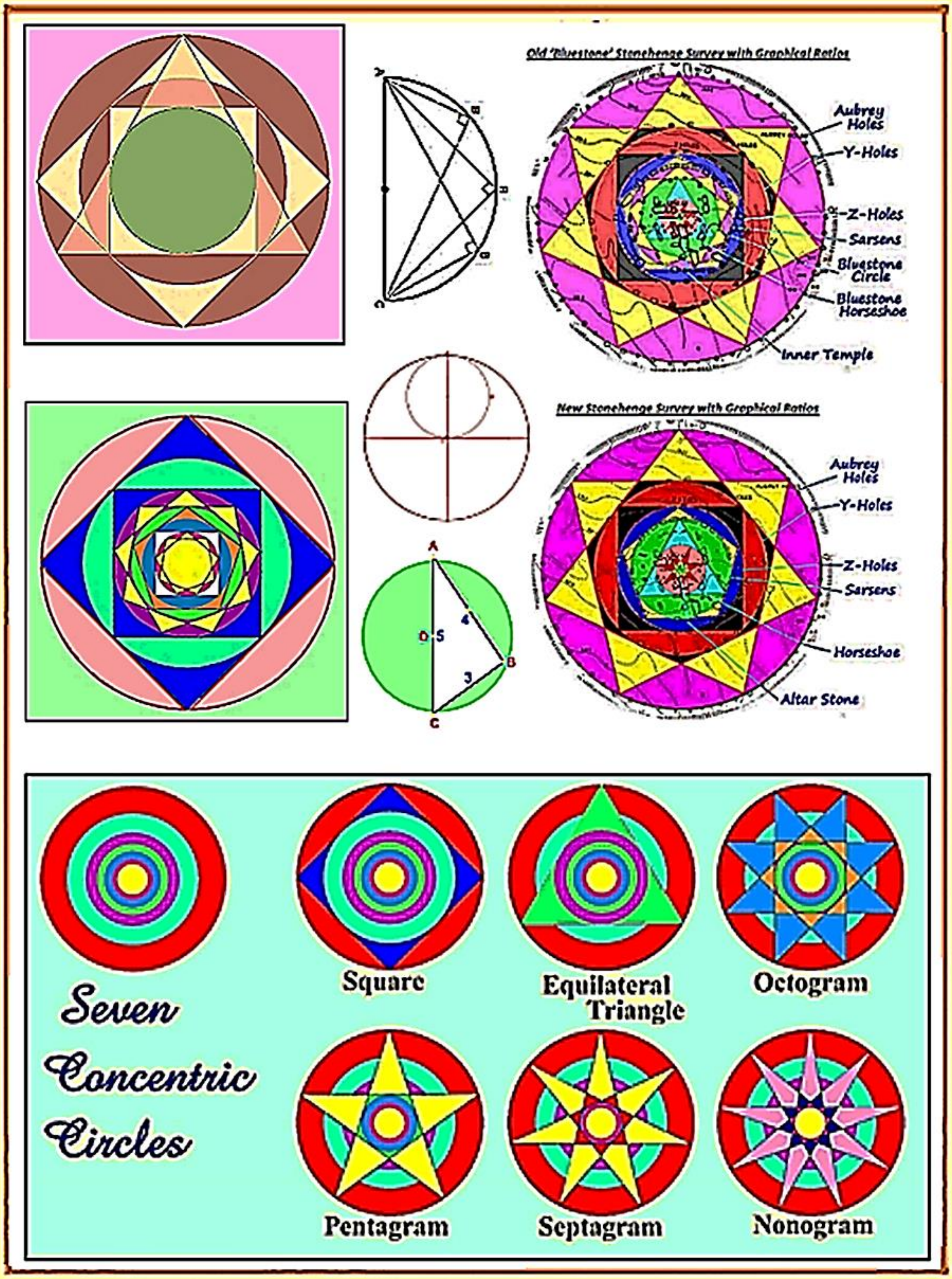
THE MATHEMATICS & GRAPHICS OF

PLANE REGULAR SHAPE



John Marcus Crombie

THE HARMONICS, MATHEMATICS & GRAPHICS, OF PLANE REGULAR SHAPE

A FURTHER TREATISE ON A THEORY OF SHAPE

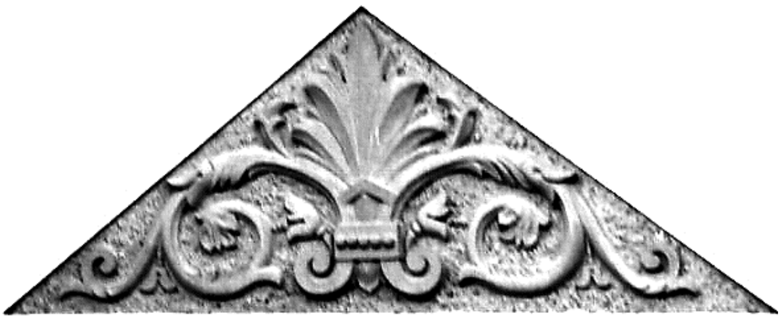
WHO KNEW WHAT & WHEN?
HOW DID THEY KNOW?

A CONTRIBUTION TOWARDS THE THEORY OF EVERYTHING

PART OF AN INTRO TO SUPERSYMMETRY?

By

John Marcus Crombie



John Marcus Crombie
47 Sizer St., Everton Park Q.4053
Ph. Mob. 0412 176 627
Email: johnmcrombie51@gmail.com

This book is proudly published and produced in Australia.

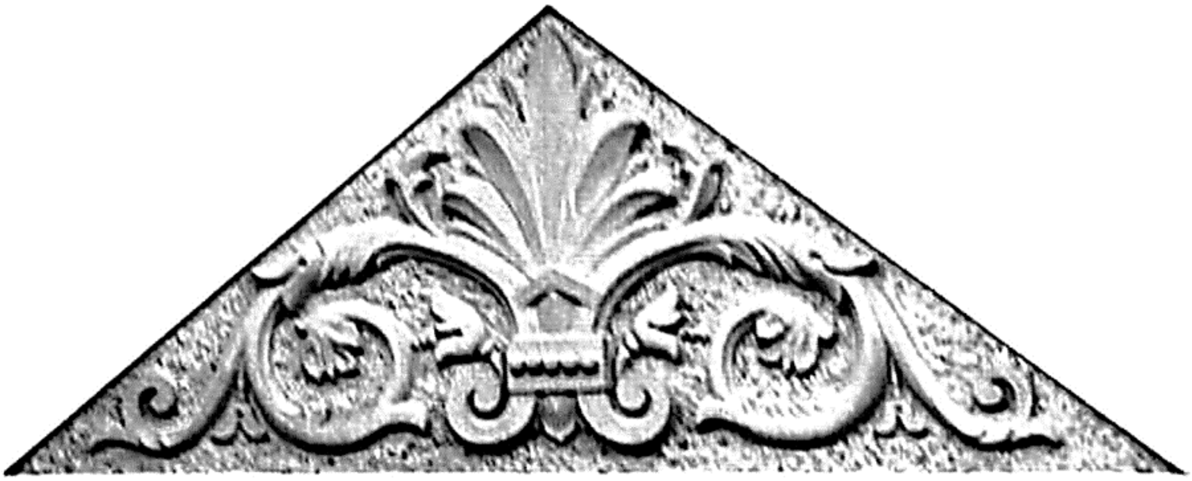
PRINTED BY:
Minuteman Press Sunshine Coast
Address: 2a22 Premier Circuit,
Warana QLD 4575
Phone: (07) 5493 9637

Metafile:

Concepts: *Antedeluvian;* ***Audible Frequencies****; Biological Cell Analysis; Big Bang; Black Holes; Catalysts; Chaos Theory; Circumscribing and Inscribing Circles; Concentric Circles; Conceptuality;* ***Cymatics****; Dark Matter; 'Dolphin Speak'; "Elegant Ratios";* ***Enmeduranki****;* ***Eratosthanes****;* ***Euclid****; FFT* ***Fourier*** *Fast Transforms; Frequency; General Theory of Relativity and Quantum Mechanics; Genome of Shape;* ***Glaucon;*** *Golden Mean; Golden Mean Equation;* ***Harmonics****; Incommensurables; Infinity;* ***Dr. Hans Jenny****;* ***Kepler****; Kibdu Secrets;* ***Alexander Lauterwasser****; Matrix; Marad;* ***Meno****; Obelisks; Photo Voltaic Cells;* ***Plato***; Polygons *or Polygrams; Pre-Euclidean Ratio Theory; Primary Ratios;* ***Ptolemy****; a general theory of Proportion; Quadrature*; *Quantum Theory; Ratios; Ratio-System; Reciprocals;* ***Republic;*** *Seven Concentric Circles; Sessile Drops; Sexagesimals; Shape Ratio Theorems; the Singularity; Stonehenge;* ***Timeaus; Thales; Theaetetus;*** *Two-dimensional Plane Regular Shape; Units of Measurement; Versailles Palace; Visual Mathematics; '360 Degrees';*

10 9 8 7 6 5 4 3 2 1

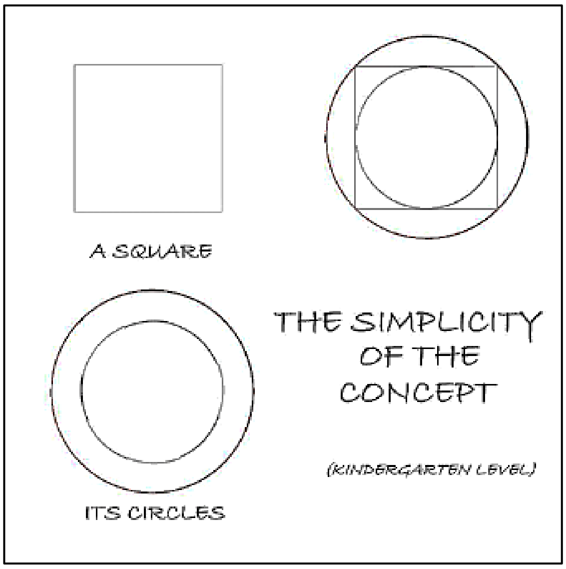
My Grandfather & Daphne Mayo:



They too knew the square root of two.

HARMONICES MUNDI . . . PLANE REGULAR SHAPE

The Shape Ratios



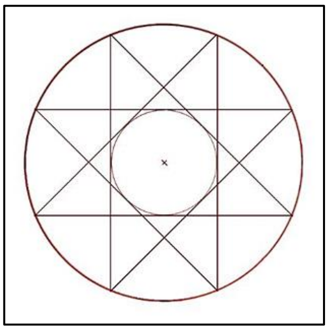
Let us start with the simplest of shapes, the square. All regular shapes have an Outer Circle which passes through all the Apex points of its angles and an Inner Circle that has all the sides of the shape as tangents as it passes through the midpoints of the sides..

The Square and its Unique Pair of Circles:
Its own unique mathematical Ratio can be determined from the relative size of its ***Outer*** to its ***Inner*** Circle. This is merely the Ratio of the *diameters* of the circles which, in the case of the square, can be seen to be also the Ratio of the ***Diagonal*** to the ***Side*** of the square.
The Shape Ratio for the Square is thus √2; or 1.414213562.
But this square is simply formed by a continuous set of tangents from the Outer Circle to the Inner Circle that starts and finishes at the same point.

