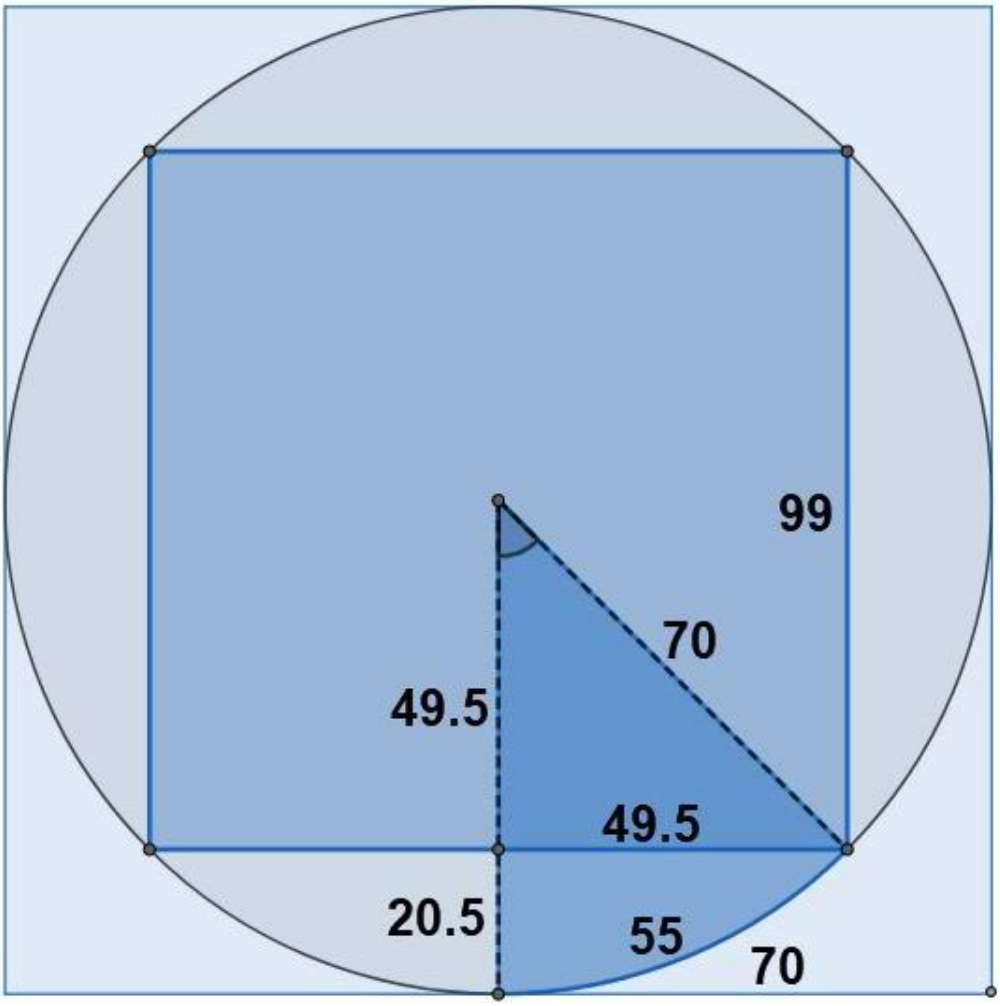


The Cosmology of the Great Pyramid

PART 1: APPROXIMATIONS OF √2 AND PI

Carl Balowski | September, 2024

Abstract

This paper is the first in a three-part study that examines the Great Pyramid's design as a reflection of fundamental geometric principles, aligning not only with ancient Egyptian cosmology but also with the layout of Stonehenge in respect to their own local observations of the Winter Solstice sunrise. It explores the intricate relationship between Egyptian cosmology, geometry, and architecture, focusing on how the Egyptians used approximations of irrational numbers like √2 and π to symbolize the cosmic principles of creation and dissolution. Central to this investigation is the 10:9 ratio, which represents the dynamic interplay between the circle and the square, embodying the transition from the infinite potential of Nun, the primordial chaos, to the finite, structured world of the Ennead. The 14:11 ratio, also significant in Egyptian geometry, is examined as a reflection of their understanding of the relationship between the square's perimeter and the inscribed circle's circumference, subtly encoding the value of π in their monumental constructions. These ratios were not merely mathematical tools but were deeply integrated into their spiritual worldview and metrological systems, symbolizing the continuous process of doubling and halving that underlies creation and dissolution. The Great Pyramid of Giza, with its precise alignment and dimensions, both internally and externally, serves as a monumental expression of these geometric principles, aligning the finite and the infinite through its symbolic connection to Heliopolis, the site of the original Benben Stone. This study highlights how the Egyptians' use of pragmatic approximations allowed them to embed profound cosmological insights into their architecture, creating a lasting testament to their quest to harmonize the material and the divine, the earthly and the cosmic, ensuring that the Pharoah's Ka was preserved safely before it's afterlife journey. Subsequent parts of this study will delve into how these geometric principles are echoed in the design of the King's chamber, Stonehenge and its alignment with the Winter Solstice sunrise, further illustrating the interconnectedness of these ancient sites and their shared cosmological foundations.

Introduction

In ancient Egyptian cosmology, the divine was understood as both immanent within creation and transcendently ineffable—present in the wonders of the natural world yet ultimately beyond complete human comprehension. This worldview is mirrored in their mathematical approach to geometry, where irrational constants such as √2 and π, which underpin the relationship between the circle and the square, could only be approximated, never exactly calculated. The Egyptians might have ingeniously used approximations like √2 as 140/99 and π as 22/7 to express these complex relationships, integrating them into their architecture and cosmology as symbols of deeper truths about the universe.

Central to their spiritual and geometric understanding was the concept of a cosmic doubling effect, where the transformation of the square into the circle and back into a larger square twice the area of the original symbolized the continuous process of creation and expansion. Both the 14:11 and 10:9 ratio, approximating the relationship between the circle's circumference and the square's perimeter, embodies this principle. The 10:9 ratio could especially signify how the finite, structured world of the Ennead (represented by the square with a perimeter of 9 units) emerges from and is encompassed by the infinite potential of Nun, the primordial chaos (represented by the circle with a circumference of 10 units).

