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THE ENIGMATIC POWER OF 142857 IN THE ANCIENT EGYPTIAN PYRAMIDS

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ABSTRACT

Ever since the enigmatic number 142857 was unearthed within the archaeological context of the ancient Egyptian pyramids, it has captivated the attention of mathematicians and scientists worldwide. Numerous studies have been conducted in an attempt to establish a direct or indirect connection between this number and the pyramids, yet no conclusive research findings have emerged thus far. Nevertheless, based on the continuous research of ancient civilizations, characters, and masterpieces, the calculation method of the line segment and the relationship between polygons and numbers are discovered in the exploration of polygons, right triangles, multiplication tables, and the mathematical constant π. These discoveries have unveiled a fascinating string of numbers that can potentially reveal that ancient Egyptian pyramids were designed and constructed using the mathematical approach rooted in the application of isosceles right triangles, with "5" and "7" as representative values,

rather than simply representing the cyclic meaning. Furthermore, they have illuminated the profound wisdom possessed by the ancient Egyptians, affirming that the pyramids stand as a testament to the advanced development of ancient mathematics. This discovery not only represents a cognitive advancement in the study of ancient Egyptian archaeology and history but also holds immense importance in the broader realm of ancient mathematics and its impact on the development of modern mathematics.

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1. INTRODUCTION

Figure 1. Ancient Egyptian pyramids.

Pyramids not only stand as the symbol of the ancient Egyptian civilization but also serve as important topics of archaeological studies in the world. A total of

110 ancient Egyptian pyramids have been unearthed in Egypt, with the Khufu Pyramid, constructed around 2690 BC, reigning as the largest among them. The pyramid consists of a square bottom and four isosceles triangular sides, featuring multiple steps that have earned it the moniker of the ladder pyramid. Amidst the enigmatic wonders of these ancient Egyptian structures, the number 142857 was stumbled upon, although the exact pyramid in which it was discovered remains shrouded in uncertainty.

Based on an extensive review of literature and retrieval of the latest research reports after 2019, the majority of studies have primarily engaged in research regarding 142857 with a string of numbers exhibiting numerical cyclic relationships, rather than establishing a connection between 142857 and ancient Egypt civilization, as well as ancient Egyptian pyramids. This raises several questions: Does the number 142857 have something to do with ancient Egyptian pyramids? Could it be a standalone number or a combination of various earthly numbers? In the exploration of ancient Latin scripts, Chinese antiquities with characters, and masterpieces 3000 years ago, it has been noted that ancient numbers and characters lacked punctuation marks and spaces. This suggests that instead of being a string of complete numbers, the mysterious number 142857 within ancient Egyptian pyramids, lacking punctuation marks and space, is more likely to contain multiple components composed of two or three sets of numbers. Consequently, there is a contention that 142857 could potentially be a numerical group comprised of multiple components, such as "142,857" or "14,28,57," among others. However, the true composition of this enigmatic number discovered in the ancient Egyptian pyramids remains elusive.

Discoveries through ancient writing, civilizations and masterpieces
Polygons and numbers

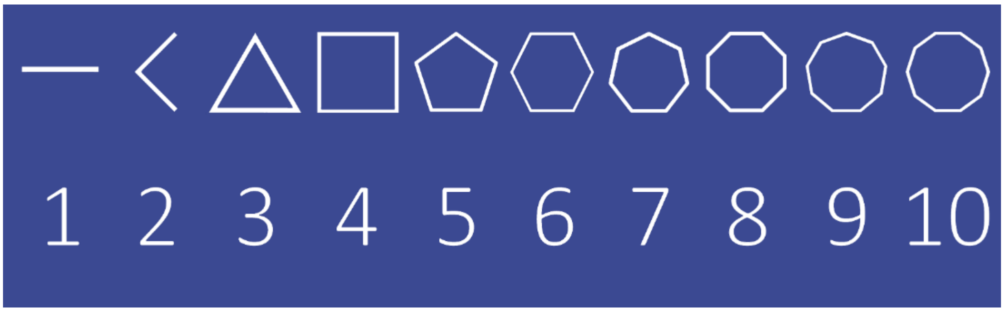

Figure 2. Polygons and number.

The polygons exactly conform to the quantity relationship that Arabic numerals express, the three-sided polygon (triangle) expresses the meaning of number 3, the four-sided polygon (square) represents number 4 and the five-sided polygon (pentagon) refers to number 5. However, it should be noted that the pentagon is composed of the triangle and the quadrilateral.