Understanding the Concept of formation of a Shape using a Continuous Tangent:
This tangent:

- starts at a **point of commencement** on the circumference of the Circumscribing Circle;
- is angled to become a tangent to the Inscribing Circle;
- goes on to be reflected by its natural angle of reflection off the Circumscribing Circle;
- becomes once more a tangent to the Inscribing Circle;
- goes on to be reflected off the Circumscribing Circle by its natural angle of reflection once more;
- and repeats this procedure until it arrives again at the **point of commencement** on the Outer Circle;

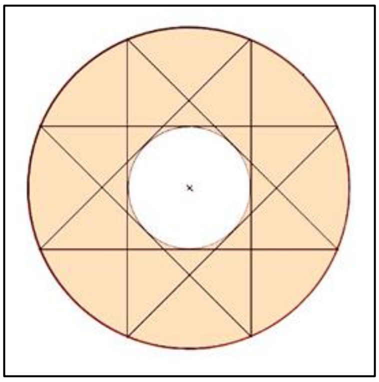
Should the continuous tangent never again arrive at the **point of commencement** once more then no plane regular shape can be formed with that pair of circles with that ratio and that angle of reflection. It is only when the continuous tangent is able to arrive again at the **point of commencement** that a shape is formed.



This image is of an Octagram Line Drawing showing how the formation of the shape is the product of a continuous tangent limited in its operation only by the two concentric circles.

The concentric circles are the outer limits of the operation of the continuous tangent as it forms the shape; the circles form what I call the '*dough in the doughnut'*. They are clearly further apart for the Octagram than they are for the Square above. There is therefore more '*dough in the doughnut'* in the Octagram.

Understanding the '*Dough in the Doughnut'* concept:
The *dough in the doughnut* represents the limit of the sphere of influence or activity of the shape as it is formed by the continuous tangent. This tangent operates between these two limits to form the shape that is unique to the pair of circles in this particular ratio. Many theories are concerned with areas of shapes but this 'Dough in the Doughnut' theory makes no reference to area; it is a ***sphere of influence*** defined by a ratio ***without any unit of measurement***.

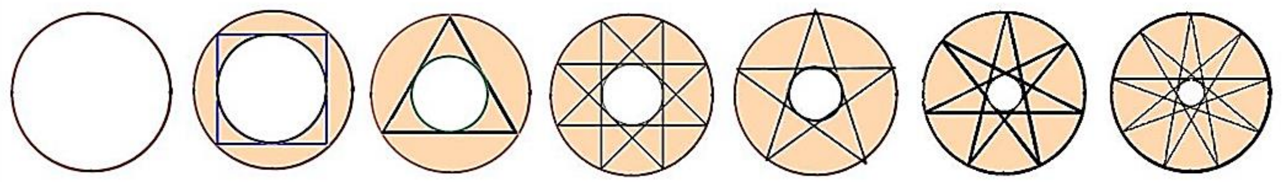


This image shows how all the 'construction' tangents that form the Octagram shape are formed and operate within the area of the 'dough' only.

Wider or narrower widths of 'dough' will form other shapes provided that the continuous construction tangent eventually returns again to the first or original **point of commencement**.

The centre of the inscribing circle is always vacant or empty. Without an **inscribing** circle there would be no shape; so, **without a vacant or empty centre there can be no plane regular shape**. – "*The Hole in the Doughnut".*

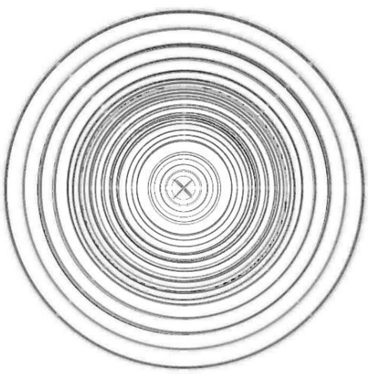
ILLUSTRATING THE VARIOUS AMOUNTS OF THE *'DOUGH IN THE DOUGHNUT' AND RELATIVE SIZES OF THE EMPTY CENTRES*.



This is a simple illustration of how various ratios of outer to inner circles will generate various shapes.
It also illustrates the concept that each shape has a ***unique*** ratio derived from its concentric circles.
The smaller the ratio the larger the *empty centre*; the smaller the ratio the larger the *angle at the apex*.
The main difficulty lies in calculating the mathematical values of the ratios.

Once calculated these ratios would, together with the angles, form the basis of a ***Genome of Shape***.
To take this genome one step further, it could be enhanced by adding frequencies verified by Cymatics; or if you like, by Modal Phenomena.

Touching on the Infinite nature of the Harmonics



How many Inscribing Circles can exist within a Circumscribing Circle? If a circumference is viewed as being a line ***without width*** then the only answer to this question must be 'An Infinite Number" so, in this way, a (circumscribing) Circle must be seen as being 'Infinite' in its content.

Of all the *infinite possibilities* of Inscribing Circles available within a Circumscribing Circle there are *possibly* only some that, in union with the Circumscribing Circle and a continuous tangent, form Regular Shapes and it will later be seen that they exist in a most uniquely genial and harmonious manner.

It is also *possible* that, given the Infinite nature of the contents of the circle, along with the Infinite number of *possible* continuous tangents they may *all* eventually produce Plane Regular Shapes.

The purpose of the exercise is to identify from the **infinite** number of Inscribing Circles those that form Plane Regular Shapes and, if possible, calculate and tabulate their ratios, then eventually disclosing their harmonics. If they *all* eventually produce Plane Regular Shapes this task itself would be **infinite**.

Numerically dealing with Shape Ratios:

If **X x X** = **X + X**, and = $\mathbf{X}^2$ what is the value of **X**?
*Answer: **2***
No other number has this peculiarity.

But **2** is also the Ratio of the two circles that give us a shape – *the Equilateral Triangle*.
So if we multiply a Shape's Ratio by **2** (or double it) we are multiplying a shape by a shape and the resulting number must be a ratio for a shape and our first theorem is: ***Shape x Shape = Shape***.
Equilateral Triangle x Equilateral Triangle = 31 point polygram = 4

So, if X is 2 then:
$\mathbf{2^2 = 2 \times 2 = 2 + 2 = 4}$

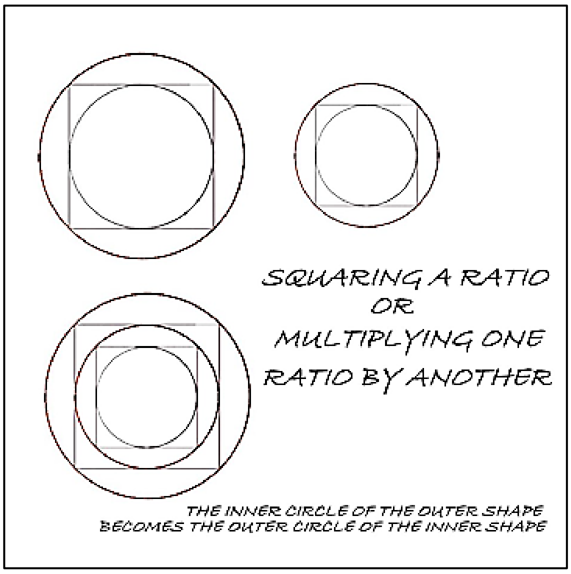
And **4** is the ratio for a 31 point polygram so, once again, ***Shape x Shape = Shape***.

Graphically dealing with Shape Ratios:

A shape's ratio is calculated from the dimensions of the two circles that define it. So it is merely the change of each circle's Diameter or Radius that we are noting and it is the change in the resulting ratio that produces a different shape.
(It is well known that ratios are multiplied or divided and not added or subtracted.)

THE METHODOLOGY OF NESTING SHAPES:

Sensing the possible existence of a Theorem:
When graphically multiplying a Shape by a Shape, NEST the shapes and their Circles such that 'The inner circle of the outer shape becomes the outer circle of the inner shape.'



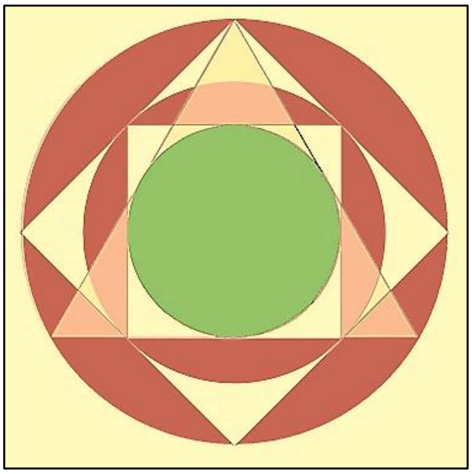
In '*dough in the doughnut'* terms, to graphically multiply a shape by a shape place a second shape and its circles into the vacant centre of the first shape and its circles. This I call ***'nesting'***. When two squares and their pairs of circles are properly ***'nested'*** we create an intermediate circle and it can now be seen that there are ***three circles*** in the equation:

- The overall Outer Circle
- The overall Inner Circle
- Plus the **Intermediate** Circle. - (It must be the Inner circle to the Outer shape *and* the Outer circle to the Inner shape).

When shapes (*Plus their Circles*) are nested we can then multiply the ratios of the shapes to arrive at the **overall** shape that has the **overall** outer and inner circles as its ratio.

In this case: $\sqrt{2} \times \sqrt{2} = 2$. So, what shape has a Ratio of 2?
(NOTE AGAIN: *Ratios are multiplied and not added.)*

When we utilize the new *overall* Outer and Inner circles found by nesting the two squares and their circles, we find that the application of a continuous tangent to these new *overall* Outer and Inner circles now produces an Equilateral Triangle.



So, **graphically** and **mathematically**:
A Square multiplied by a Square equals an Equilateral Triangle.

This was my first major introduction, (utilising the Concentric Circles that define Plane Regular Shape), to the possible existence of a ***system*** of maths, ***graphical maths***, within the '*kindergarten*' world to which Plane Regular Shapes had been demoted.

Mathematically: *√2 x √2 = 2.000000000*
And, **2.000000000** is the shape ratio for an Equilateral Triangle.
Its Circumscribing Circle has twice the diameter of its Inscribing Circle.

We started with the Ratio for the ***Square*** which was:	1.414213562	**√2**
Then came the ratio for ***Equilateral Triangle*** which was:	2.000000000	**√2 x √2**
Then we calculated the ratio for the ***Octagram*** which was	2.613125930	**√2 x √(2 + √2)**
Then we found the ratio for the ***Octagon*** which was	1.082392200	**√2 / √(1 + √2/2)**
And then The ***Octagram x the Octagon*** equals	2.828427125	**√2 x √2 x √2**

And this leads to my earlier hypothesis wherein I defined this theory as being ***"Shape x Shape = Shape".***
How many such equations can be found in Ramanujan's works? But be careful! He adds the Ratios!

THE APPLICABILITY OF INFINITE VALUES:

The difference between Graphical and Mathematical Geometry highlights the problems faced by *"Pure Maths"* proponents who cannot accept infinity. It is not that they cannot deal with Infinity it is that they **will not** deal with Infinity as they feel that mathematics involving Infinite values or quantities can never be proved. But in this they are incorrect. It seems that the ratios of Plane Regular Shapes are all ***Infinite*** and yet they produce ***Finite*** Shapes. (A Hilbert problem) But, the very existence of Plane Regular Shapes in the Universe proves the applicability of their infinite ratios and their harmonious existence.

Infinite values also produce the equation or concept that ***"Shape multiplied by Shape equals Shape".***

Above we have multiplied, both graphically and mathematically, a shape with an **infinite** ratio (√2) by another shape with an **infinite** ratio (√2) to achieve a third shape with the ratio 2. The jury is still out on whether 2 is Finite or Infinite. That is a debate for other times and places and mathematicians.

Another exercise that illustrates the application of Infinite Values successfully is the correlation exercise I refer to as the ***"Music to Shape Harmonies"***. This exercise revealed to me the manner in which Infinity gives order to the Universe. In this exercise Music Note Frequencies (***Infinite***) are compared mathematically against Shape Ratios (***Infinite***) and produce almost complete co-relation. I state *"almost"* as both parts of the equation are evaluated in *Infinite Terms.* Any variances that occur can be seen to be the means by which the Shape Ratios and Music Note Frequencies ***are ordered***. Without these miniscule variances caused by their Infinite nature there would be no **Order in the Universe**. But these variances are caused by the infinite nature of the Frequencies and the Ratios. So, ***"Pure Maths"*** advocates will never find God's 'Toe'.

