The Fellowship Of Maths

MATHEMATICS AND NATURE

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The purpose of mathematics; it is to improve the thinking ability that people bring innately. In order to achieve this development, it provides us with some information and makes reviews, researches and comparisons of the events and problems we will encounter, allowing us to be regular and careful, think rationally and find the truth about everything.The scientific explanation of many seemingly supernatural events, such as natural phenomena, can be made by mathematics. It is understood that there is mathematics in the perfect order of the universe. Known since prehistoric times, this fact is reflected in our age with a more advanced technology. The most basic mathematical concepts are in nature. The deepest, most abstract concepts of mathematics arise as a result of a necessity from the most basic concepts that nature offers us. In the bosom of each concept, other concepts are included.

Mathematics exists independently of mathematicians and people. Pythagoras did not create steep triangles, he discovered them. Galois did not create or explore groups. Noether didn't create the rings, he discovered them. Hilbert did not create hilbert spaces, he discovered... In short, mathematics exists in nature.

This article was prepared by karan:vfl

CİCADAS

North America forests, there is a type of cicadas who have weird lifestyle in the. These cicadas have been hiding underground for 17 years. Then, in May of the seventeenth year, they rise to the surface.

We generally call them ‘periodical cicadas’. These cicadas only live on earth for 4-6 weeks. They match during that time, they try to lay as many eggs as possible with the hope that who come after them will survive. Then they die singing their song. The most interesting thing for a mathematician, choosing of the prime number 17.

There are other types of cicadas that stay underground for 7 and 13 years. These numbers are also prime numbers. If these periodical cicadas decided to rise early from the ground, they do it in a way that puts them in a subgroup, not a year. So they are rise from the ground in the 13 years instead of 17 years.The reason is why they instinctively organize their life cycles into prime numbers, 13 and 17 are prime numbers and these numbers It is also possible for two different groups of cicadas to appear simultaneously in nature every 221 years, which is a multiple of 13 and 17. As a result, prime numbers are directly related to the life of cicadas.

This article was prepared elif.ı.vfl

THE BIRDS

Many bird species fly in regular groups and especially in the form of 'V'. According to research in the journal 'NATURE', this flight form is the most aerodynamically useful form for birds.

The researchers, who did this research, showed that birds make the most beneficial use of airflow by adjusting their wing movements in flight to the movement of the nearest bird in the flock. During 'V' flight, the regular movement of the wings of the birds allows them to make the most of the upward airflow. As they fly one after the other, they make the least use of downward air movement, as the harmony between their wings is reduced. As a result, 23% energy efficiency is achieved for each bird, and 60%-70% in general.

This article was prepared

WAYFINDING METHOD OF ANTS

The desert ants that live in the Sahara, always manage to return to their nest by walking hundreds of meters in the barren desert land. A team that consists of German and Swiss biologist and zoologist, liken this feature to the speedometer in cars. The ants come and go the same distance in an infallible way. The ants of the Sahara use road integration system to find their way. In this system the ant uses its walking and rotations total to calculate its distance to its nest. A series of mathematical operations are performed during this time period. The ant divides the distance to its nest into small segments; each segment carries the appropriate vector of direction and distance. With he sum of these vectors, the 'homing' vector, which gives the distance and direction of the slot, is obtained. It is not yet clear how the Sahara ant measures its forward movements and turns and how it makes these calculations.

This article was prepared elif.ı.vfl

WAVES AND MATHS

Waves are periodic disturbances in some medium, like water waves in water, vibrations of a string or wire (e.g. guitar), sound waves in air, or electromagnetic waves in the electromagnetic field. To describe wave motion mathematically, we refer to the concept of a wave function that describes the position of a particle in the medium at any given time. The most basic of wave functions is the sine wave or the sinusoidal wave, which is a periodic wave. These are the benefits of mathematics in terms of understanding wave signals.

This article was prepared pınar.a.vfl

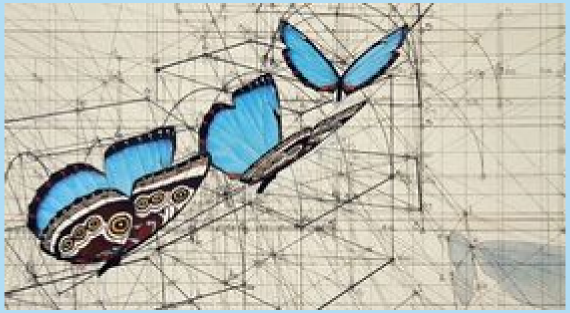
BEES AND MATHS

Honeycombs are built in a hexagonal shape to fully utilize the space available and with the least amount of materials. Honeycombs are three-dimensional shapes in the form of hexagonal prisms. The honeycombs in the form of hexagonal prisms are in two layers, with one open end and the other closed ends placed back to back. When the frame is placed perpendicular to the ground, the prisms are constructed to make an inclination angle of 130 with the horizontal, and this angle is the smallest sufficient angle for the honey not to flow. Bees visit flowers in many different regions everyday and use a lot of energy. Therefore, they immediately learn to fly on the best route to sace en