Figure 3. Five-sided polygon (pentagon).

a. The pentagon represents number 5 through the view of sides,
b. From the perspective of structure, the pentagon is composed of two polygonal elements, the triangle and the quadrilateral. Consequently, it exhibits the polygonal relationship between 3 and 4, namely, "3+4=7".
c. Therefore, the pentagon refers to two numerical meanings, "5" and "7", which correspond to appearance and essence respectively in ancient civilizations and mathematics.

The components of right triangles

Figure 4. Trisquare (square ruler).

In ancient times, a tool known as the "trisquare" or "square ruler" was utilized to construct right triangles and squares

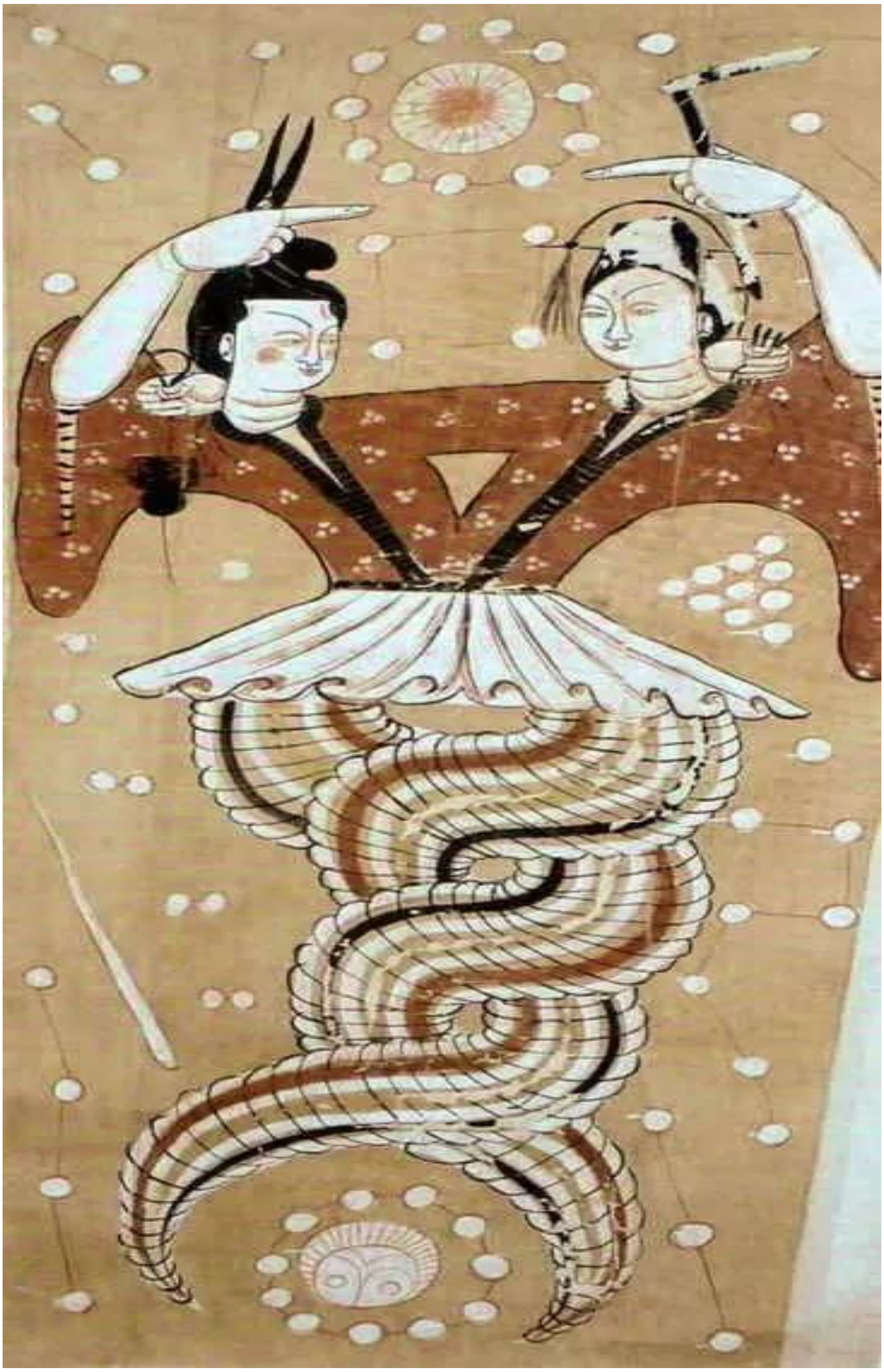

Figure 5. The "trisquare" in Nüwa and Fuxi ancient Chinese artifacts.