Furthermore, the Egyptians recognized the importance of the 14:11 ratio, another key approximation that reflected their sophisticated grasp of geometry and cosmology. This ratio, which corresponds to the relationship between the square's perimeter and the *inscribed* circle's circumference, was encoded in the slope of the Great Pyramid, where for every 14 cubits of vertical height, the pyramid's side extends 11 cubits horizontally. This subtle encoding of π in their architecture reflects their attempt to embody the cyclical nature of the universe and the emergence of order from chaos.

The integration of these ratios—10:9 and 14:11—into the cosmology of the Great Pyramid's design was not merely a technical achievement but a profound symbolic statement. The Egyptians' use of the Remen and the Royal Cubit, their primary units of measurement, reflected the √2 relationship between the square's side and its diagonal, reinforcing the foundational doubling effect that signified the emergence and expansion of the cosmos. The Great Pyramid's apex and diagonal is precisely measured and aligned at a 45-degree angle to Heliopolis and at 117.59° the Winter Solstice sunrise, demonstrating the importance of risen Atum-Ra and the square on a large scale.[1]

Through these architectural achievements, the Egyptians might have sought to capture the eternal cycle of creation, order, and renewal, embedding the sacred relationship between the circle and the square, the primordial infinite and the manifested finite, into their monumental constructions. By approximating the elusive principles of √2 and π, and encoding them within their structures, they created a lasting testament to their reverence for the cosmic order. This is where the divine potential of Nun, the circular infinite, continuously gives rise to the edged, structured world of the Ennead, the finite—a symbolic dance of doubling, renewal, and the cyclical interplay between the circle and the square that lies at the heart of their understanding of the universe.

Approximating the Ineffable: Geometry and the Divine

In ancient Egyptian thought, as in modern times, the divine was likely viewed as both immanent within creation and transcendently ineffable—loosely reflected in the wonders of the natural world, yet never fully captured or comprehensible in its true essence. This perspective might find an interesting parallel in mathematics through the

[1] In part 2 I will demonstrate its alignment with the Winter Solstice Sunrise in accordance with √2. For the Great Pyramid's diagonal alignment and measure to Heliopolis see Balowski, 'The Great Pyramid of "Heliopolis". https://www.academia.edu/117323810/The_Great_Pyramid_of_Heliopolis_An_Osirian_Calendric_Unit_from_Khufus_Pyramid_used_for_Large_Scale_Metrology_LSM_

concept of irrational numbers, such as √2 and π. These constants can be represented and visualized through geometry and arithmetic, but they remain elusive, resisting precise definition. The Egyptians' sophisticated approach to geometry, particularly their use of √2 and π, could reflect this philosophical understanding: just as the divine can only be approached through symbols and representations, these mathematical constants can only be approximated, never perfectly captured. By engaging with irrational numbers, they might have acknowledged the limitations of human understanding in capturing the true nature of existence. Their use of these constants in architecture, particularly in the construction of monumental structures like the pyramids, was likely more than just a demonstration of technical skill; it was an attempt to immortalize this pursuit in stone. They sought to approximate the infinite within the finite, embedding the divine principles of the cosmos into the enduring permanence of their monuments.

While the ultimate goal—perfect knowledge of the divine—was perhaps always beyond reach, the Egyptians likely found profound meaning in their precise approximations. By embodying these elusive mathematical truths in the grandeur of their temples and pyramids, they aspired to capture a glimpse of the divine, preserving it for eternity in the very fabric of their civilization. In this way, through geometric approximation in stone, the Egyptians transformed the inherently unattainable into something enduring and sacred in reverence to the mysteries that govern all existence.

The Benben Stone: A Symbol of Creation and Infinite Geometry

In the cosmological landscape of ancient Egypt, the Benben Stone held a central place, particularly within the Heliopolitan creation myth. It was revered as the primordial mound, the first solid form to rise from the chaotic, circular waters of Nun at the beginning of time. According to tradition, the Benben Stone was enshrined at Heliopolis, a site dedicated to the worship of the sun god Ra-Atum, and it was said to mark the very spot where the act of creation began. Intriguingly, Heliopolis is located precisely at a 45-degree azimuth relative to the apex of the Great Pyramid at Giza, a geometric alignment that echoes the square root of 2 (√2), the diagonal of a square (Figure 1).

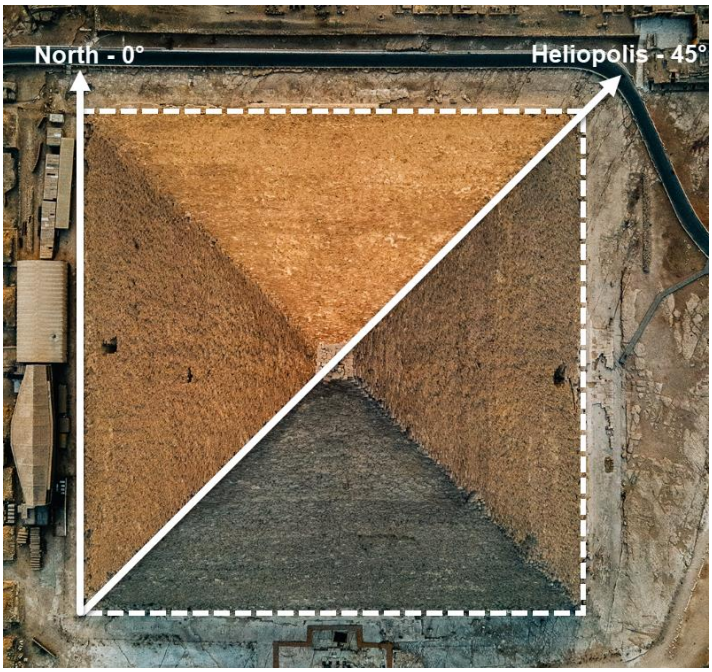


Figure 1

From the Circle to the Square: The Emergence of Order

The primordial waters of Nun, infinite and formless, yet chaotic, were envisioned as a boundless circle—an unbroken shape representing the eternal potential of creation. From this circular expanse, the first 'mound' represented by the archetypal Benben Stone was said to have emerged, symbolizing the first piece of solid land and the beginning of the

cosmos. The Benben's square base signifies stability and the structured nature of 'earth,' or the manifest, contrasting sharply with the infinite, unbounded essence of the waters from which it rose. This transition from the circular to the square could be seen as reflecting the emergence of the finite, material world of 'earth' from the infinite potential of the chaotic Nun. In geometric terms, the square could be viewed as 'emanating' from the circle, much like the Benben Stone was believed to have risen from the primordial waters. This dynamic relationship between the square and the circle is central to the symbolism of the Benben. Just as the circle, embodying the circular course of the divine heavens, encompasses and gives form to the square, representing the earth, the emergence of the Benben Stone's apex can be seen as a manifestation of the divine presence taking shape within the material world from a single point (Figure 2).

