The Circle as the Heart of Ancient Egyptian Geometry

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Abstract: Ancient Egypt extracted the ratio between the circumference and the diameter of any circle through the determination of the area of the circle as $(8/9.2r)^2$ where this amount $r^2 = 2\pi$, also from the decimal system this ratio can be concluded by doubling 8 and dividing it by 9 , and the square of this sum gives the mentioned ratio which is a universal constant because the circle is the geometry of the universe . The circle governs the geometry of the Great Pyramid as its squared base equals a circle, the radius of this circle is the height of the Pyramid itself and by dividing the base by the height we have 2π . The golden ratio 1.618 is based also on circular terms in the Pyramid because it comes from dividing the slope by $1/8$ of the base and both of them are parts of a circle. The problem known as squaring the circle in middle ages, took in ancient Egypt the form of circling the square! It seems that ancient Egypt intended to harmonize its thought and the top of its achievements (the pyramids) according to the circular universe

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1. Introduction

Extracting geometry from arithmetic:

Before designing the Great Pyramid Egypt determined the ratio between the circumference and the diameter of any circle as 3.16 or π, the area of the circle as had been calculated is $\left(8/9\right)^2$ the diameter of the circumference, or $\left(8/9.2r\right)^2 = 256/81$ $r^2 = 3.16 . r^2$

In fact from the decimal system, π can be extracted because the decimal system itself is a circular one where the row from 1 to 9 repeats itself on the power of 10, another circle begins by 1 with the "nothing" before the digit 1 called zero, putting in the space of this "nothing" the same 9 digits according to the power of ten endlessly. This circular process takes place at the left direction from the decimal sign. On the right side of the decimal sign any digit from 1 to 8 divided by 9 gives this digit endlessly as $1/9 = ,1111111111111$, or $3/9 = ,3333333333333$, showing the circulatory nature of this ratio between every digit in the row and the digit 9 at which the circle ends beginning another circle. The greatest value of this ratio is $8/9$, here 9 represents the diameter of the circle, because the diameter divides the circumference into two equal and opposite parts , therefore 8 must be doubled in order to have the two parts of the circumference , and the ratio between the circumference and diameter is $16/9$, squaring this ratio gives π which is a geometric term obtained from the circular nature of the decimal system, this proves the equivalence between geometry and arithmetic.

The circular design of the Great Pyramid:

Because the geometry of universe is designed on the circle in its alive or non-alive things, Egypt harmonized the Great Pyramid with the circular universal geometry according the following:

1- One side of the squared base of the Pyramid is 230.35 m. the perimeter is 921.4 m. dividing this amount by the height of the pyramid gives

$$921.4/142.71 = 6.28 = 2x3.14 = 2\pi$$

Therefore the squared base of the pyramid is in the same time the circumference of a circle, the radius of which is the height of the pyramid itself.

2-The hypotenuse of any right triangle is necessarily the diameter of a circle, this is the case of the slope of the pyramid where the height with the half of the base being squared equal the squared value of the slope

$$(h + 1/2\, b)^2 = s^2$$

Or

$$(146{,}71 + 115.182)^2 = (186.42)^2$$

Therefore any slope of the Great Pyramid (186.42) is a diameter of a circle, and thus any line in the geometry of the Pyramid is a part in a circle!

3- In the golden ratio the longest part of a line divided by the shortest part equal the two parts divided by the longest one, this golden ratio is based in the design of the pyramid on circular terms, because dividing the slope (which is the diameter of a circle) by the half of the base (which is $1/8$ the circumference of the base as a circle) gives the golden ratio as

$$\frac{186.369}{115.182} = 1.6180 = \Phi$$

This is the longest part divided by the shortest part, on the other hand dividing the two parts by the longest one gives the same result in the design of the Pyramid as

$$\frac{slope + 1/2\, base}{slope} = \frac{slope}{1/2\, base}$$

Or $\frac{186.369 + 115.182}{186.369} = \frac{186.369}{115.182} = 1.1680 = \Phi$

Again, all these quantities are parts of circles.

Circulating the square:

The old problem known as squaring the circle had been turned out in the case of the Great Pyramid to be circling the square. If the base considered to be only two units then the perimeter of it is

$$2x4 = 8$$

Because 8 is also the circumference of a circle , then the radius which is the height of the Pyramid is

$$\frac{8}{2\pi} = r = h = 1.27388535$$

But 1.27388532 is the root square of the golden ratio $\sqrt{\Phi}$, then the circumference of the circular base is $2\pi\sqrt{\Phi} = 8$

The height of the Pyramid with the half base (here = 1) and the slope form a right angle triangle , then the slope itself has the same value of the golden ratio Φ . this shows that circling the square in the design of the Pyramid contained the golden triangle (as the hypotenuse of the golden triangle must be the diameter of a circle) the golden ratio here is the value of two hands of the golden triangle.

The Result:

From all what passed the circle is the heart of ancient Egyptian geometry, it is the heart of the most important geometrical forms like the square, the right angle triangle, and the golden ratio.

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Reference:

Let us refer here only to World Mysteries.com although there is a lot of books and researches contain the same measurements of the Great Pyramid, and generally the ancient Egyptian Geometry.

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