Three is not only a number *

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19, 20, 21 March 2019, ore 18.30
Sala Pietra, ex Ospedale Militare

Piero della Francesca's Flagellation The picture in which three persons enigmatically make up the foreground, apparently without any connection to Christ's torture, is well known, but neither its history, nor its meaning are clear, and it is not known who commissioned the artist for the painting.
A cottage industry of interpretations sprang up in recent years, in particular after R. Longhi's book on Piero della Francesca. We discuss Piero's life and mathematical work | after all, he is considered to be one of the foremost mathematicians of the early Renaissance | putting some of the known 42 interpretations from the literature into this context.

Trisecting an Angel Trisecting an angle with circle and straightedge is a classical problem from Greek mathematics, and it was shown only in the 19th century that it is not possible. But what does this mean exactly? How did Archimedes and Albrecht Dürer solve this problem when they had to? We look a bit into algebra for establishing that a solution cannot be found with these constraints, that Archimedes cheated a bit by using additional tools, and that Dürer found an approximate solution, which, however, is surprisingly close to the exact solution. What is even more flabberghasting is that the problem can be solved through paper folding (so bring two or three quadratic sheets of paper to class).

Fibonacci's numbers We will deal with Fibonacci's numbers, after having had a look at the life and the paramount achievements of L. Fibonacci. We will mention the Golden Ratio only in passing, but rather investigate methods for dealing with numbers like Fibonacci's.
A typical example is the money changer's problem - how many ways are there to pay a given amount of money with a fixed repertoire of coins? We look at ways to solve this problem and go into other, related problems with the methods developed there, in what could be called a dignified way of counting.

Cantor's set and Hilbert's hotel Take an interval in the real numbers, discard the middle third, obtaining two intervals. Repeat this operation with each of the surviving intervals, and carry on, repeating the process infinitely. What do you get? A characterization of the resulting set is given, and it is shown that it is still infinite. This set has some other remarkable properties.
Most puzzling is the fact that we still obtain an infinite set, and we will need to talk about counterintuitive properties of infinite sets. One delightful example is Hilbert's Hotel, a hotel with an infinite number of rooms. If it is full, and an infinite number of visitors arrives suddenly, all of them can be accomodated. I will show you how the hotel manager gets this done, and how one is even able to help when an infinite number of other fully occupied Hilbert hotels has to be evacuated.

* il corso si terrà in lingua inglese