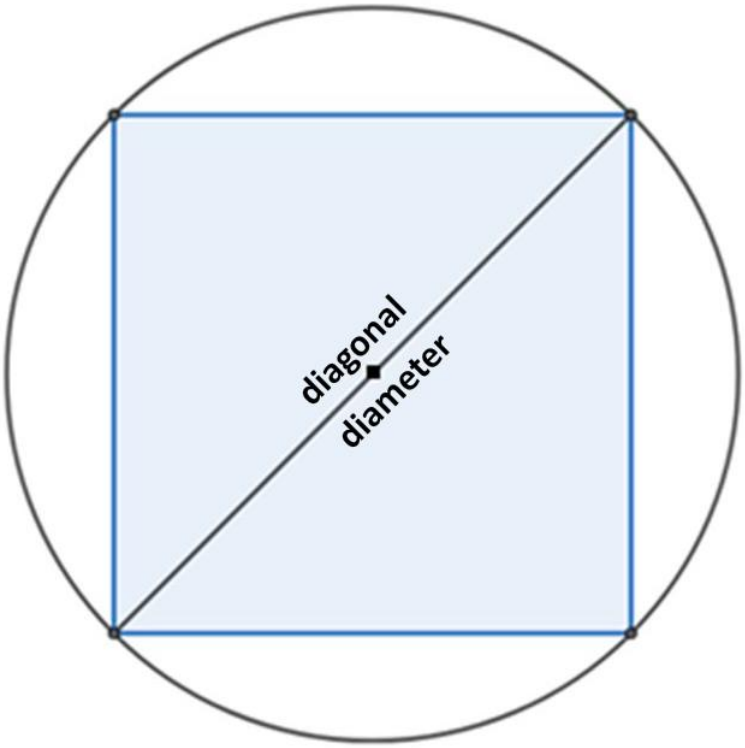


Figure 2

The Pyramids as Monumental Extensions of the Benben Symbolism

To delve into the symbolism of the Benben, one might consider the pyramids, especially the Great Pyramid, as monumental extensions of its geometric and philosophical significance. The Egyptians didn't just imagine the pyramid as an infinite series of square terraces; they actually constructed them in this manner, with each successive square layer or step ascending toward a conceptual singular point at the apex of the pyramidion (Figure 3). This architectural approach, while practical, also encapsulates a profound metaphysical journey from the broad square base representing the earthly realm in its entirety to the pointed apex symbolizing creations' point of origin—the time and place where the apex of the Benben first pierced through the primordial chaos. In this way this physical construction of the Great Pyramid from base to apex might be seen as the inverse of the process of creation itself. In Egyptian cosmology, creation began with a single point of emergence from the primordial waters of Nun, symbolized by the Benben Stone. From this point, the cosmos expanded upward and outward, giving rise to the structured, stable form of the earth, much like how a geometer's compass point sets the origin for the first circle, from which all geometric forms arise (Figure 4). The pyramids, built from the broad base to the pointed apex of its pyramidion, may reflect the Egyptians' awareness of this inverse relationship.