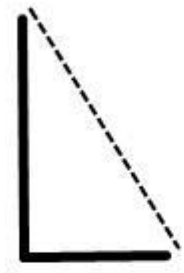

Figure 6. Composition of a right triangle.

Through the examination of right triangles and various polygons, it was observed that right triangles could be generated by employing these "trisquares" which also construct two right-angle sides, and the hypotenuses of a triangle can be obtained by drawing the diagonal between two right-angle sides. Therefore, right triangles were found to be comprised of both "trisquares" and their corresponding hypotenuses. Specifically, non-equilateral "trisquares" were instrumental in forming diverse right triangles, while equilateral "trisquares" were involved in constructing special isosceles right triangles.

The ancient calculation method for computing the line segments

By continuously delving into ancient characters, civilizations and mathematics, researchers have uncovered the ancient calculation method for computing line segments, Specifically, a line segment was divided into four equal parts with the same value, and then the length of line segments was accurately calculated based on the value of equal parts or the value of the basic line segments.

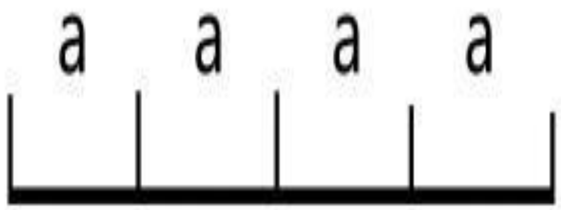

Figure 7. Dividing a line segment into four equal parts

2. THE ANALYSIS OF 142857

Part 1. Composition of 142857, "142,857" or "14,28,57"?

2×7=14,4×7=28.

By performing simple division operations on the two sets of numbers, namely "142,857" and "14,28,57", only number "7" is a common divisor for "14" and "28", and there are no shared divisors for the numbers "142" and "857". Therefore, the possibility of sequence "142,857" should be rejected, instead, selecting the composition of "14,28,57".

As "7" is not a divisor of "57", this suggests that the composition of "14,28,57" was composed of two parts: "14,28" and "57", which could potentially be the true composition of the mysterious number 142857 within ancient Egyptian pyramids.

Part 2. 57

The representative values of right triangles are "3, 4, and 5". It is clear that "5 and 7" also represent a right triangle that conforms to the characteristics of "3, 4, and 5" by splitting "7" into "3 and 4", although they may not directly reflect "3, 4, and 5" of the right triangle. Hence, the number “57” in the mysterious number 142857 discovered from the ancient Egyptian pyramids conveys the meaning of right triangles. Moreover, such a right triangle has two equal right-angle sides. This is because an isosceles right triangle with two equal right-angle sides can be defined by only two values “5 and 7”, where "7" and "5" indicate the hypotenuse and right-angle side, respectively.

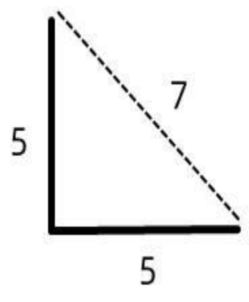

Figure 8. "5 and 7" of an isosceles right triangle.

If "5 and 7" refer to an isosceles right triangle, "14 and 28" must denote the content pertaining to the isosceles right triangle.

Part 3. 14

Due to the finding of basic calculation method of the line segment, the number "14" in the enigmatic number "142857" within the ancient Egyptian pyramids exhibits two meanings:

a. The number "14" refers to the quartering of a line segment.
b. The number "14" is twice of "7", with a value of "14(2×7)" for each two parts and a value of "7" for each equal part.

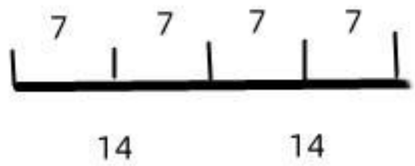

Figure 9. A schematic diagram illustrating the equal division of the hypotenuse of an isosceles right triangle.

Since the number "57" has illustrated "7" as each part value of the hypotenuse, "5" must denote the core value of the right-angle side of an isosceles right triangle.

