

# Subirach's Magic Square: A Brief Insight

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The Subirachs Magic Square is prominently located on the Passion Facade of the Sagrada Familia, a monumental basilica in Barcelona, Spain, designed by the architect Antoni Gaudí. The square is named after Josep Maria Subirachs, the Catalan sculptor who contributed much of the artwork to the Passion Façade in the late 20th century. This magic square is an integral part of Subirachs' larger representation of the Passion of Christ, blending mathematical curiosity with religious and symbolic meaning. Magic Squares, of which the Subirach Square is, of course, a subset of, traditionally consist of integer sums from 1 to 16 that are composed in such a way that all of the rows, columns, diagonals, and 2x2 subgrids compose a combined sum of 34. As described in the homework, however, the Subirachs Magic Square is a 4x4 grid (matrix) containing the numbers 1 through 15, with the number 10 appearing twice. What differentiates this magic square is the sum of its rows, columns, etc. The sum, 33, is often interpreted as a reference to the age of Christ at the time of his crucifixion, thus infusing religious symbolism into its mathematical form. 33 can also hold significance in other traditions, such as Freemasonry, where it represents the highest degree of wisdom. The double appearance of the number 10 could symbolize completeness or a form of divine unity. The exclusion of 16 could also point to how Subirachs wanted potential puzzle solvers to deviate from a standard mathematical algorithm, which is as follows.

Let  $M$  be the magic constant, or the sum of any  $n$  rows, columns, etc. of an  $n \times n$  Magic square.

The solution is as follows:  $M = \frac{n(n^2+1)}{2}$ .

Meanwhile, the solution for the sum of a Subirach's Square requires the puzzle solver to go beyond permutation and simply add together the first row (computationally speaking, the easiest way to determine the sum) since the Subirach's Square still follows the general rules of a Magic Square as a subset. Now, a quick note on Subirachs himself. Subirachs was known for incorporating symbolic and mathematical elements into his works. By creating a magic square that deviates from traditional patterns, he introduced a sense of intentional imperfection, reflecting the suffering and mystery surrounding the Passion of Christ. One of Subirach's main goals in creating his interpretation of magic square was not only to show how humanity's imperfection and mathematical perfection can combine to create a product both with a profound meaning and also subvert the expectations of people who view his medium of expression.