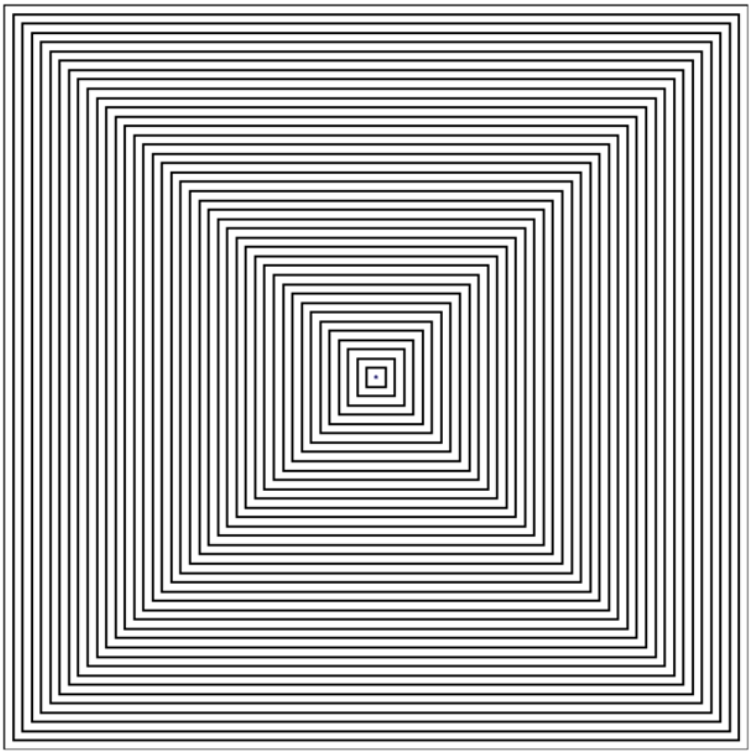


Figure 3

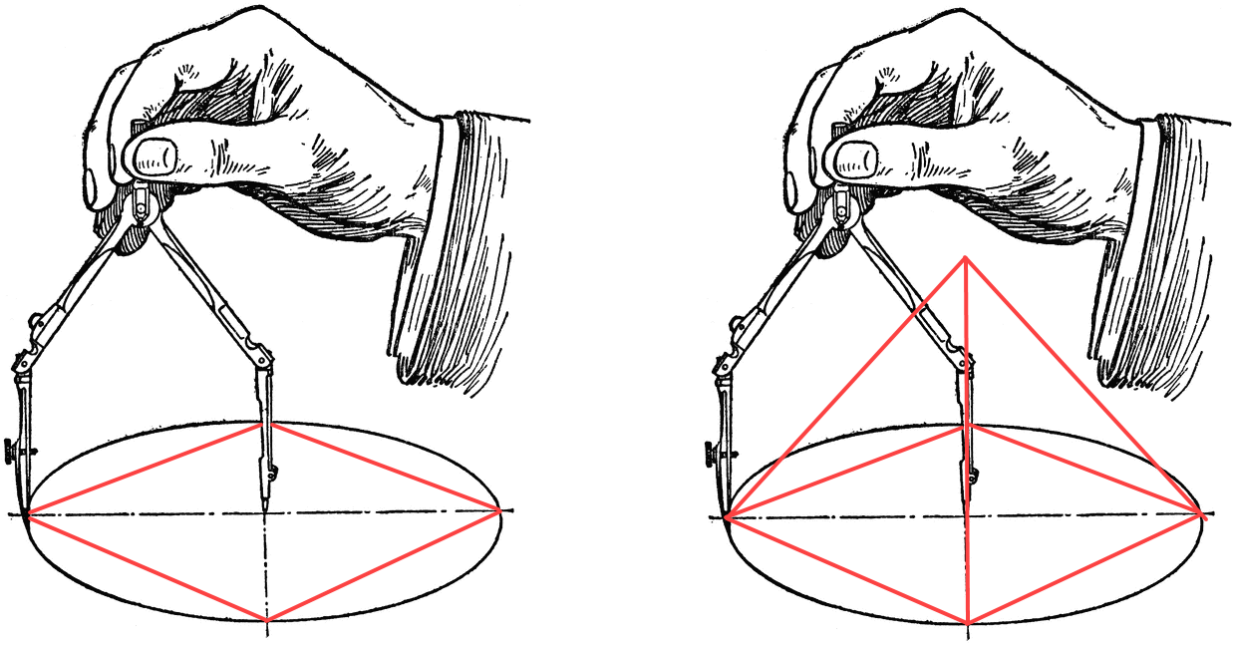


Figure 4

The Benben Stone and the Metaphor of Creation

The apex of the pyramid, where the pyramidion would have been placed, is thought to have symbolized the original Benben Stone—elevated from the very point where the material world first emerged. In this view, the entire pyramid might represent a model of the original Benben Stone rising from the primordial waters of Nun, reminiscent of the initial act of creation: a single, infinitesimal point emerging from chaos and expanding to form the ordered world. This symbolism is intricately connected with the Heliopolitan myth of Atum-Ra, the creator god who, like the Winter Solstice

sunrise, was believed to have arisen alongside the Benben as the first manifestation of the sun and light from the primordial darkness of Nun, becoming the progenitor and head of the Ennead (the Nine). In Egyptian cosmology, the Benben and Atum-Ra were so closely associated that they were almost inseparable in their symbolic meaning. To speak of the Benben was to evoke the first appearance of Atum-Ra, the god who personified the initial light at the dawn of creation. Just as Atum-Ra was thought to have risen from the primordial waters atop the Benben, heralding the beginning of time and order, so too might the Pharaoh, associated with the Benben, symbolically rise with the rebirth of the sun. This convergence of symbols is particularly significant when considering the Winter Solstice sunrise, a time when the sun, after reaching its lowest point, begins to rise again, signifying renewal and the rebirth of the original light, Atum-Ra, from the primordial Nun.

This primordial Nun symbolized the unstructured, yet circular, essence of the celestial realm before material creation. From the very center of this primordial circle emerged the Benben Stone, a tiny, almost imperceptible square that represented the first point of stability and order rising from the water in the form of a pyramid. In Heliopolitan cosmology this point was understood to have been at Heliopolis. This small square was not only the first piece of solid ground but also the physical embodiment of Atum-Ra's Ka, or divine soul. The Egyptians would have believed that from this single point of origin in Heliopolis, Atum-Ra expanded outward, bringing forth the structured material world from the chaotic waters of Nun.

The Geometric and Cosmological Significance of the Great Pyramid

The process of creation that followed this emergence can be understood through the geometric relationship between the square and its diagonal, governed by the square root of two (√2). In Egyptian metrology, the Remen and the Royal Cubit were two fundamental units of measurement that encapsulated this relationship. The Remen, representing a base unit of length, and the Royal Cubit, approximately 1.414 times longer, or vice-versa, corresponded precisely to the relationship between a square's side and its diagonal, or 1 to √2. This metrological system wasn't just a practical tool for measurement but also a symbolic reflection of their cosmological beliefs.

When a square is circumscribed by a circle, its diagonal becomes the diameter of the circle. If a new square is drawn around this circle, the area of the original square doubles, ad infinitum (Figure 5). This geometric doubling, guided by the ratio √2, symbolizes how Atum-Ra, emerging from the infinitesimal point of the Benben, expanded the universe in a harmonious and ordered way. The Egyptians likely saw this doubling effect as a manifestation of the symbiosis between their cosmology and their measurement system: the Remen (the side of the square) and the Royal Cubit (its diagonal) formed a harmonious union that reflected the unfolding of creation itself.