The right triangle is composed of two elements, in other words, "trisquare" and hypotenuse. The "trisquare" as a whole, when quartering the hypotenuse of the isosceles right triangle, should be simultaneously divided into four equal parts. Nevertheless, quartering "trisquare" means that two right-angle sides are divided into four equal parts, resulting in each right-angle side divided into two equal parts, with a value of "5" for each equal part.

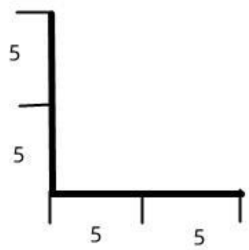

Figure 10. Quartering of "trisquare" for isosceles right triangle.

Based on the above analysis, "5” and "7" are each equal part value of the right-angle side and hypotenuse in an isosceles right triangle respectively. In other words, the values "5 and 7" are core values for calculation in an isosceles right triangle.

Part 4. 28

It can be easily observed that 2 is twice of 1, 8 is twice of 4, and 28 is twice of 14. According to this pattern, the number "28" in the mysterious number 142857 within ancient Egyptian Pyramids expresses the multiple relationship, and there is an identical multiple relationship between the right-angle side and hypotenuse of an isosceles right triangle.

Part 5. The calculation method for isosceles right triangles through the mysterious number 142857

a. Calculation based on "5 and 7"
When the value of the right-angle side in an isosceles right triangle is n times of "5", the value of the hypotenuse must be "n" times of "7".

During a calculation of the hypotenuse of isosceles right triangles, the multiple of the right-angle side "5" is multiplied twice by "7" to acquire the main value for the first time and D-value for the second time. Since two right-angle sides are equal, the values obtained from both calculations are identical and the combination of the same two values is the value of the hypotenuse in isosceles right triangles.

Table 1. Calculation of the hypotenuse of isosceles right triangles of "5 and 7".

<table>
<tr><td colspan="6">Dividing hypotenuse into four equal parts, with a value of 7 (0.7) for each part.</td></tr>
<tr><td colspan="6">Each right-angle side is divided into two equal parts, with a value of 5 (0.5) for each part.</td></tr>
<tr><td>Value of right-angle side</td><td>Multiple of 5</td><td>Main value of hypotenuse</td><td>D-value of hypotenuse</td><td>Combination of both main value and D-value</td><td>Value of hypotenuse</td></tr>
<tr><td>1</td><td>2</td><td>2×7=14</td><td>2×7=14</td><td>1414</td><td>1.414</td></tr>
<tr><td>2</td><td>4</td><td>4×7=28</td><td>4×7=28</td><td>2828</td><td>2.828</td></tr>
<tr><td>3</td><td>6</td><td>6×7=42</td><td>6×7=42</td><td>4242</td><td>4.242</td></tr>
<tr><td>4</td><td>8</td><td>8×7=56</td><td>8×7=56</td><td>5656</td><td>5.656</td></tr>
<tr><td>5</td><td>10</td><td>10×7=70</td><td>10×7=70</td><td>7070</td><td>7.070</td></tr>
<tr><td>6</td><td>12</td><td>12×7=84</td><td>12×7=84</td><td>8484</td><td>8.484</td></tr>
<tr><td>7</td><td>14</td><td>14×7=98</td><td>14×7=98</td><td>9898</td><td>9.898</td></tr>
</table>

14,28,57

b. The calculation method for computing the line segment

According to the above analysis, the hypotenuse of an isosceles right could be divided into four equal parts in straight line segments, with a value of "7" for each equal part and a value of "14 (2×7)" for each two parts. For the right-angle side, the value of each part is "5" and each right-angle side is divided into only two equal parts.

The value of the right-angle side of isosceles right triangle is the multiple of a value "14", the basic line segment value of the hypotenuse and the whole value of the hypotenuse can be obtained by twice multiplied. This is because there is an identical multiple relationship between the right-angle side and hypotenuse of an isosceles right triangle.

Table 2. The Calculation method of the hypotenuse of isosceles right triangles.