SEEKING AND APPLYING MATHEMATICAL SHAPE RATIOS:

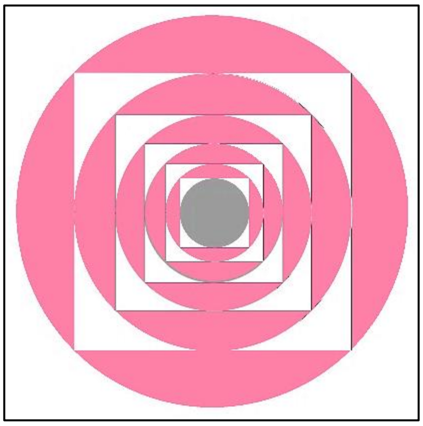
A method of graphically & mathematically multiplying a shape by a shape is invisible to us until we apply the two circles belonging to each shape; its Circumscribing and Inscribing circles.

This method of Graphical Mathematics only becomes visible when the two concentric circles that define the shapes are visible. Without these circles we cannot accurately "nest" the shapes. The various number of angles or apex points of the various shapes cannot naturally "nest" within each other. When properly "nested" some or all of the points of the Inner Shape will not be touching the construction lines of the outer shape and yet, mathematically and graphically they could be well 'nested'. It is only the act of applying the circumscribing and inscribing circles that enables correct "nesting" of shapes regardless of their various denominations. ***'Nesting'*** does not include or infer ***'Tesselations'***. They are different concepts, but if you wished to tesselate a circular space ***'Nesting*** would be useful.

As the shape's Ratio is derived from the shape's outer to inner circles then these circles define the area of influence of the shape; the shape may be rotated around the central point through 360^0 but its construction lines will remain within the area defined by these two circles; thus the ***'dough in the doughnut'*** concept.

UNDERSTANDING THE CONCEPT OF "RATIO" WITH REGARD TO OVERALL PHYSICAL SIZE:

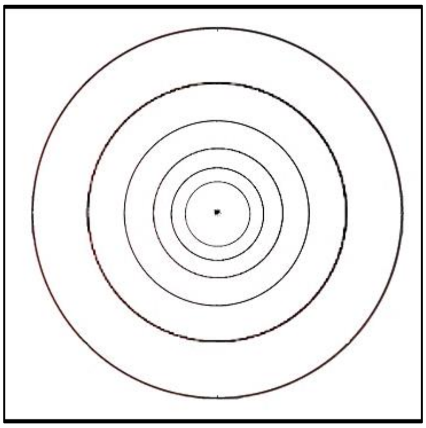
Overall, **Mathematically**, **physical size of a shape has absolutely no effect upon its ratio.**
Graphically, it is necessary to control the shape's **physical size** when 'Nesting' shapes**.**



This image illustrates 5 **squares** *nested* within their respective circles.

They are *'nested'* as the outer circle of each inner shape is the inner circle of its respective outer shape. No construction line of any square is in contact with an adjacent square yet they are *'nested'.* Each *nested* shape in this image is a square and thus each has a shape ratio of √2 or 1.414213562.

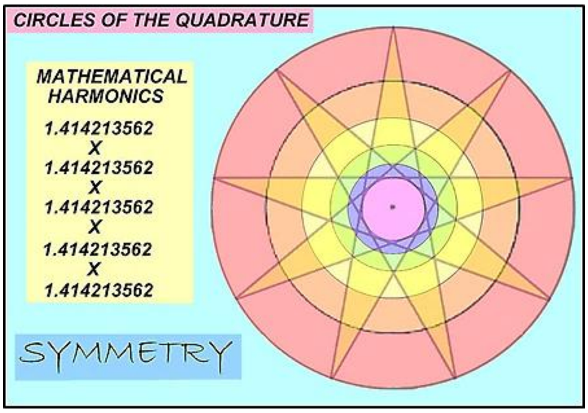
Each inner square is 70.7106781% of the **size** of its outer square but each **still** has a **shape ratio** of √2 or 1.414213562 as does its outer square.



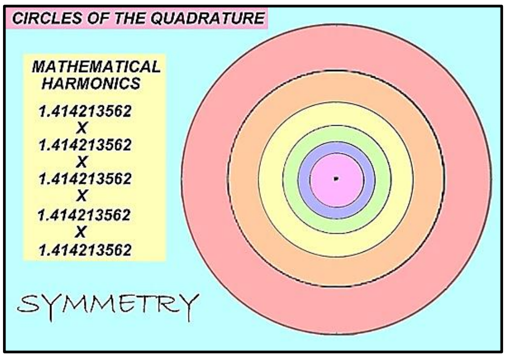
This image is the above image with the Shapes (squares) removed.

As all the shapes between each adjacent pair of circles were squares then each adjacent pair of circles is in the ***ratio*** of √2 or 1.414213562.

But, if we had not just removed the squares, and without knowing the simple methodology of 'nesting' shapes with their circles it is hard to realize that each adjacent pair of circles in this image will form a shape; the same shape; and each adjacent pair of circles is in the same *ratio*. How many ancient rock carvings (and / or Henges) are sets of similar concentric circles?



The ratio from the ***overall*** outer circle to the ***overall*** inner circle is found by multiplying the ratios for all the adjacent component shapes.
√2 x √2 x √2 x √2 x √2 (or 4 x √2) – **5.656854249.**
We can find the shape that is formed by using the ***overall*** outer circle and the ***overall*** inner circle
We find it is a Nonogram.
This is the Ratio for the Nonogram.
(Ratios are multiplied and not added.)
And Shape x Shape x Shape x Shape x Shape = Shape.



THE IRRELEVANCY OF 'AREA'

In this illustration ***each pair*** of **adjacent circles** with its own coloured *'dough in the doughnut'* exist with a shape ratio to each other of √2 or 1.414213562.

In ***Shape Ratio terms*** all these coloured segments are **equal**.

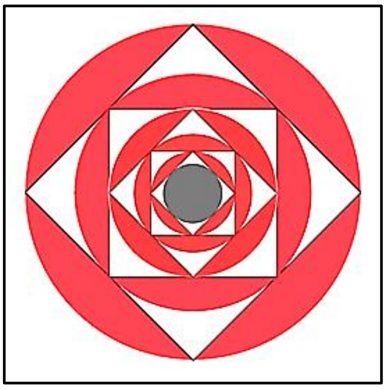
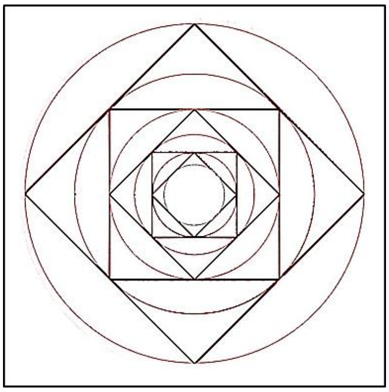
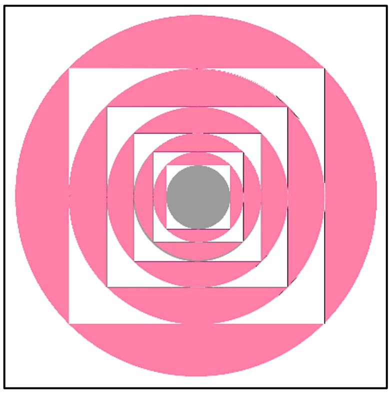
In ***Physical Size terms*** they are clearly **unequal**.

Shape Ratios are therefore independent of the Physical Size of the shape.

A shape the size of a thimble will have the same ratio as the same shape the size of the Universe.

Do Plane Regular Shape Ratios apply equally both in the **Quantum** area, and in the area of the **General Theory of Relativity**?

THE SPIRAL OF SQUARES AND MEASURING WITHOUT A UNIT OF MEASUREMENT.

 -  - 

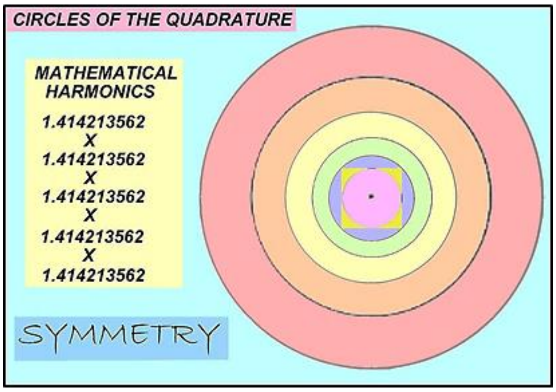
Throughout history, ancient and modern, the Spiral of Squares has appeared in the construction of structures and in mathematical instruments and calculations without any fanfare; without any acknowledgement of its role in the structures and calculations; without any explanation for its use; and possibly without any knowledge of its hidden harmonic traits. The most we know seems to come from Plato's *Meno* – and Socrates tells the boy if he cannot calculate the result then look at the geometry. Plato here distinguishes between *Graphical* Geometry and *Mathematical* Geometry; i.e. between Geometry and Trigonometry.

Many theories about *Symmetry* could be embodied in this repetition of the √2.

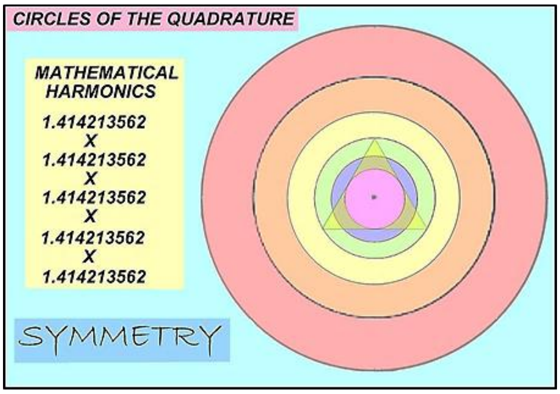
Introducing a Theorem:

"A Shape Ratio x a Shape Ratio = another Shape Ratio". – (√2 x √2 = 2)

If we use each of these circles in turn as a Circumscribing Circle with *the overall inner circle* as the Inscribing Circle in each case (i.e. as a **common Inscribing Circle**) we can produce other shapes which have Shape Ratios that are multiples of the ***ratio*** of √2 or 1.414213562.