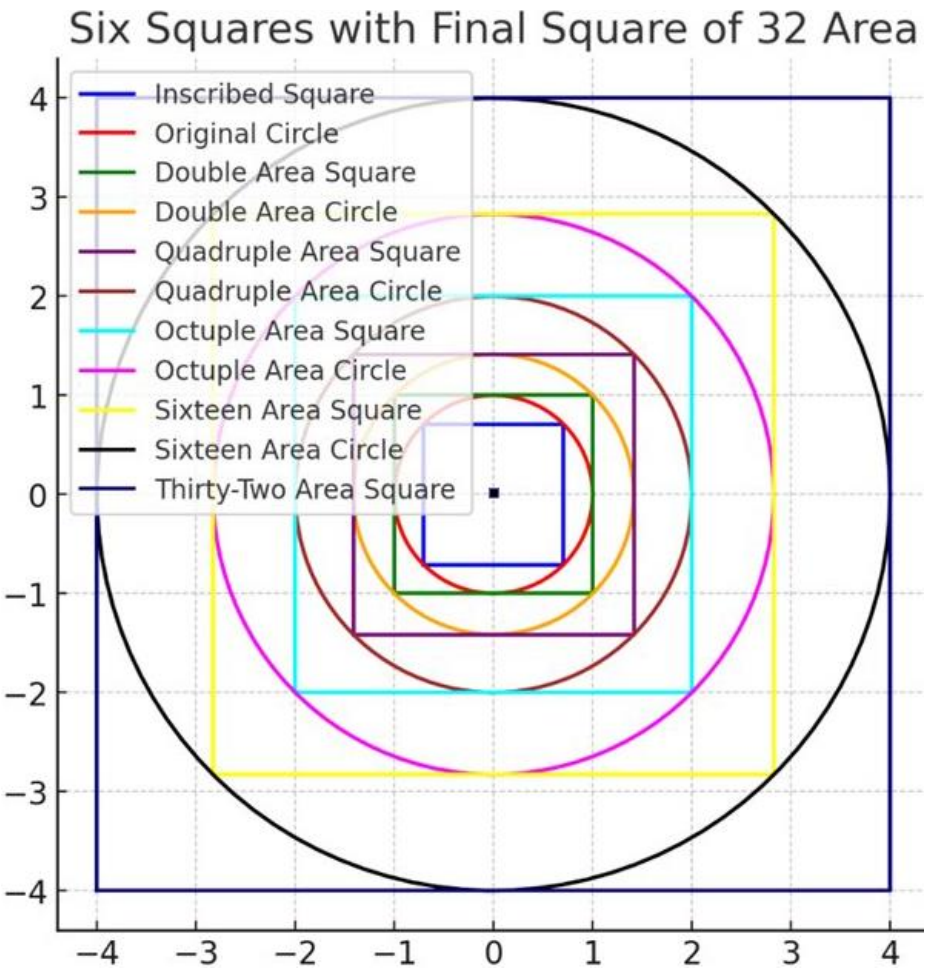


Figure 5

The Great Pyramid of Giza, built by Pharaoh Khufu, is a monumental expression of this geometric principle and its cosmological significance. The Great Pyramid's interior and exterior design, with its unusual ascending height-to-length proportion and placement of the King's Chamber, embeds a unique property of the Benben Stone's emergence through the √2 ratio. While the original square expanded outward through this doubling process, the pyramid's design channels this growth upward.

The hidden stepped core of the Great Pyramid, beneath its smooth outer casing, manifests a series of square terraces culminating at the apex, or pyramidion (now lost). The Great Pyramid's precise diagonal 45° alignment with Heliopolis, the sacred city of Ra and the site of the original Benben Stone, further underscores this symbolic relationship with the square's diagonal. Heliopolis was considered the birthplace of creation, where the first light and Atum-Ra's Benben emerged from the dark waters of Nun. By aligning the Great Pyramid's diagonal and measure with this sacred site, and with the Winter Solstice sunrise, Khufu's monument becomes a physical representation of the fundamental relation between the circle, square, earth, and sun, mimicking Atum-Ra's original ascent from the primordial waters of Nun. IN this way, the Great Pyramid, like the Benben Stone, may have been a spiritually geometric pathway that reflected the Egyptians' deep understanding of the universe—a universe where the fundamental principles of geometry and the sacred act of creation were intertwined, much like the doubling of the square through the circle, grounded in the union of Remen and Royal Cubit.

The Geometric Ideal: √2 and the Diagonal of the Square

This reverence for √2 was not just symbolic, but was embedded in Egyptian metrology as the Royal Cubit, measuring 52.36 centimeters, and the Remen, measuring 37 centimeters, demonstrate (Figure 6). Their connection, where the Royal Cubit corresponds to √2 and the Remen to 1 (or vice versa), suggests that the Egyptians incorporated this geometric constant into their measurement system, hinting at a sophisticated understanding of the interplay between the linear and the diagonal, the rational and the irrational. By aligning their units of measurement with this irrational constant, the Egyptians could have been acknowledging the limits of human knowledge, using the Royal Cubit and Remen not just as tools for building, but as approximations of the divine order in the finite realm of human endeavor.

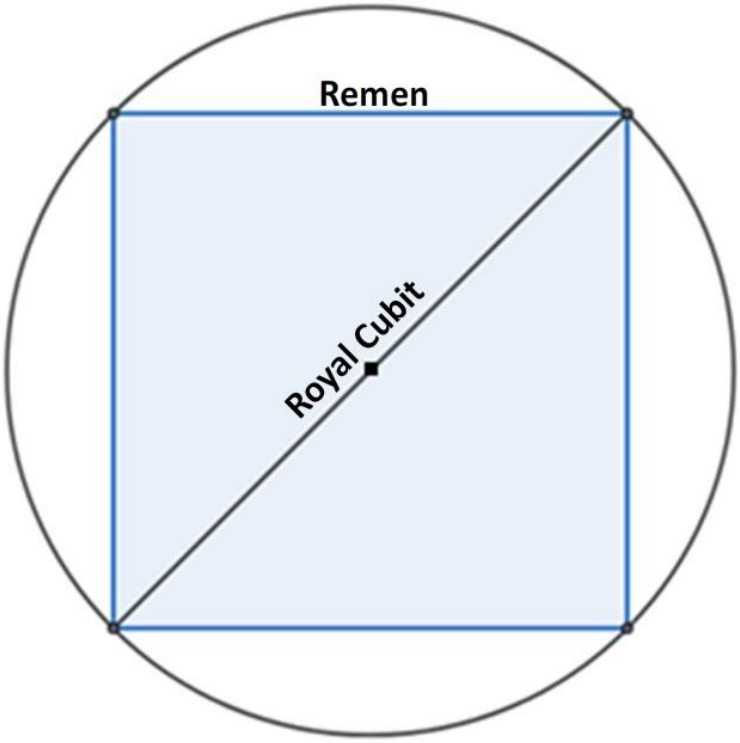


Figure 6

This interpretation suggests that, to the Egyptians, the divine (the Royal) was seen as both immanent within creation and transcendent—present in the natural world yet beyond full comprehension. The irrationality of √2 and π mirrors this ineffable quality. These mathematical constants, fundamental to geometry, can be represented and visualized but resist exact definition, remaining forever elusive. In this context, π, associated with the circle, represents the celestial, cyclical nature of the primordial, while √2, linked to the square, symbolizes the material order that emerges from this primordial source, much like light from darkness, yet remains enveloped by it, as the earth is surrounded by the heavens.

The Benben Stone, with its cosmological symbolism, could be seen as a geometric representation of this philosophical pursuit. Just as the Benben emerges from the circular waters of Nun, the square is both born from and contained within the circle, with their common center symbolizing the alignment of the primordial source and the material world. In this interpretation, the circle's diameter, equivalent to the square's diagonal, represents the emergence of order from chaos—mirroring the creator's first act of creation, the drawing of a line. Thus, the pyramidion of the Great Pyramid, mirroring the form of the Benben and aligned at a 45-degree angle with the Benben Stone at Heliopolis, may serve as more than just a physical apex; it symbolizes this primordial act of creation, highlighting the significance of √2, the square's diagonal.

