_n and b_n circuits can be written in

[αn]

and

[βn].

These obvious formulas can be derived from the value of Rayx=2/(1+√5), since the value of 1 is equal to

2/(3+√5) ,

$\alpha = \frac{1}{x}, \beta = 1$/(1-x).

In the article of Baababov, this theorem is fully proven and summarized its results in general, indicating that the selection of the natural sequence is infinite.[5]

In future, we look forward to research the “golden ratio” in the food industry.

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