This article was prepared sudenaz.a.vfl

Symmetry and Butterflies

We say an object is symmetric if it is invariant to any various transformation (including reflection, rotation or scaling: enlarging or reducing). If we want to be very rigorous (mathematically), we can say “A mathematical object is symmetric with respect to a given mathematical operation, if, when applied to the object, this operation preserves some property of the object.” For mathematics, maintaining the same property after some sort of operation is key to understanding many advanced concepts. Looking at the beautiful patterns of a butterfly’s wings is the first step at understanding concepts from calculus (even vs odd functions), linear algebra abstract algebra, statistics and way more



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The Golden Ratio And Its Examples In Nature

The golden ratio is a geometric and numerical correlation of proportions observed in mathematics and art between parts of dec whole, which is believed to give the most competent dimensions in terms of harmony. This ratio is, and its representation in decimal is 1.618033988749894... it is in the form of. Although it is not known how it was found, some studies were first carried out by the Egyptians and Greeks. This number is also known as the Fibonacci number. Fibonacci numbers : 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1597, 2584, 4181, 6765... it continues in the form of. Fibonacci series 0+1= 1, 1+1=2, 1+2=3, 2+3=5, 3+5=8 it starts with a simple sequence such as and, and ends with a short sequence reaching the numbers a thousand and a million. The most important feature of these numbers is that the ratio of any number in the series with the number before it gives the number 1,618 with very small differences.

The edge lengths of the squares in the figure above give the Fibonacci numbers, respectively. This ratio occurs in many places in nature. Chameleon tail, seashells, fern shoots, ocean waves, flower buds, snail shell, cones, sunflowers, spider webs are very well-known examples.

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THE BEAVERS

The beaver's nest in the form of a very wide dam. The dam built by the beaver blocks the water at an angle of exactly 45 degrees.

In other words, the beaver builds the dam not randomly, but in a completely planned way. All of today's hydroelectric power plants are built in this way. Beavers also do not completely block the water. They build the dam to hold water at the height they want, and leave special channels for excess water to flow out.

This article was prepared sudenaz.a.vfl

SNOW CRYSTALS

Snowflakes falling from the sky are all different from each other. All of them have six corners.

First, they all grow larger and larger around a small grain of dust, and small arms begin to form from its corners. As the air cools, growth accelerates and capillary extensions begin to form. As snowflakes are thrown, each one is exposed to different environmental conditions and they all acquire different characteristics. The resulting complex structures form a unique symmetry connected to the multiples of gold in connection with the hexagon, and the crystal acquires its three-dimensional structure.

American Wilson Bentley made the first research on these crystals and said the following about the uniqueness of the crystals he discovered: “Under the microscope, I discovered that snowflakes were miraculously beautiful.

It is a great loss that this beauty is not seen by others and not given the necessary importance. Every crystal is a marvel of design and no design is repeated...”

This article was prepared mislina.z.vfl

Trees and Math

A ‘Social Network’ was discovered where trees and plants were connected underground.

A study conducted by the Crowther Laboratory in Zurich, Switzerland, and Stanford University in the US found that under every forest and grove,It was discovered that there is a complex web structure consisting of roots, fungi and bacteria that connect trees and plants underneath.The research, published in the journal Nature, used the Global Forest Initiative’s database covering 1.2 million forests and 28,000 species in more than 70 countries

Mathematician Spiders

The shapes they make prove that they are masters of geometry. Indeed, the best example is the Archimedes Spiral.

Archimedes Spiral: It is the curve followed by a point moving outward with a constant speed on a line that opens outward from the origin and rotates with a constant angular velocity in the two-dimensional plane. This is the movement of spiders as they weave their webs.

Spiders first release a silk fiber from the hindquarters, waiting for it to fly with the air current and get stuck somewhere. This silk fiber creates a line that acts as a bridge. It goes down from the top of this line and fixes the silk wire to form a Y shape. This resulting Y shape is the skeleton of the mesh. The center of the mesh will be where the three branches of the Y shape meet.

This article was prepared
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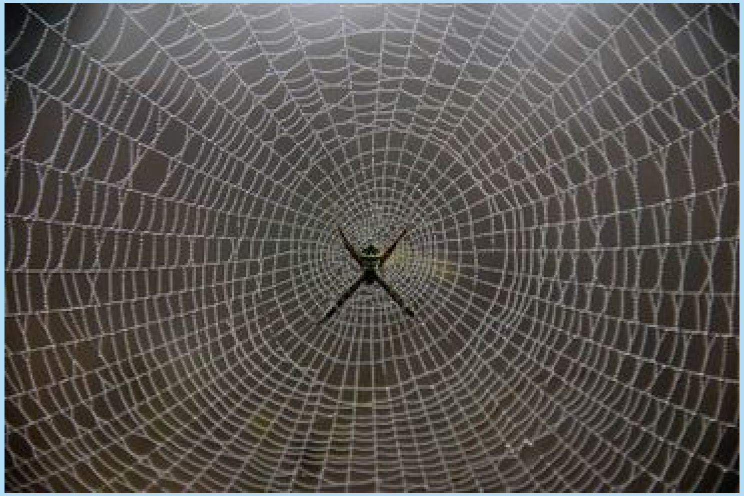
After building the foundation frame, it begins to form radial (central outward) strands, each fixed in the centre. It continues to weave in different directions, with fixed angles and the same movements, to fill the remaining radii. He then makes the final arrangements by creating temporary networks from the center to the outside. After that, it weaves the permanent web between temporary spiral radii, starting from the outermost and towards the centre.



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