Approximations of √2 and π in Egyptian Geometry

Understanding that √2 and π were fundamental to their cosmology, the Egyptians likely used specific fractions to approximate these irrational numbers for their architectural and metrological needs. They may have defined a single value that served as both the diameter (or radius) of a circle and the diagonal (or half diagonal) of a square, allowing them to approximate both constants. For instance, they could have approximated √2 as 140/99 and π as 440/140, with the common factor of 140 or 70 representing both the diagonal (or half diagonal) and the diameter (or radius). This shared value would have provided a practical and symbolic way to incorporate these mathematical principles into their construction and measurements.

How might the ancient Egyptians have arrived at 140/99 or 99/70 as an approximation for √2? A simple fractional approximation for √2 is 7/5, or 1.4 in decimal form. This value is part of a basic iterative sequence of fractions which may have been known since ancient times to approximate √2. The sequence progresses as follows:

1/1, 3/2, 7/5, 17/12, 41/29, 99/70, ...

To generate the sequence, begin with 1/1 = 1. For the next fraction, add the numerator to the denominator to obtain 2, and add the numerator again to generate the next numerator, yielding 3. This gives the next fraction, 3/2, or 1.5, as follows:

1 + 1 = 2

2 + 1 = 3 → 3/2 = 1.5

3 + 2 = 5

5 + 2 = 7 → 7/5 = 1.4

7 + 5 = 12

12 + 5 = 17 → 17/12 = 1.41666

17 + 12 = 29

29 + 12 = 41 → 41/29 = 1.41379

41 + 29 = 70

70 + 29 = 99 → 99/70 = 1.41428

As you can see, this sequence converges toward √2, and the Egyptians may have found 99/70 to be a particularly useful approximation. Interestingly, 99/70 can be expressed as a simple sum of unit fractions—1 + 1/5 + 1/7 + 1/14—fractions the Egyptians were well accustomed to working with in their calculations. Moreover, their base 10 system would have made both the number 70, being 10 x 7, and 99, being just 1/100th less than 100, particularly significant. Its doubled reciprocal, 140/99, offers another precise approximation for √2, highlighting its mathematical elegance and practicality. These characteristics suggest that 99/70 was an ideal choice for their metrological and architectural applications, seamlessly integrating their mathematical principles with symbolic meanings. If this discovery followed their use of π as 440/140 (or 220/70), or vice-versa, the shared value of 140 or 70 would have been seen as highly significant, serving as a common link between both approximations.

The approximation of π as 440/140 or 220/70 likely arose from practical experimentation rather than theoretical calculation. The Egyptians might have observed that a wheel with a diameter of 1 unit had a circumference slightly over 3 units (3.1459), while a wheel with a diameter of 7 units had a circumference nearly exactly 22 units (21.9911). This

empirical observation would have led them to the well-known approximation of π as 22/7. For the Egyptians, the ratio 22/7, or 44/14 for π would not have been just a mathematical curiosity but a profound discovery, revealing a connection between the numbers 7 and 11, fundamental to both the circle's circumference-to-diameter ratio and the square's diagonal-to-side ratio. The symbolic resonance of these numbers, particularly 7 and 11 (since 9 x 11 = 99 and 10 x 7 = 70), would have reinforced the interconnectedness between circular and square forms in their cosmology, merging practical knowledge with spiritual and symbolic meaning.

Relationship Between Circular and Square Measurements

Using these approximations, the Egyptians likely observed a remarkable relationship between circular and square measurements. For example, a circle with a radius of 70 units and a circumference of 440 units would perfectly circumscribe a square with a half-diagonal of 70 units and a perimeter of 396 units, establishing a precise 10/9 ratio between the circle's circumference and the square's perimeter (Figure 7). Similarly, when this circle is inscribed within a larger square, it forms a precise 14/11 ratio with the larger square's perimeter of 560 units. These ratios—10/9 and 14/11—are not coincidental. They are embedded in the design of the Great Pyramid, which measures 440 Royal Cubits at the base, 280 Royal Cubits in height (560/2) and 198 (396/2) Royal Cubits from the apex to the floor of King's Chamber, deliberately segmenting the 280-cubit height of the Great Pyramid into the Silver Ratio via √2, while simultaneously using the half-base to emulate 1/8th the circumference of the circle, or the side of an octagon (Figure 8).[2] The recurring presence of the numbers 9, 10, 11, and 14 (or 7) in these proportions suggests a deliberate integration of these fundamental values into their architecture. This interplay between the circle and the square, the diameter and diagonal, foundational to their geometry and cosmology, reveals the Egyptians' sophisticated understanding of these principles as the basis of their architectural and spiritual worldview.