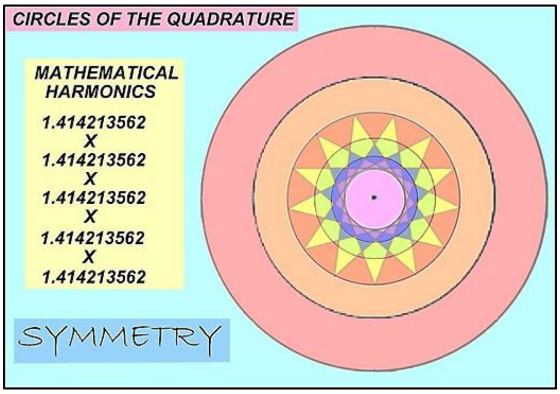


X

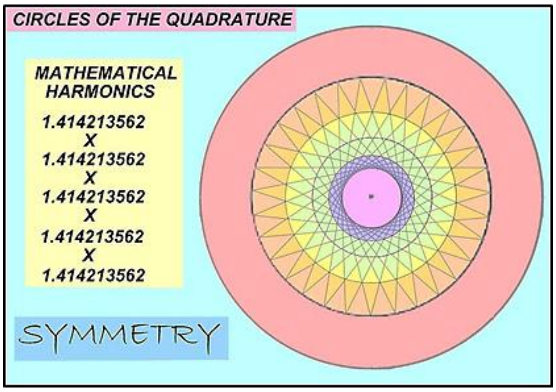


Shape – **ratio √2**
SQUARE ratio 1.414213562

Shape – **ratio √2 x √2**
EQUILATERAL TRIANGLE ratio 2.000000000

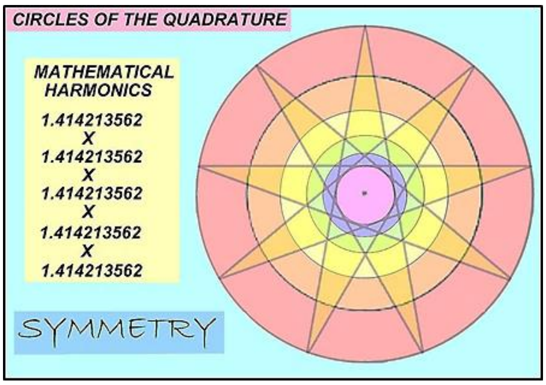


X

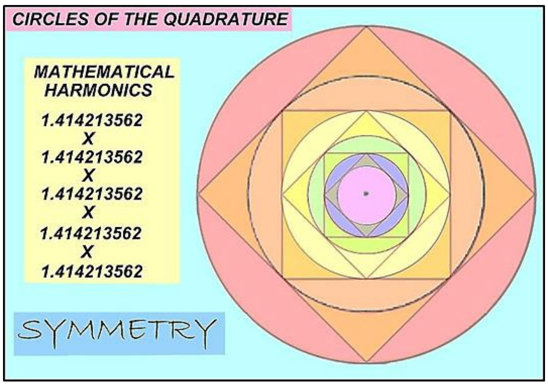


Shape– **ratio √2 x √2 x √2**
13 POINT POLYGRAM ratio 2.828427125

Shape – **ratio √2 x √2 x √2 x √2**
31 POINT POLYGRAM ratio 4.000000000



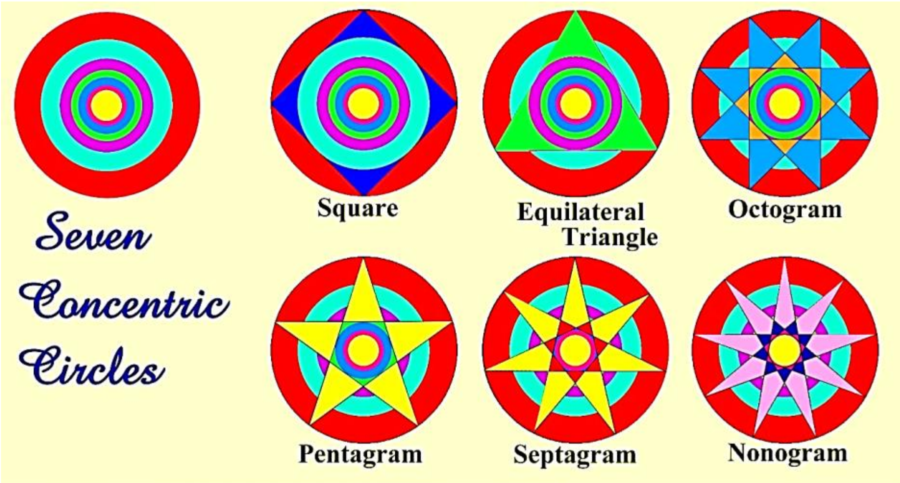
X



Shape – **ratio √2 x √2 x √2 x √2 x √2**
NONOGRAM ratio 5.656854249

Shape – **ratio √2 x √2 x √2 x √2 x √2**
THE SPIRAL OF SQUARES ratio 5.656854249

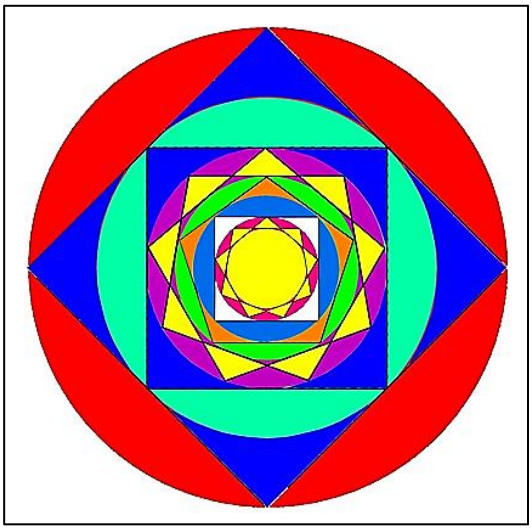
These illustrations indicate that **√2** can be a prominent influence in the Harmonics of Plane Regular Shape. It is also prominent in the Harmonics of Music and in the Harmonics of the Square Roots of Integers.



One of my next quests (*after the Holy Grail*) was to seek a concept that could be called ***"The Seven Concentric Circles"***. In this exercise I have used the Outer Circle as a **common circumscribing circle** which produces six shapes, each contained between the **common circumscribing circle** and one of the other six circles which was the Inner Circle for each one of the shapes.

This is just one example of Seven Concentric Circles.

'*CATALYSTS*' IN SHAPE THEORY:

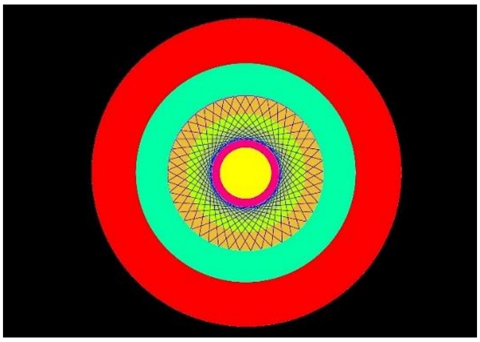


Above, we have produced six shapes utilising 'nested' circles; one ***common*** outer circle and six inscribing circles such that each together with *the common outer circle* produced a shape. ***(Construction Harmonic Shapes)***

We now look at the **adjacent circles:** Each adjacent pair produce a shape. But these are the same Seven Concentric Circles used above. ***(Mathematical Harmonic Shapes)***

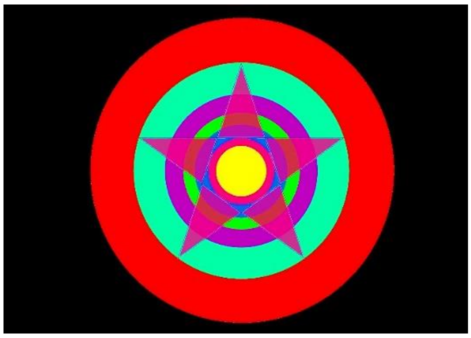
A third feature that was later revealed was that ***any pair*** in a set of these relevant circles, adjacent or otherwise, would produce plane regular shapes. ***(My Stonehenge Theorem)***.

Thus Shape X Shape = Shape.



FEATURES

Common Outer Circles
Common Inner Circles
Adjacent Circles
Catalysts
Any Pair in a System



Can you imagine the harmonics of a system that would produce these results?

- These features confirmed the presence of a ***system*** in *Shape Theory: e.g.* ***Shape x Shape = Shape***.
- These features also indicate a major part of ***the harmony*** of the system.
- These features then led me to ***search for the underlying harmonics*** that could produce such a system and any *mathematical properties* that caused or supported it.

SOME THEOREMS &/or FEATURES INDICATED BY THIS THEORY

"A Shape Ratio x a Shape Ratio = another Shape Ratio".

A method of graphically &/or mathematically multiplying a shape by a shape is invisible to us until we apply the two circles to each shape; the Circumscribing and the Inscribing Concentric circles; and learn to calculate their ratios.

When graphically multiplying a Shape by a Shape we NEST the shapes and their Circles such that 'The inner circle of the outer shape becomes the outer circle of the inner shape.'

"If in a set of three or more concentric circles a Shape Ratio exists between each adjacent pair of Concentric Circles then a Shape Ratio will exist between any pair of these circles."

Overall Physical Size of a shape has absolutely no effect upon its ratio.

A shape the size of a thimble will have the same ratio as the same shape the size of the Universe.

A natural code exists (2-1-2-0.5) that enables the conversion of a numerically ordered list of Polygons into a list of Primary Polygrams.

A Primary Polygram is one that when its sides (or tangents) are extended outwards they form parallel lines or radiate out into space without meeting again to form another shape.

A Primary Polygram may contain all other polygrams of its own denomination as well as other harmonic inner shapes. It may also appear with itself in parallel in phase in various denominations.

Because *"A Shape Ratio x a Shape Ratio = another Shape Ratio"* **then shape ratios may be derived with the use of a Matrix. Shape Ratios may also be divided in a Matrix.**

Continuous results of matrices of shape ratios may be utilised in generating and identifying shapes by computer *ad infinitum* **thus enabling the production of a 'genome' of shape** *ad infinitum***.**

With the exception of 2 and integer multiples of 2 all Plane Regular Shape Ratios are *Infinite* Irrational or incommensurable numbers that form *Finite* shapes – providing the border crossing from the infinite to the finite worlds. Can we also apply this *border crossing* **concept to Music and other compatible entities and senses.**

QUESTIONS:

- Will any pair of circles, provided they are concentric, produce a Plane Regular Shape?

Any pair of circles, if they are concentric, will produce equilateral sides or tangents.
Plane Regular Shapes have equilateral sides.
Any pair of circles, if they are concentric, will produce equi-angular apexes.
Plane Regular Shapes have equi-angular apexes.

I have only taken the production of shapes to 72 points.

- What about circles which ostensibly have tangents that do not meet again at the point of commencement but in fact might do so if the procedure was continued *ad infinitum*?
- Can we therefore confirm or dismiss the statement that *"Any pair of circles, provided they are Concentric, will produce a Plane Regular Shape"*?
- Or, do only pairs of circles in certain harmonic ratios comply?

And:

- given that Plane Regular Shapes have **Inner** Harmonic Shapes along with the Primary **Outer** Shapes

As ***both*** Music Note Frequencies and Plane Shape Ratios respond to 2 and √2 with Music Notes being separated by **$\sqrt[12]{2}$**, they may be aligned in a *mathematical* harmony. Given our previous analysis of the "Spiral of Squares" and a musical "Octave" being √2 the results are almost predetermined.

SHAPE to MUSIC HARMONICS

SHAPE	Note	Music Freq Hz / 100	Shape Ratios Ratios including new results	Shape / Music *DIFFERENTIALS* *Repeating Sets of 6*
	G_4	7.839908693047540	8.000000032556430	1.020420051530810
	F_4#	7.399888401532760	7.404918347287620	1.000679732650270
	F_4	6.984564581286640	6.992256391181140	1.001101258325410
	E_4	6.592551095778560	6.854101966249600	1.039673696369000
	D_4#	6.222539636457180	6.472135954999560	1.040111647835880
	D_4	5.873295324487420	5.990704784914500	1.019990389370950
Nonogram	C_4#	5.543652589457180	5.656854249492380	1.020420049454480
41pts 22deg	C_4	5.232511279394490	5.236067977499760	1.000679730614110
	B_4	4.938832989112590	4.944271909999160	1.001101256288390
	A_4#	4.661637594629210	4.846581979279140	1.039673694253500
Septagram	A_4	4.399999982093960	4.576491222541460	1.040111645719490
40pts 27deg	G_3#	4.153046960306820	4.236067977499750	1.019990387295500
31pts 29deg	G_3	3.919954346523770	4.000000000000000	1.020420047378160
	F_3#	3.699944215823500	3.702459173643810	1.000679728577950
120pts 33deg	F_3	3.492282304855350	3.496128195590570	1.001101254251370
	E_3	3.296275561303650	3.427050983124800	1.039673692137990
Pentagram	D_3#	3.111269830890070	3.236067977499770	1.040111643603090
23pts 39.13deg	D_3	2.936647674194560	2.995352392457270	1.019990385220050
Stonehenge	C_3#	2.771826306008690	2.828427124746190	1.020420045301830
Octogram	C_3	2.616255650344240	2.618033988749880	1.000679726541790
30pts 48deg	B_3	2.469416504605720	2.472135954999580	1.001101252214360
	A_3#	2.330818806800000	2.423290989639570	1.039673690022490
45pts 52deg	A_3	2.200000000000000	2.288245611270730	1.040111641486700
41pts 57.07deg	G_2#	2.076523488603940	2.118033988749880	1.019990383144590
Equi Tri	G_2	1.959977181238120	2.000000000000000	1.020420043225500
60pts	F_2#	1.849972115440310	1.851229586821910	1.000679724505630
36pts 70deg	F_2	1.746141159533690	1.748064097795280	1.001101250177340
Decagram	E_2	1.648137787359010	1.713525491562400	1.039673687906990
Golden Mean	D_2#	1.555634921775780	1.618033988749890	1.040111639370300
15pts	D_2	1.468323843072700	1.497676196228630	1.019990381069140
Square	C_2#	1.385913158644390	1.414213562373100	1.020420041149180
Inner Nonogram	C_2	1.308127830495620	1.309016994374940	1.000679722469470
Pentagon	B_2	1.234708257327570	1.236067977499790	1.001101248140320
	A_2#	1.165409408142700	1.211645494819790	1.039673685791480
Hexagon	A_2	1.100000004476510	1.144122805635360	1.040111637253900

When the spreadsheet is **sorted** by the *"Differentials"* column from *'smallest to largest'*, we find the existence of repeating sets of 6 differentials whose values vary slightly but enough to give some *order* to this part of the universe. I would like to refer here to Plato's harmony of sight and sound.