The value of a basic line segment is "14"					
Value of right-angle side	Multiple of 14	Main value of hypotenuse	D-value of hypotenuse	Combination of both main value and D-value	Value of hypotenuse
1	1	1×14=14	1×14=14	1414	1.414
2	2	2×14=28	2×14=28	2828	2.828
3	3	3×14=42	3×14=42	4242	4.242
4	4	4×14=56	4×14=56	5656	5.656
5	5	5×14=70	5×14=70	7070	7.070
6	6	6×14=84	6×14=84	8484	8.484
7	7	7×14=98	7×14=98	9898	9.898

Based on our analysis from Part 1 to Part 5, "57" in the mysterious number 142857 of ancient Egyptian pyramids refers to each equal part value of right-angle side and hypotenuse in isosceles right triangles respectively. Furthermore, "14" represents the method for quartering the line segment and basic calculation unit of the hypotenuse in an isosceles right triangle, and "28" means the identical multiple relationship between the right-angle side and hypotenuse of an isosceles right triangle. Therefore, the enigmatic number 142857 not only perfectly reflects the isosceles right triangle, but also serves as an authentic testament of the design and construction methods employed in ancient Egyptian pyramids.

3. THE ANALYSIS OF ANCIENT EGYPTIAN PYRAMIDS

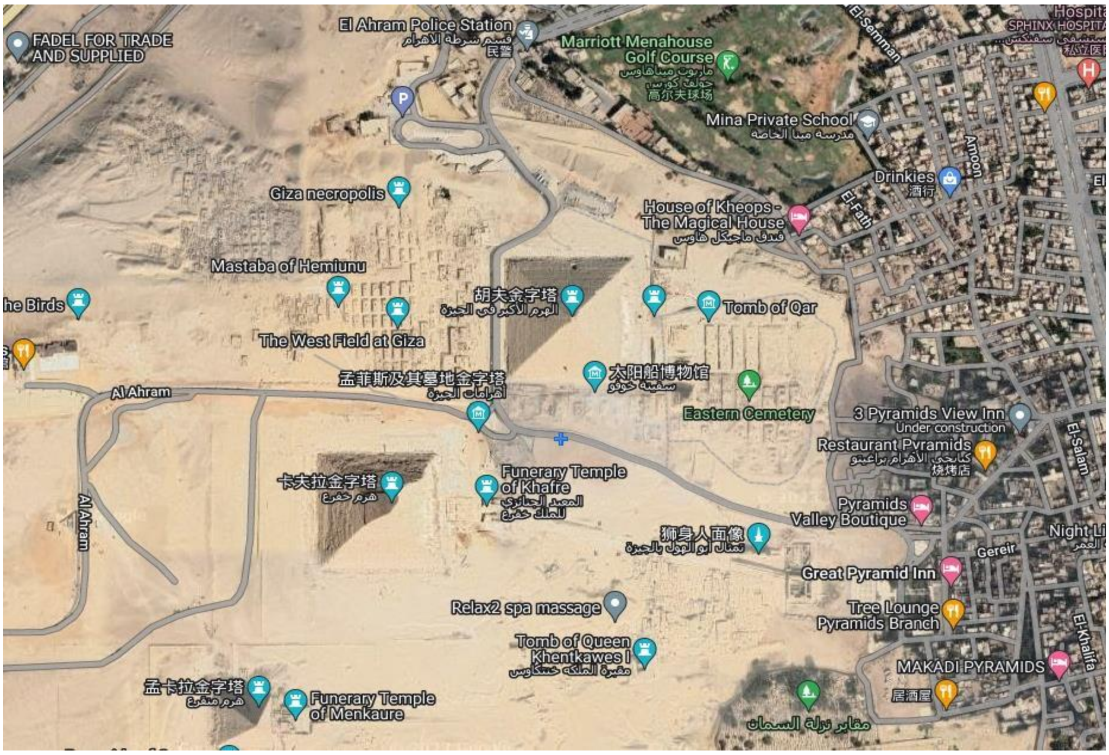

Figure 11. Satellite aerial view of the Kafra and Khufu Pyramids (From Earth satellites, https://www.earthol.com/view-11306.html).

Figure 12. Partial enlarged image of the Khufu Pyramid (From Earth satellites, https://www.earthol.com/view-11306.html).

The pyramids are rectangular pyramids with a square bottom. The intersection mode of its four ridges, as seen from the satellite image, precisely mirrors the diagonal arrangement found in a square. Additionally, since the intersecting diagonals of a square are always perpendicular to each other, it can be inferred that the four triangular slopes of the pyramid are isosceles right triangles. The dark color slope of triangle in the partially enlarged image is apparently an isosceles right triangle, with the right angle on the top. Enthusiastic readers may employ a square ruler to discern whether four triangular slopes are isosceles right triangles or not by engaging comparison through above satellite aerial view. However, why is it that people today, when observing the ancient Egyptian pyramids in person, fail to perceive them as isosceles right-angle triangles?