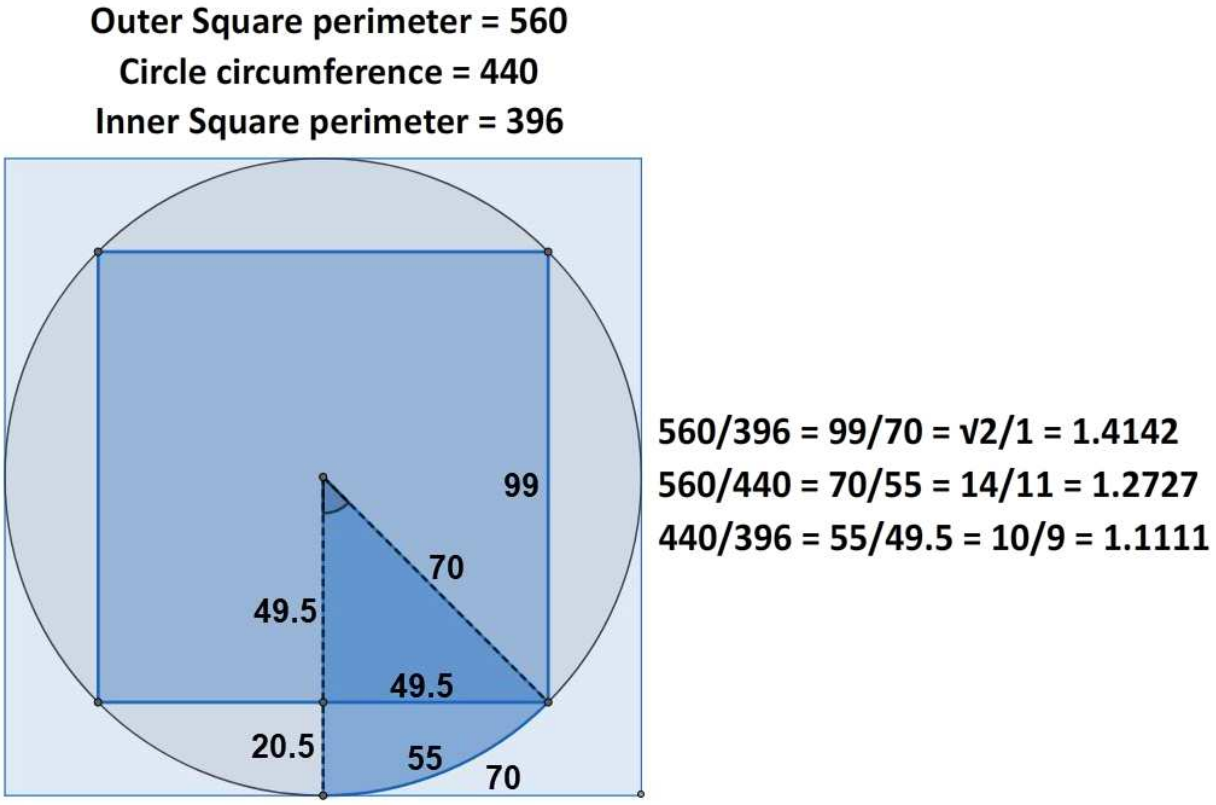


Figure 7

[2] All internal measurements of the Great Pyramid are taken from Petrie's survey, where he reports that the floor of the King's Chamber is between 140.70 and 141.06 feet (42.88 – 42.99 meters) above the base pavement of the Great Pyramid.

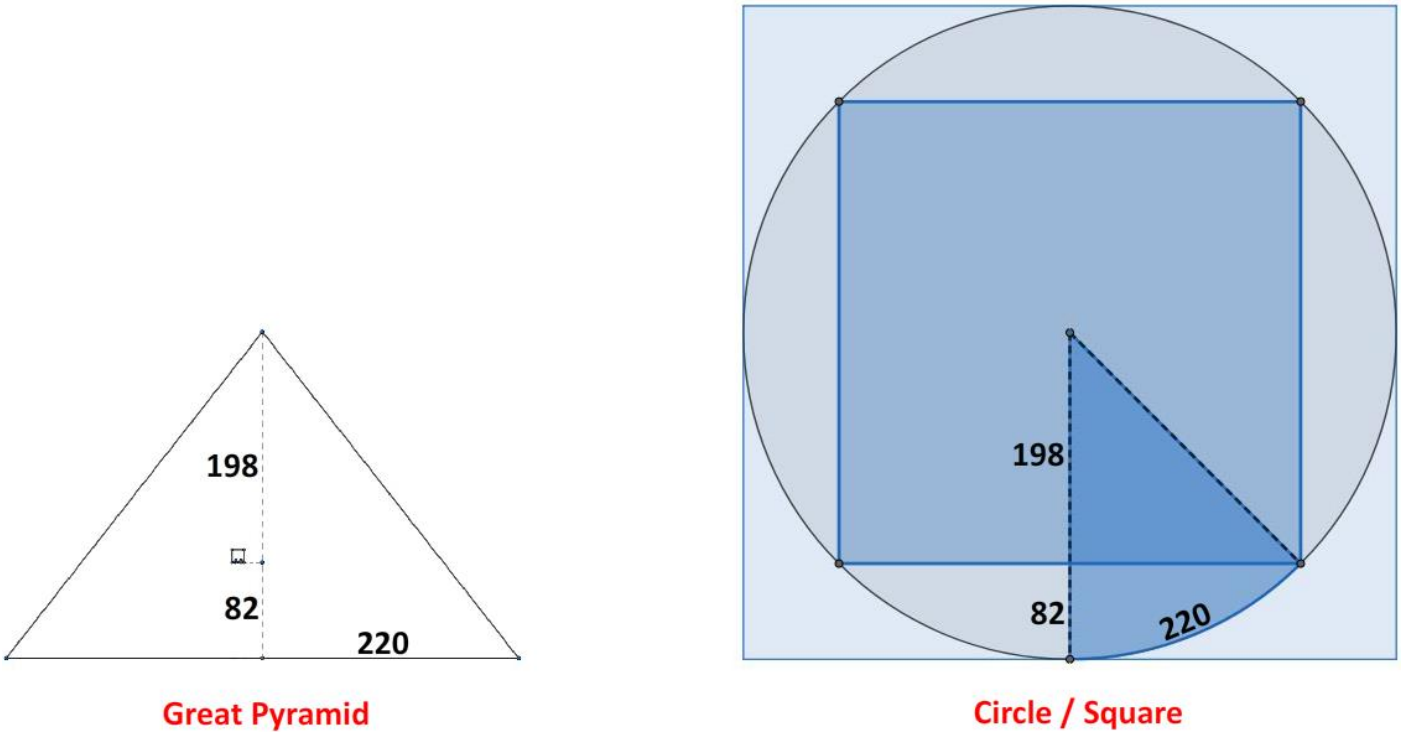


Figure 8

The Iterative Process of Doubling the Square

By inscribing a circle within a square, followed by drawing a square within this new circle, and continuing this iterative process, the Egyptians would have illustrated the intertwined relationship between √2 and π in doubling the square. Beyond the well-known surface values of √2 and π, hidden values such as 1.2727... and 1.1111... emerge from this iterative sequence, revealing the deeper mechanics that make the circle-square relationship 'tick.' For example, 1.2727, or 14/11, represents the relationship between the perimeter of a square and the circumference of the inscribed circle when π is approximated as 44/14, or 3.1428. The value of 1.1111... (10/9) emerges from the comparison of the same circle circumscribing a smaller square.

Integration into the Structure of the Great Pyramid

These ratios are not only mathematical curiosities but also deeply integrated into the very structure of the Great Pyramid (Figure 9). The Seked theory, for instance, uses the ratio 14/11 to define the slope of the pyramid. In this system, the Seked measures the horizontal run relative to the vertical rise, producing a slope angle of approximately 51.84 degrees. This ratio translates into a slope where for every 14 cubits of vertical height, the pyramid's side extends 11 cubits horizontally, or alternatively, for every 1 cubit of vertical height, the pyramid's side extends 5 ½ 'palms' horizontally. This relationship subtly encodes the approximation of π because multiplying 14/11 by its inverse, 44/14, results in 4.