SHAPE to MUSIC HARMONICS — **SORTED BY**

SHAPE	Note	Music Freq Hz / 100	Shape Ratios Ratios including new results	Shape / Music DIFFERENTIALS Repeating Sets of 6
Inner Nonogram	C_2	1.308127830495620	1.309016994374940	1.000679722469470
60pts	F_2#	1.849972115440310	1.851229586821910	1.000679724505630
Octogram	C_3	2.616255650344240	2.618033988749880	1.000679726541790
	F_3#	3.699944215823500	3.702459173643810	1.000679728577950
41pts 22deg	C_4	5.232511279394490	5.236067977499760	1.000679730614110
	F_4#	7.399888401532760	7.404918347287620	1.000679732650270
Pentagon	B_2	1.234708257327570	1.236067977499790	1.001101248140320
36pts 70deg	F_2	1.746141159533690	1.748064097795280	1.001101250177340
30pts 48deg	B_3	2.469416504605720	2.472135954999580	1.001101252214360
120pts 33deg	F_3	3.492282304855350	3.496128195590570	1.001101254251370
	B_4	4.938832989112590	4.944271909999160	1.001101256288390
	F_4	6.984564581286640	6.992256391181140	1.001101258325410
15pts	D_2	1.468323843072700	1.497676196228630	1.019990381069140
41pts 57.07deg	G_2#	2.076523488603940	2.118033988749880	1.019990383144590
23pts 39.13deg	D_3	2.936647674194560	2.995352392457270	1.019990385220050
40pts 27deg	G_3#	4.153046960306820	4.236067977499750	1.019990387295500
	D_4	5.873295324487420	5.990704784914500	1.019990389370950
Square	C_2#	1.385913158644390	1.414213562373100	1.020420041149180
Equi Tri	G_2	1.959977181238120	2.000000000000000	1.020420043225500
Stonehenge	C_3#	2.771826306008690	2.828427124746190	1.020420045301830
31pts 29deg	G_3	3.919954346523770	4.000000000000000	1.020420047378160
Nonogram	C_4#	5.543652589457180	5.656854249492380	1.020420049454480
	G_4	7.839908693047540	8.000000032556430	1.020420051530810
Decagram	A_2#	1.165409408142700	1.211645494819790	1.039673685791480
	E_2	1.648137787359010	1.713525491562400	1.039673687906990
	A_3#	2.330818806800000	2.423290989639570	1.039673690022490
	E_3	3.296275561303650	3.427050983124800	1.039673692137990
	A_4#	4.661637594629210	4.846581979279140	1.039673694253500
	E_4	6.592551095778560	6.854101966249600	1.039673696369000
Hexagon	A_2	1.100000004476510	1.144122805635360	1.040111637253900
Golden Mean	D_2#	1.555634921775780	1.618033988749890	1.040111639370300
45pts 52deg	A_3	2.200000000000000	2.288245611270730	1.040111641486700
Pentagram	D_3#	3.111269830890070	3.236067977499770	1.040111643603090
Septagram	A_4	4.399999982093960	4.576491222541460	1.040111645719490
	D_4#	6.222539636457180	6.472135954999560	1.040111647835880

Our music notes are sorted into a natural order by the marshalling of the *shape to music* differentials.

Then:

- How can it be determined whether the images produced by an audible frequency mechanism are Outer Primary images or their Harmonic Inner images?
- Will the Concentric Circles give us the answer?
- Will the *Hidden* ***Mathematical Harmonics*** reveal themselves in experiments such as Cymatics experiments?
- Will the **Construction Harmonics**, those inner shapes formed by the original tangents and the original pair of circles, be the only shapes revealed by a Cymatics experiment?

And if two "relevant" frequencies are played simultaneously:

- How can we ascertain how their respective Concentric Circles will mesh to form a new shape? Will they mesh one inside the other, or nest, and produce a result graphically. Will they mathematically mesh to form a new ratio mathematically? Hans Jenny actually carried out this experiment. He reported a new ratio was formed!

WITHOUT INFINITY WE WOULD NOT HAVE SHAPE!

PLANE REGULAR SHAPES ARE ***FINITE OBJECTS*** DERIVED FROM ***INFINITE RATIOS***.

WITHOUT INFINITY WE WOULD NOT HAVE MUSIC!

MUSIC NOTES ARE ***FINITE SOUNDS*** DERIVED FROM ***INFINITE FREQUENCIES***

BUT . . . WITH INFINITY WE HAVE HARMONY!

SHAPE TO MUSIC HARMONICS ANALYSIS SHOWS THAT INFINITY GIVES ***ORDER TO OUR UNIVERSE***!

INFINITY CANNOT BE MEASURED.

BUT:

INFINITY IS:
AN INFINITE SET OF HARMONIC INFINITE RATIOS

WITH INFINITY:
PHYSICAL SIZE IS IMMATERIAL!

INFINITY ITSELF HAS NO PHYSICAL SIZE

INFINITY DOES NOT INFER A PHYSICAL SIZE

'SHAPE TO MUSIC' MULTIPLIERS TO 15 DECIMAL PLACES

Shape Harmonic Multipliers Pattern	*Music Linear Multipliers Pattern*
1.080363026950910	1.059463094359300
1.059016994374940	1.059463094359300
1.020156458951420	1.059463094359300
1.059016994374940	1.059463094359300
1.080363026950910	**1.059463094359300**
1.059016994374940	1.059463094359300
Cumulative Product of above	*Cumulative Product of above*
1.414213562373090	**1.414213562373130**

Differential
1.000000000000030

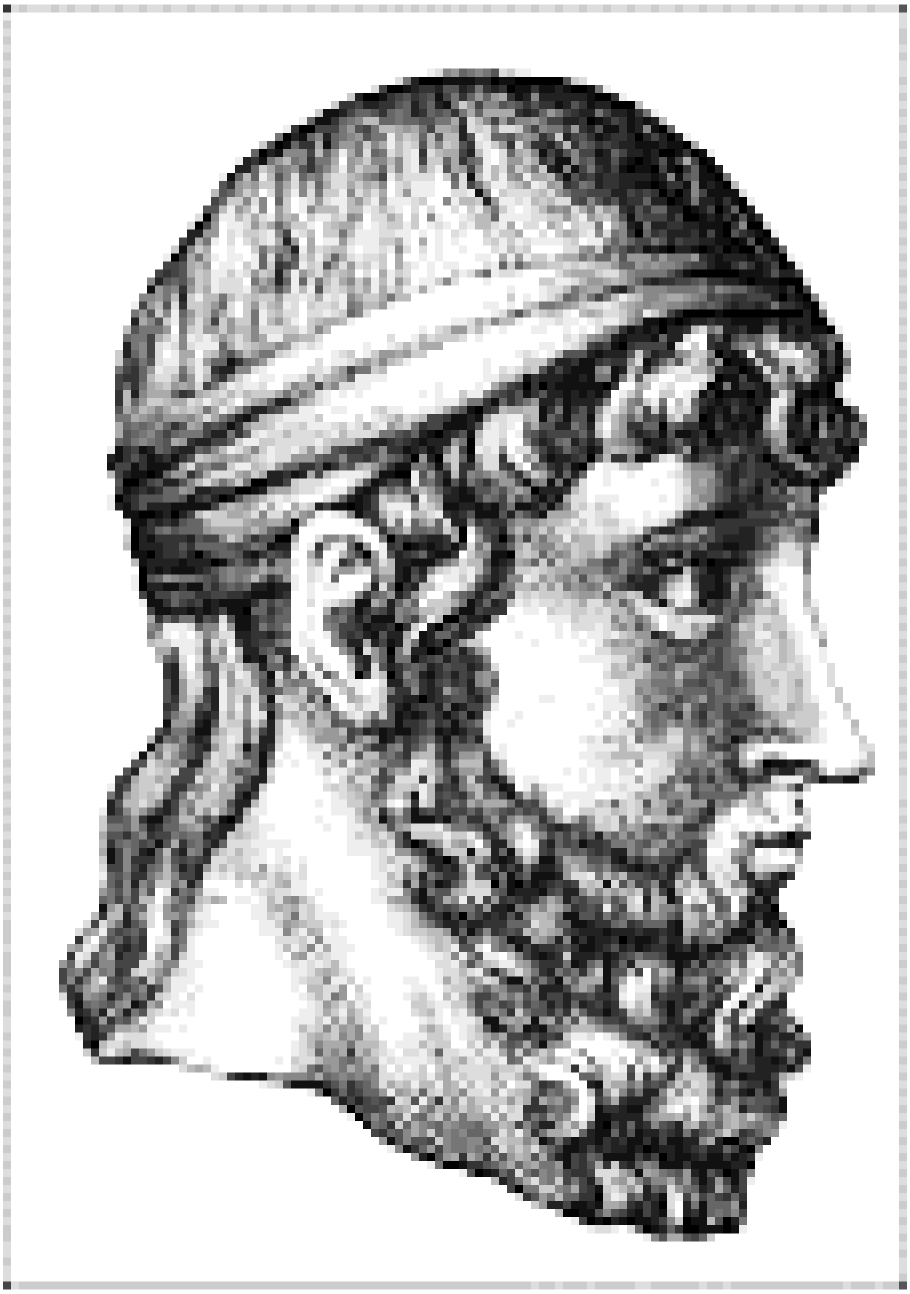
This concept I would like to label as "The same but different". It reminds me of Ptolemy's description of his chords as being *"Sufficient for the Senses".* This differential is to me the Higgs Bosun of Shape and Music.

But, does not this "Differential" contribute to **Order in the Universe**?

Without this "Differential" there could be no natural Order.
There would be nothing to say *"viva la difference"* to.
Would not everything be the same?

PLATO'S ACADEMY OF GEOMETRY

What was Plato's real name?



Aristocles

Did Plato have a wife?

Plato did not have children, and it is assumed based on textual evidence that he never married. He did have a number of siblings, however:

- three brothers, **Glaucon**, **Antiphon**, and **Adeimantus** of Collytus,
- and one sister, Potone.