"All ancient Egyptian pyramids are wrapped by shells made from fine white limestone", said Mohamed Megahed, an Egyptian archaeologist from the Czech Republic.

Figure 13. The Kafra Pyramid.

Some primitive limestone shells still preserved at the top of the Kafra Pyramid provide substantiation for Mohamed Megahed’s assertion. Consequently, it is understandable that people today fail to perceive pyramids as isosceles right triangles because pyramids we see today, are pyramids from which fine white limestone shells have eroded over time rather than the true appearance of ancient Egyptian pyramids over 4000 years ago.

Figure 14. Schematic diagram of the limestone shell on a pyramid.

It is conceivable that the pyramid with this specific shell might be the pyramid with four triangular slopes of isosceles right triangles. If so, the ancient Egyptian pyramids align comprehensively with the mathematical principles of the isosceles right triangle, particularly in terms of design, construction, and the polygonal structure.

4. POLYGONAL ANALYSIS OF ANCIENT EGYPTIAN PYRAMIDS

Figure 15. Pyramids on a one-dollar bill.

The ancient Egyptian pyramids have earned the moniker of the ladder pyramid for multiple steps, and each step is a quadrilateral with a triangle at the top on multiple steps. Therefore, the ancient Egyptian pyramids are composed of two polygonal elements, namely, a triangle and a trapezoidal quadrilateral, based on the pyramid pattern on the one-dollar bill.

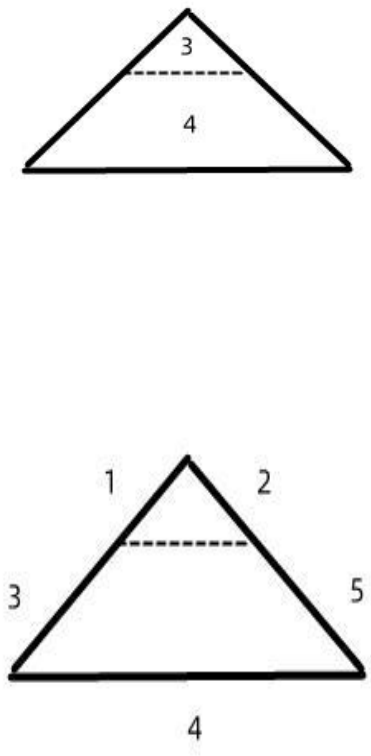

Figure 16. Polygonal structure of the pyramids.

From the perspective of polygonal shapes, each triangular slope of the ancient Egyptian pyramids is composed of a triangle and an isosceles trapezoidal quadrilateral, and this slope, when only perceived through external structure, looks like a triangle-like pentagon. Furthermore, from the perspective of the essence of composition structure of the polygon, the slopes of the ancient Egyptian pyramids exhibit a polygonal relationship of "3+4=7". Therefore, the polygonal structure and the external appearance of ancient Egyptian pyramids perfectly reflect the number "57", which further illustrates that ancient Egyptian pyramids stand as a remarkable architecture, characterized by an isosceles right triangle design, with the number "57" serving as its central element.

5. CONCLUSION

The ancient Egyptian pyramids exhibit mathematical correlations with the isosceles right triangle of "5 and 7", and further analysis reveals the presence of these numbers through the composition structure of polygonal shapes. This number appeared within pyramids, providing sufficient grounds to believe that the numbers "5 and 7" not only represented the design and construction methods of the ancient Egyptian pyramids but also potentially carried cultural, religious reverential significance as a symbolic numerical value.

Both the square root extraction and the Pythagorean Theorem are unnecessary in the method of calculating isosceles right triangles that stem from the enigmatic number 142857 of the ancient Egyptian pyramid. Additionally, these methods do not produce infinite recurring decimals. Therefore, it is contended that during the ancient Egyptian era, over 4000 years ago, human mathematical development had achieved a remarkable level. The impeccable and intricate construction of the ancient Egyptian pyramids, which have withstood 4 millennia, stands as a compelling testament to the advanced and developed state of mathematics during the ancient Egyptian epoch.

"57", the representative number of isosceles right triangles discovered, holds significant implications for a wide range of fields, including archaeology, history, history of mathematics, history of science and architectural history. Its potential impact on the study of ancient Egyptian civilization, in particular, is of extraordinary significance.

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