Similarly, the Arris theory focuses on the relationship between the half-diagonal of the pyramid's base and its height, employing the ratio 10/9. This ratio indicates that for every 9 units of height, the pyramid's half-diagonal measures 10 units. The 10/9 ratio not only serves as a geometric approximation but also resonates with Heliopolitan cosmology,

specifically the Ennead (the Nine), aligning the diagonal of the Great Pyramid perfectly with the Benben Stone of Atum-Ra at Heliopolis.

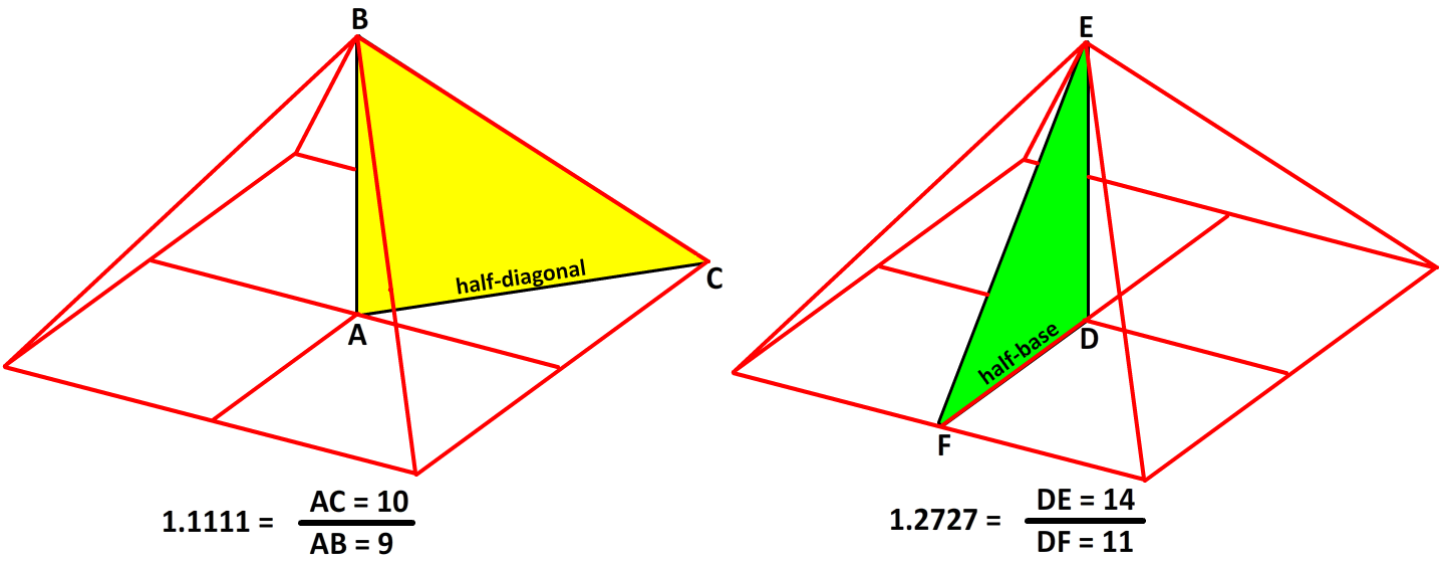


Figure 9

The 10:9 Ratio as a Cosmic Symbol

Thus, the 10:9 ratio encapsulates the geometric and symbolic relationship between the circle and the square, reflecting the dynamic interplay between the 'eternal' primordial and the finite, the potential and the manifest. In this context, the circle's circumference is represented by the number 10, while the square's perimeter is represented by the number 9. The circle, with its unbroken, encompassing nature, signifies the infinite potential of Nun, the primordial chaos, while the square, with its defined boundaries, represents the structured world of Atum-Ra's Ennead and Benben Stone—the first act of creation through doubling.

Counting to 9 in this symbolic framework represents the complete manifestation of the material world, the structured and finite expression of the cosmos as understood through the Ennead. The value of the number 9, symbolized by the length of the square's perimeter, signifies the ordered world that has emerged from chaos, while the value of the number 10, represented by the circle's circumference, symbolizes the return to the infinite, the completion of the cycle, and the reabsorption of the manifest back into the primordial potential of Nun. This cyclical process, where 10 represents the return or completion of the circle, reflects the Egyptian understanding of the cosmos as an eternal cycle of creation, order, and renewal, where the finite world is continually reabsorbed and re-emerges from the infinite source. The Egyptians' adoption of a base-10 system for their numerical reckoning mirrors this cosmological principle, structured around repeating cycles of units in multiples of 10. Without the concept of zero, each time they counted up to 10, they began a new cycle, repeating this process for higher orders of magnitude—10, 100, 1,000—symbolizing the cyclical nature of creation and dissolution. Thus, the act of counting from 1 to 9 represents the manifestation of the material world, and the 10th count signifies the return to the infinite potential, marking the completion of one cycle and the beginning of another. In this way the Nine, as a square, is contained in the circle, the Ten.

Practical Approximations in Cosmological Context

The Egyptians, in their architectural and cosmological practices, did not use exact irrational numbers like √2 or π as we do today. Instead, they relied on practical approximations that were sufficiently accurate for their symbolic and functional purposes. They likely approximated √2 as 140/99 and π as 22/7 or 3.142857. While these values were not mathematically exact, they offered a precise symbolic representation of these complex numbers for use in both practical

and spiritual contexts. The 10:9 ratio, expressed as 1.1111, serves as a remarkably effective approximation of the intricate relationship between the circle and the square, encapsulating the essence of the doubling effect in a simplified and symbolically powerful form, even though the true value of this relationship is approximately 1.1107, an error of only 0.035%. Therefore, the 10:9 ratio, while not a mathematically perfect representation between the square and circle, serves as a very close and meaningful approximation. It symbolizes the harmonious relationship between the circle and the square, the chaotic and the manifest, where the infinite potential (10) gives rise to the structured world (9). This approximation allowed the Egyptians to encode complex, yet fundamental, geometric principles into their architecture, art, and cosmology in a way that was both practical and symbolically rich.

Ultimately, the 10:9 ratio represents the very essence of the Egyptian conception of the cosmos as a continuous cycle of creation and dissolution. The doubling of the square via the circle symbolizes the process of creation, where the finite world emerges and grows from the infinite potential. Conversely, the infinite regression, or halving of the square, symbolizes dissolution, the return of the structured, manifest world back into the primordial chaos from which it came. This constant interplay between doubling and halving, creation and dissolution, birth and rebirth, is the foundational essence of the cosmos, as expressed through the circle and square relationship approximated by both the 10:9 and 14/11 ratios.