Plato's number From Wikipedia, the free encyclopedia

*"**Plato's number** is a number enigmatically referred to by Plato in his dialogue the Republic (**8.546b**). The text is notoriously difficult to understand and its corresponding translations do not allow an unambiguous interpretation. There is no real agreement either about the meaning or the value of the number.*

*It also has been called the **"geometrical number"** or the "nuptial number" (the "number of the bride"). The passage in which Plato introduced the number has been discussed ever since it was written, with no consensus in the debate. As for the number's actual value, **216** is the most frequently proposed value for it, but 3,600 or 12,960,000 are also commonly considered.*

***An incomplete list** [1] **of authors who mention or discourse about** includes the names of*

- *Aristotle, Proclus for antiquity;*
- *Ficino and Cardano during the Renaissance;*
- *Zeller, Friedrich Schleiermacher, Paul Tannery and Friedrich Hultsch in the 19th century*
- *and further new names are currently added.[2]*

Further in the *Republic* (**9.587b**) another number is mentioned, known as the **"Number of the Tyrant"**.

Plato's text

*"Great lexical and syntactical differences are easily noted between the many translations of the Republic. Below is a typical text from **a relatively recent translation** of **Republic 546b–c**:"*

- *"Now **for divine begettings** there is **a period** comprehended by a perfect number,*
- *and **for mortal** by the first in which augmentations dominating and dominated when they have attained to **three distances and four limits** of*
  - ***the assimilating and the dissimilating**,*
  - *the waxing and the waning,*
  - *render **all things conversable and commensurable** [546c] **with one another**,*
  - *whereof a basal four-thirds wedded to the pempad **yields two harmonies at the third augmentation,***
    - ***the one the product of equal factors taken one hundred times,***
    - ***the other of equal length one way but oblong,***
- ***one dimension** of a hundred numbers determined by the **rational** diameters of the pempad **lacking one in each case**,*
  - *or of the **irrational lacking two**;*
- ***the other dimension** of a hundred cubes of the triad.*

*And **this entire geometrical number** is determinative of this thing, of better and inferior births."[3] The 'entire **geometrical number'**, mentioned shortly before the end of this text, is understood to be Plato's number.*

The introductory words mention (a period comprehended by) 'a perfect number' which is taken to be a reference to Plato's perfect year mentioned in his Timaeus (39d).
The words are presented as uttered by the muses, so the whole passage is sometimes called the 'speech of the muses' or something similar.[2][4]
Indeed Philip Melanchthon compared it to the proverbial obscurity of the Sibyls.[5]
Cicero famously described it as 'obscure' but others have seen some playfulness in its tone".[1]

Plato's number, a mathematical word puzzle

Religious Forums
https://www.religiousforums.com › threads › platos-nu...
27 Mar 2017 — Not sure what he means by rational diameters of the **pempad** minus 1 if by **pempad** he means a right triangle. We are guessing at what a **pempad** is.

And for **mortal** by the first in which augmentations **dominating** and **dominated** when they have attained to **three** distances and **four** limits of the assimilating and the dissimilating,

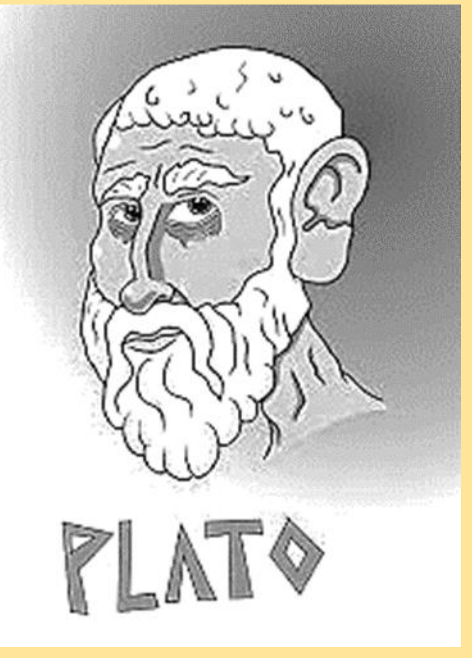
“He is getting superstitious here about some sort of universal formula that he suspects exists.

> 3 x 4 is twelve, which is the number of months in a year.
>
> 3 and 4 are the sides of a perfect triangle with sides of length 3,4,5.
>
> > This triangle is probably what is meant by the term pempad (according to various people).”

Whereof a basal **four**-thirds wedded to the **pempad** yields **two** harmonies at the **third** augmentation,

“Some ancient Greeks discovered and studied the harmonics of the tetrachord, which today we consider to be half of a major music scale. There is such a thing as a perfect note, and there is such a thing as a note that is out of tune. Two tetrachords together make up 1 major scale or an octave, notes A through F. Some Greeks noted that if you plucked a particular note there were a series of natural overtones that came as a result and this determined which following notes were most pleasing to the ear. Today we refer to scales. If you play the major scale you are following natural overtones. If you play minor or jazz scales then you are choosing some dissonance. What he's doing here is comparing harmonics to some bigger formula that he associates with 4's and 3's or better births.”

SIMPLIFYING THE THEORY & PLATO



AND

THE HARMONICS OF PLANE REGULAR SHAPE & MUSIC

OR

THE TWO HARMONIES OF PLATO

'GLAUCON'

Plato to Glaucon:

"They investigate the numerical relationships between the harmonies which are heard, but they never get as far as formulating problems - that is to say, they never reach the natural harmonies of number, or reflect why some numbers are harmonious and others not."

'That,' he said,' would be a fearsome job.'

"Nevertheless, a thing,' I replied, 'which I would rather call useful, that is, if investigated with a view to the beautiful and good. But if pursued in any other spirit, it is useless."

'Very true,' he said.

Plato argues the merits of harmonies: - *Glaucon*

Here Plato gives arguments similar to those employed when he discussed astronomy.

'Motion,' I said, 'has many forms, and not just one. ***Two*** of them are obvious enough even to brains no better than ours; but there are others, as I imagine, which may be left to experts.'

'But what are the two?'

'There is a second,' I said, 'which is the counterpart of the one already named.'

'And what is that?'

'The second,' I said, 'would seem to relate to the ears in the same way that the first relates to the eyes. I believe that as the eyes are designed to look up at the stars, so the ears are designed to hear movements of harmony, and these are sister sciences - as the Pythagoreans say, and we, *Glaucon*, agree with them?'

'Yes,' he replied.

'But this,' I said, **'is a long and difficult study**, and therefore we had better go and consult them on the subject and ***they will tell us whether there are any other applications of these sciences***. At the same time, we must not lose sight of our own higher principles.'

'What is that?'

'There is a level which all knowledge ought to reach, and which our pupils ought also to attain, and not to fall short of, as I was saying that they did in astronomy. For **in the science of harmony**, as you probably know, the same thing happens. The teachers of harmony compare the sounds and consonances **which are audible**, and their labour, like that of the astronomers, is in vain.'

'Yes, by heaven!' he said, 'and it's as good as a play to hear them talking about their condensed notes, as they call them. They put their ears close alongside of the strings like people trying to hear a sound through their neighbour's wall - some of them declaring that they can distinguish an intermediate note and have found the least interval which should be the unit of measurement, while the others insist that there is no difference between the two notes - both lots are putting their ears before their understanding.'

'You mean,' I said, 'those gentlemen who tease and torment the strings and twist them on the pegs of the instrument. I might continue the metaphor and speak after their manner of the blows which the plectrum gives, and make accusations against the strings, both of backwardness and forwardness to sound - but this would be tedious, and therefore I will only say that these are not the men, and that I am referring to the Pythagoreans, of whom I was just now proposing to enquire about harmony. For they too are in error in the same way as the astronomers. ***They investigate the numerical relationships between the harmonies which are heard, but they never get as far as formulating problems - that is to say, they never reach the natural harmonies of number, or reflect why some numbers are harmonious and others not.'***

'That,' he said,' would be a fearsome job.'

'Nevertheless, a thing,' I replied, 'which I would rather call useful, that is, if investigated with a view to the beautiful and good. But if pursued in any other spirit, it is useless.'

'Very true,' he said.

PLATO'S HARMONIES OF SIGHT AND SOUND

SPREADSHEET FOR MUSIC TO SHAPE HARMONICS

SORTED BY ↓

SHAPE TO MUSIC CORRELATION

Refined

SHAPE	Note	Music FREQ / 100	Shape Ratios (Ratios including refined results)	*Shape Harmonic Multipliers*	*Shape / Music Differential Harmonics*	SUB-HARMONICS WITHIN DIFFERENTIALS: *Differential multipliers*	*Differential sub-multipliers*	
Hexagon	A_2	1.100000000000000	1.144122805635360	1.080363026950910	1.040111641486690			
	A_2#	1.165409403795230	1.211645494819790	1.059016994374940	1.039673689669900	1.000421239684280		
Pentagon	B_2	1.234708253140320	1.236067977499790	1.020156458951420	1.001101251535340	1.038530006905300	0.963305087992038	1.038092721055230
Inner Nonogram	C_2	1.308127826503010	1.309016994374940	1.059016994374940	1.000679725523690	1.000421239684280	1.038092721055230	0.963305087992038
Square	C_2#	1.385913154884390	1.414213562373100	1.080363026950910	1.020420043917590	0.980654713211912	1.020156458951420	0.980241796467049
15pts	D_2	1.468323839587070	1.497676196228630	1.059016994374940	1.019990383490480	1.000421239684290	0.980241796467043	1.020156458951420
Golden Mean	D_2#	1.555634918610450	1.618033988749890	1.080363026950910	1.040111641486670	0.980654713211912	1.020156458951420	0.980241796467044
Decagram	E_2	1.648137784564400	1.713525491562400	1.059016994374940	1.039673689669870	1.000421239684280	0.980241796467049	1.020156458951420
	F_2	1.746141157165080	1.748064097795280	1.020156458951420	1.001101251535310	1.038530006905300	0.963305087992039	1.038092721055230
60pts	F_2#	1.849972113558250	1.851229586821910	1.059016994374940	1.000679725523670	1.000421239684280	1.038092721055230	0.963305087992038
Equi Tri	G_2	1.959977179908830	2.000000000000000	1.080363026950910	1.020420043917570	0.980654713211912	1.020156458951420	0.980241796467049
41pts 57.07deg	G_2#	2.076523487899830	2.118033988749880	1.059016994374940	1.019990383490450	1.000421239684280	0.980241796467046	1.020156458951420
45pts 52deg	A_3	2.200000000000120	2.288245611270730	1.080363026950910	1.040111641486640	0.980654713211912	1.020156458951420	0.980241796467046
	A_3#	2.330818807590580	2.423290989639570	1.059016994374940	1.039673689669840	1.000421239684280	0.980241796467046	1.020156458951420
30pts 48deg	B_3	2.469416506280770	2.472135954999580	1.020156458951420	1.001101251535290	1.038530006905300	0.963305087992041	1.038092721055220
Octogram	C_3	2.616255653006160	2.618033988749880	1.059016994374940	1.000679725523640	1.000421239684280	1.038092721055230	0.963305087992039
Stonehenge	C_3#	2.771826309768920	2.828427124746190	1.080363026950910	1.020420043917540	0.980654713211912	1.020156458951420	0.980241796467049
	D_3	2.936647679174300	2.995352392457270	1.059016994374940	1.019990383490430	1.000421239684280	0.980241796467050	1.020156458951420
Pentagram	D_3#	3.111269837221060	3.236067977499770	1.080363026950910	1.040111641486610	0.980654713211918	1.020156458951410	0.980241796467056
	E_3	3.296275569128980	3.427050983124800	1.059016994374940	1.039673689669820	1.000421239684280	0.980241796467055	1.020156458951410
	F_3	3.492282314330350	3.496128195590570	1.020156458951420	1.001101251535260	1.038530006905300	0.963305087992039	1.038092721055230
	F_3#	3.699944227116690	3.702459173643810	1.059016994374940	1.000679725523610	1.000421239684280	1.038092721055230	0.963305087992039
31pts 29deg	G_3	3.919954359817880	4.000000000000000	1.080363026950910	1.020420043917510	0.980654713211912	1.020156458951420	0.980241796467049
	G_3#	4.153046975799880	4.236067977499750	1.059016994374940	1.019990383490400	1.000421239684280	0.980241796467046	1.020156458951420
Septagram	A_4	4.400000000000470	4.576491222541460	1.080363026950910	1.040111641486580	0.980654713211912	1.020156458951420	0.980241796467046
	A_4#	4.661637615181420	4.846581979279140	1.059016994374940	1.039673689669790	1.000421239684280		
	B_4	4.938833012561810	4.944271909999160	1.020156458951420	1.001101251535230	1.038530006905300		
41pts 22deg	C_4	5.232511306012600	5.236067977499760	1.059016994374940	1.000679725523590	1.000421239684280		
Nonogram	C_4#	5.543652619538130	5.656854249492380	1.080363026950910	1.020420043917480	0.980654713211912	sub-multiplier	reciprocal
	D_4	5.873295358348910	5.990704784914500	1.059016994374940	1.019990383490370	1.000421239684290	0.980241796467043	1.020156458951420
	D_4#	6.222539674442450	6.472135954999560	1.080363026950910	1.040111641486560	0.980654713211910	157.5 degrees	16 sided gon
	E_4	6.592551138258310	6.854101966249600	1.059016994374940	1.039673689669760	1.000421239684280		
	F_4	6.984564628661070	6.992256391181140	1.020156458951420	1.001101251535210	1.038530006905300	sub-multiplier	reciprocal
	F_4#	7.399888454233780	7.404918347287620	1.059016994374940	1.000679725523560	1.000421239684280	0.963305087992039	1.038092721055230
	G_4	7.839908719636170	8.000000000000000	1.080363026950910	1.020420043917460	0.980654713211912	150 degrees	12 sided gon

If you peruse the Differential columns you will note almost insignificant ***variations*** to the numerical values.

