



Geopythafibotonpolyhypotesaeder! Matheliebe.

Press images with subtitles and explanations

The arrangement of seeds in sunflowers

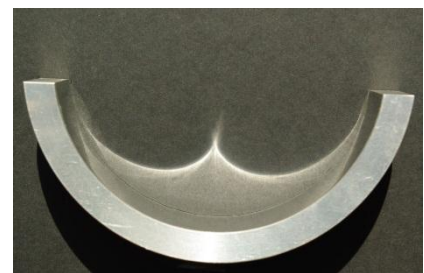
Seeds in a sunflower are arranged in a series of clockwise and an anticlockwise spirals. If you count these spirals then, depending on the size of the flower head, numbers from the following sequence always appear: 13, 21, 34, 55, 89, 144. The secret lies in the Fibonacci numbers. Curious?



Sunflower head, photo: Georg Schierscher

Nephroids in a coffee cup

Sunlight falls on the reflective, circular inner surface of a coffee cup. On the surface of the coffee, the reflected rays appear together in the semi-kidney shape (or nephroid). A simple phenomenon, but a mathematically difficult task! Why?



Semi-kidney shap in a metal semicircle, photo: Georg Schierscher



Who wins?

Two balls are released at the same time on sloped starting ramps of the same length at the top of a ball run with two separate routes. One of the balls rolls along a horizontal, straight route; the other ball takes a U-shaped route. Who will win the race?



Ball run, photo: Sven Beham (Liechtenstein National Museum)

Horse saddle on the roof

Saddle surfaces are roughly the same shape as a horse saddle. They are very popular in architecture, particularly in construction projects using concrete. Why? Although elegantly curved, they can be made cost-efficiently using straight-line girders. Can you imagine that?



Thread model of a saddle surface, photo: Sven Beham (Liechtenstein National Museum)

Pass the truncated icosahedron!

Ever played with a truncated icosahedron? Of course you have! After all, from a geometrical perspective, that is what a conventional football is. To be mathematically correct, an icosahedron is composed of 20 equilateral triangles, each side being, for example, 18 centimetres long. It has five

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triangular faces meeting at each of the twelve vertices. Truncating each corner and dividing the edge lengths by three results in a regular pentagon with sides of six centimetres. From each formerly equilateral triangle a regular hexagon is formed with a side length that has been reduced to six centimetres. In other words: a football is made up of 20 regular hexagons and twelve regular pentagons. Do you understand? Is the ball really round?



Cardboard model of the icosahedron, photo: Sven Beham (Liechtenstein National Museum)