VIVA LA DIFFERENCE!

HIGHLIGHTS OF THE *E* AND THE *A#* *HALF-OCTAVES*

	MUSIC NOTES HARMONIES	MUSIC NOTES FREQUENCIES	SHAPE RATIOS	SHAPE HARMONIC MULTIPLIERS	SHAPE TO MUSIC DIFFERENTIALS	SHAPE RATIO HARMONICS	VARIANCES BETWEEN SHAPE TO MUSIC DIFFERENTIALS
	E_4	6.592551138258310	6.828427124746210	1.059016994374940	1.035779166750650		
	A_4#	4.661637615181420	4.828427124746210	1.059016994374940	1.035779166750670	1.414213562373100	1.000000000000030
	E_3	3.296275569128980	3.414213562373090	1.059016994374940	1.035779166750700	1.414213562373100	1.000000000000020
	A_3#	2.330818807590580	2.414213562373090	1.059016994374940	1.035779166750730	1.414213562373100	1.000000000000030
Decagram	E_2	1.648137784564400	1.707106781186550	1.059016994374940	1.035779166750760	1.414213562373090	1.000000000000030
	A_2#	1.165409403795230	1.207106781186550	1.059016994374940	1.035779166750780	1.414213562373090	1.000000000000030

But, so long as there are variances Order in the Universe remains! Without it, all activity would cease.

This is what happens to our Music Notes when we sort the spreadsheet by the *Differential* column.

- The spreadsheet is sorted into musical half-octave order
- The Music Notes and Shape Ratios are both naturally sorted into descending numerical order thus giving some *ORDER* to the Universe.
- This Order is possibly derived from the Music Notes relying upon the 12th. Root of 2 which is incommensurable and can never be displayed infinitely in a balanced manner. But, it is this imbalance that gives Order to the Universe.
- ***There will always be a differential.*** – Understand the usefulness of Infinity.
- ***Embrace Infinity*** as it gives **Order to the Universe**.

ORDER IN THE UNIVERSE:

SHAPE TO MUSIC CORRELATION

SORTED BY

Refined

SHAPE	Note	Music NEW, Freq, Hz *Linear* *Refined* *Linear*	Shape Ratios Ratios including refined results (nearest above) *Harmonic*	*Shape Harmonic Multipliers*	*Shape / Music Differential Harmonics*	*Differential multipliers*	DIFFERENTIALS 30 10,000,000,000,000	
	F_4#	7.399888454233780	7.404918347287620	1.059016994374940	1.000679725523560	Note the differences between the sets		
41pts 22deg	C_4	5.232511306012600	5.236067977499760	1.059016994374940	1.000679725523590	1.000000000000030		
	F_3#	3.699944227116690	3.702459173643810	1.059016994374940	1.000679725523610	1.000000000000030		
Octogram	C_3	2.616255653006160	2.618033988749880	1.059016994374940	1.000679725523640	1.000000000000030		
60pts	F_2#	1.849972113558250	1.851229586821910	1.059016994374940	1.000679725523670	1.000000000000030		
Inner Nonogram	C_2	1.308127826503010	1.309016994374940	1.059016994374940	1.000679725523690	1.000000000000030		
	F_4	6.984564628661070	6.992256391181140	1.020156458951420	1.001101251535210	1.000421239684150		1.000421239684150
	B_4	4.938833012561810	4.944271909999160	1.020156458951420	1.001101251535230	1.000000000000030		
	F_3	3.492282314330350	3.496128195590570	1.020156458951420	1.001101251535260	1.000000000000030		
30pts 48deg	B_3	2.469416506280770	2.472135954999580	1.020156458951420	1.001101251535290	1.000000000000030		
	F_2	1.746141157165080	1.748064097795280	1.020156458951420	1.001101251535310	1.000000000000030		
Pentagon	B_2	1.234708253140320	1.236067977499790	1.020156458951420	1.001101251535340	1.000000000000030		
	D_4	5.873295358348910	5.990704784914500	1.059016994374940	1.019990383490370	1.018868353152150	1.018868353152150	1.000000000000030
	G_3#	4.153046975799880	4.236067977499750	1.059016994374940	1.019990383490400	1.000000000000030		
	D_3	2.936647679174300	2.995352392457270	1.059016994374940	1.019990383490430	1.000000000000030		
41pts 57.07deg	G_2#	2.076523487899830	2.118033988749880	1.059016994374940	1.019990383490450	1.000000000000020		
15pts	D_2	1.468323839587070	1.497676196228630	1.059016994374940	1.019990383490480	1.000000000000020		
	G_4	7.839908719636170	8.000000000000000	1.080363026950910	1.020420043917460	1.000421239684180	1.000000000000000	1.000421239684180
Nonogram	C_4#	5.543652619538130	5.656854249492380	1.080363026950910	1.020420043917480	1.000000000000030		
31pts 29deg	G_3	3.919954359817880	4.000000000000000	1.080363026950910	1.020420043917510	1.000000000000030		
Stonehenge	C_3#	2.771826309768920	2.828427124746190	1.080363026950910	1.020420043917540	1.000000000000030		
Equi Tri	G_2	1.959977179908830	2.000000000000000	1.080363026950910	1.020420043917570	1.000000000000030		
Square	C_2#	1.385913154884390	1.414213562373100	1.080363026950910	1.020420043917590	1.000000000000030		
	E_4	6.592551138258310	6.854101966249600	1.059016994374940	1.039673689669760	1.018868353152150	1.018868353152150	1.000000000000030
	A_4#	4.661637615181420	4.846581979279140	1.059016994374940	1.039673689669790	1.000000000000030		
	E_3	3.296275569128980	3.427050983124800	1.059016994374940	1.039673689669820	1.000000000000030		
	A_3#	2.330818807590580	2.423290989639570	1.059016994374940	1.039673689669840	1.000000000000030		
Decagram	E_2	1.648137784564400	1.713525491562400	1.059016994374940	1.039673689669870	1.000000000000030		
	A_2#	1.165409403795230	1.211645494819790	1.059016994374940	1.039673689669900	1.000000000000030		
	D_4#	6.222539674442450	6.472135954999560	1.080363026950910	1.040111641486560	1.000421239684150		1.000421239684150
Septagram	A_4	4.400000000000470	4.576491222541460	1.080363026950910	1.040111641486580	1.000000000000030		
Pentagram	D_3#	3.111269837221060	3.236067977499770	1.080363026950910	1.040111641486610	1.000000000000020		
45pts 52deg	A_3	2.200000000000120	2.288245611270730	1.080363026950910	1.040111641486640	1.000000000000030		
Golden Mean	D_2#	1.555634918610450	1.618033988749890	1.080363026950910	1.040111641486670	1.000000000000020		
Hexagon	A_2	1.100000000000000	1.144122805635360	1.080363026950910	1.040111641486690	1.000000000000030		

MY INTERPRETATION OF PLATO'S SQUARE OF FIVE LESS THE ONE . . .

THE PEMPAD?

√5 and its effect on Plane Regular Shape Ratios			
dark matter Φ	ϕ	(√5 - 1) / 2	0.618033988749895
16pts 22.5deg 41pts?		√5 + 3	5.236067977499790
Septagram	[(√5 + 1) /√ 2] x 2	or {[(√5 + 1) /√ 2] / 2} x 4	4.576491222541470
40pts 27 degrees		√5 + 2	4.236067977499790
pentagram		√5 + 1	3.236067977499790
octogram			2.613125930000000
45 pts 52 deg		(√5 + 1) /√ 2	2.288245611270740
equilateral triangle	$\sqrt{2}^2$	$\sqrt{2}^2$	2.000000000000000
inner septagram	Φ	(√5 + 1) / 2	1.618033988749890
square	√2	√2	1.414213562373100
inner nonogram		$\Phi^2 / 2$	1.309016994374950
pentagon		√5 - 1	1.236067977499790

Ramanujan has used the above mathematics around the ratios √5 and 2 significantly in his works indicating that perhaps he was heavily into Plane Regular Shape.

Hexagon Ratio = 1.154700538379250

= 2/√3
= √4/√3
= Equilateral Triangle / Decagram

Ratio √3 = 72 degrees 10pts Decagram ratio 1.732050808000000

'FUNDAMENTAL' SHAPE AND ITS HARMONICS

Experimentally, when I overlay a transparent image of a shape over some Cymatics image I am able to determine with some degree of certainty the true shape that is being imaged cymatically by a certain frequency. Thus, it would seem, that a Shape's ***Construction Harmonics*** are what is being imaged by the Cymatics experiment; the ratio remains unseen but, it may be obtainable from the ***Mathematical Harmonics*** which are the hidden nested shapes that reside between the ***Construction Harmonics***.

So, what can now be knowable about a Shape's Harmonics?

From results of observations and experimentations it would seem that Plane Regular Shape embodies more Harmonics than the rest of Nature combined.

The Harmonics of Nature:

- It can be shown that complete correlation exists between Music Notes and Plane Regular Shape and Square Roots of Integers. These results were in wide Spreadsheets and are not illustrated here.

Construction Harmonics:

- They share the same Inscribing Circle.
- Each inner or intermediate shape exists in harmony with all other inner or intermediate shapes within the same outer or primary shape.

Mathematical Harmonics:

- They are the invisible **nested shapes** that exist between the circumscribing circles of the consecutive apexes of shapes formed by the ***Construction (or Graphical)*** tangents.
- They exist between all ***Construction Harmonics***.
- The outer circle for an inner nested shape becomes the inner circle for the next outer nested shape
- These hidden nested shapes share no common inscribing circle.
- The ratios of all the hidden nested shapes multiply together to give the Ratio for the overall shape.
- The ***Mathematical Harmonics*** may possibly be imaged in a Cymatics experiment by their circles.
- The Outer Construction or Shape may be identified from the multiplication of all the nested Mathematical Harmonics or shapes that could possibly fit within the Outer shape's Circles.

My Stonehenge Theorem:

- *In a set of three or more concentric circles if a shape exists between each adjacent pair of circles then a shape will exist between any pair of these circles. . . (see also Shape x Shape = Shape)*

(*My Stonehenge Theorem*) (*See also my 7 Concentric Circles*).

Polygon to Complementary Primary Polygram Conversion Harmonics:

- Embedded in a list that is indicative of the continuous, repeating **0.5 – 2 – 1 – 2** multiplying sequence.
- Polygons, when converted to Complementary Polygrams, produce ***Primary*** Polygrams.

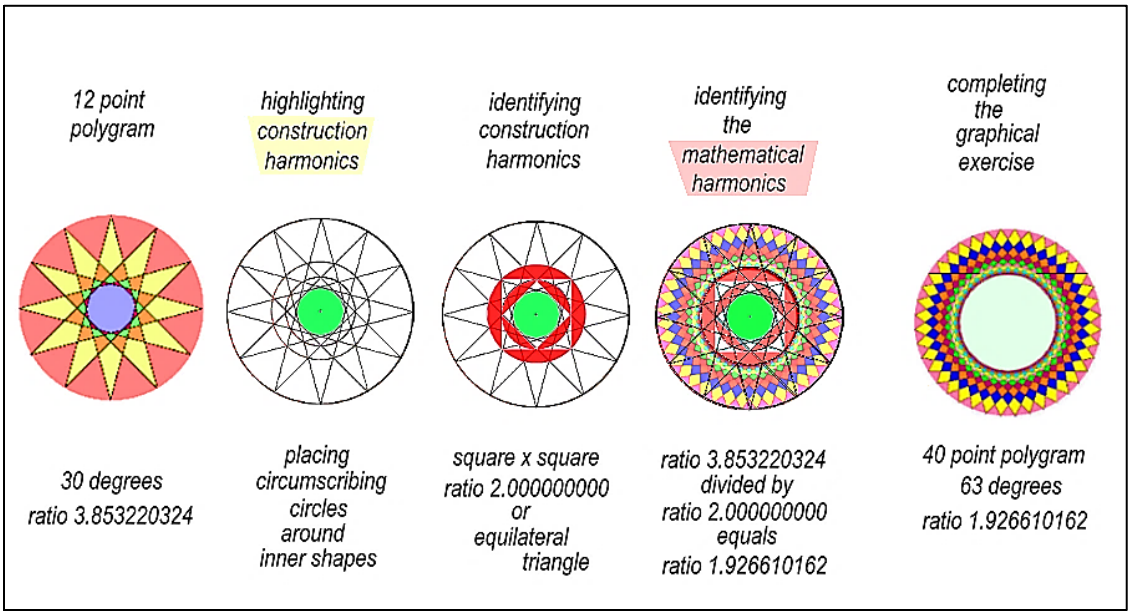
Plane Regular Shape is Harmonic because a Shape Ratio x a Shape Ratio = a Shape Ratio.

THIS IS THE COST OF THE OVERWHELMING CURRENT DESIRE TO USE "AUDIBLE FREQUENCIES" AS TOOLS IN EXPERIMENTS TO 'EXCITE' MEDIUMS THAT ARE INTENDED TO FORM SHAPES – BUT WHAT SHAPES?

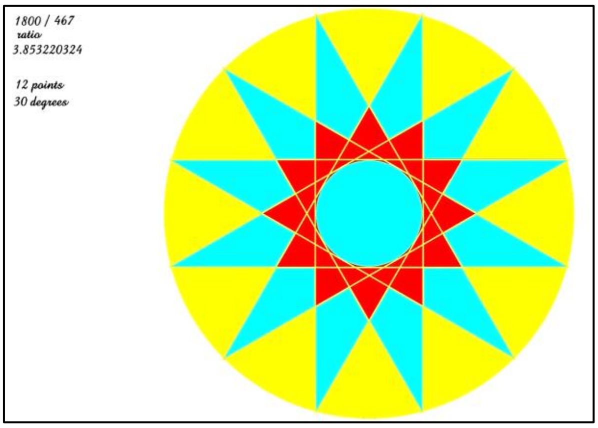
IDENTIFYING CONSTRUCTION AND MATHEMATICAL HARMONICS

Once we have understood the differences between ***Construction Harmonics*** and ***Mathematical Harmonics*** we can seek out new ways to identify unknown ratios or unknown shapes.

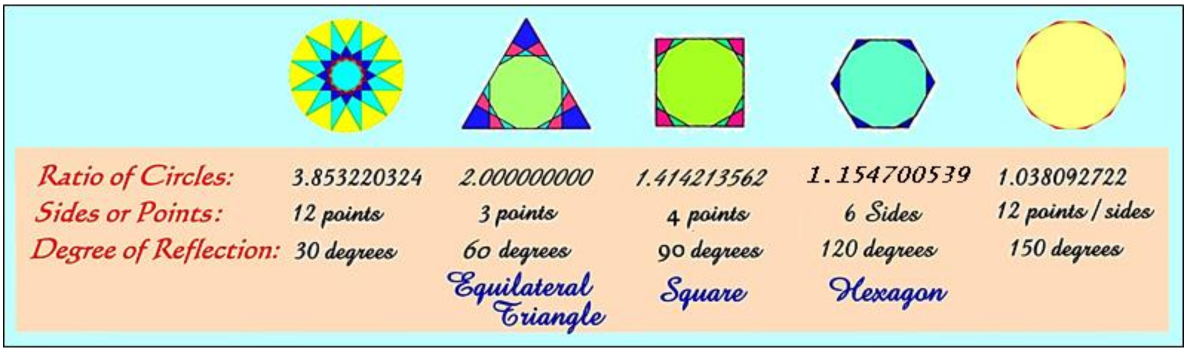
THE HARMONICS OF THE 12 POINT POLYGRAM



THIS ILLUSTRATION PORTRAYS THE COMPONENT CONSTRUCTION SHAPES CLEARLY:



ALL MULTIPLES OF 30^0:



ORIGINAL RATIOS USED		CORRECTED RATIOS		SHAPE THEORY
√5 + 1	3.236067977499790	3.236067977499790	pentagram	√5 + 1
Φ²	2.618033988749890	2.613125929752760	octogram	2x[√(1+[√2/2])]
(√5 + 1) /√ 2	2.288245611270740	2.288245610000000	45 pts 52 deg	√{2+(√5 + 1)}
√2²	2.000000000000000	2.000000000000000	equilateral triangle	√2²
(√5 + 1) / 2	1.618033988749890	1.609351075933140	inner septagram	not Φ
√2	1.414213562373100	1.414213562373100	square	√2
Φ² / 2	1.309016994374950	1.306562964876380	inner nonogram	√(1+[√2/2])
√5 - 1	1.236067977499790	1.236067977499790	pentagon	√5 - 1
[(√5 + 1) /√ 2] / 2	1.144122805635370	1.154700538379250	hexagon	2/√3
{√5 - 1} / { [(√5 + 1) /√ 2] / 2}	1.080363026950910	1.082392200342570	octogon	2x[√(1+[√2/2])] / (1+√2)

So, a Hexagon x a Hexagon **or** a Hexagon squared equals 1.33333333333333

A	AxA
1.154700538379250	1.333333333333330

But, 1.33333333333333 is the ratio for a 13 point polygram.
A 13 point polygram with 96.923 degrees
And ratio 1.33333333333333.

*JUST MORE EVIDENCE THAT **SHAPE** X **SHAPE** = **SHAPE**.*

Construction Harmonics for the 12 point polygram and its polygon:

RATIO	POINTS	DEGREES	Pts x Deg	Pts x Deg / 360
				INDEX NUMBER
3.853220324000000	12	30	360	1.00
2.000000000000000	3	60	180	0.50
1.414213562000000	4	90	360	1.00
1.154700579000000	6	120	720	2.00
1.038092722000000	12	150	1800	5.00

Construction Harmonics for *13 POINT OR SIDED SHAPES:*

DEGREES	SHAPE	RATIO	INDEX NUMBER DEGREES X 13 / 360
152.307692300000000	**13 SIDED POLLYGON**	**1.033333333333330**	**5.50**
124.615384600000000	**13 POINT POLLYGRAM 1**	**1.133333333333330**	**4.50**
96.923076920000000	**13 POINT POLLYGRAM 2**	**1.335402142000000**	**3.50**
69.230769230000000	**13 POINT POLLYGRAM 3**	**1.666666666666660**	**2.50**
41.538461540000000	**13 POINT POLLYGRAM 4**	**2.828427124746190**	**1.50**
13.846153850000000	**13 POINT POLLYGRAM 5**	**8.000000000000000**	**0.50**

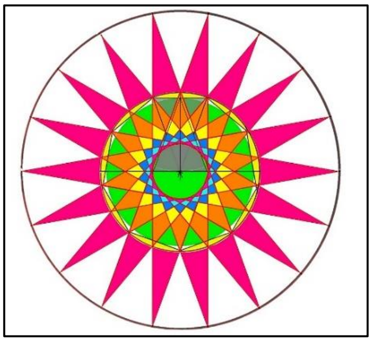
When all the Construction Harmonic shapes for 13 point or sided shapes are martialed, they produce an interesting array of their Index Numbers. Thus is the Harmony of the Universe.

‘A Shape multiplied by a Shape produces a third Shape’

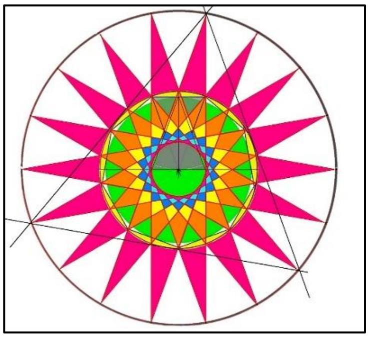
P197: *JENNY:* *“A wide variety of **commensurable frequencies** can, however be combined in turn and thus produce what is virtually a complete series of periodic figures.”*

*IN MY THEORY: **Graphically:** A Shape multiplied by a Shape produces a third Shape. - **Shape x Shape = Shape***
*__**Mathematically:**__ a Shape Ratio x a Shape Ratio = a Shape Ratio.*

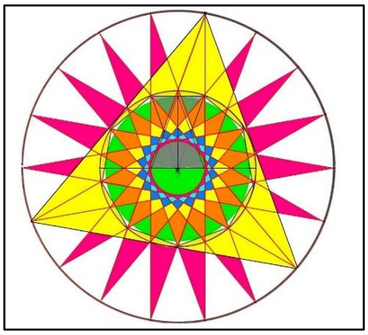
ANALYSING THIS 18 POINT POLYGRAM:



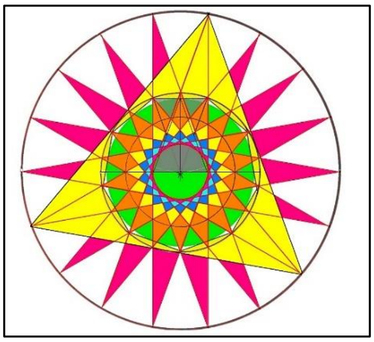
Start with an 18 (2x9) point polygram



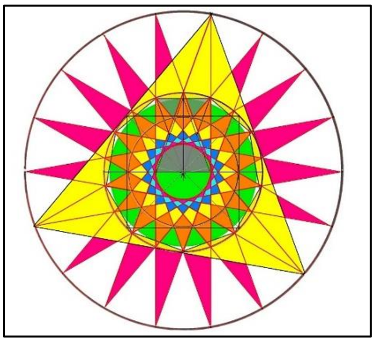
Join 3 points to make an Equi Triangle



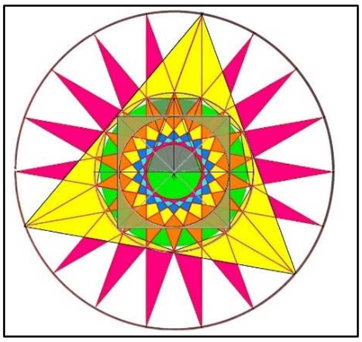
Note that the Inner Circle for Triangle is an intermediate circle for the Polygram



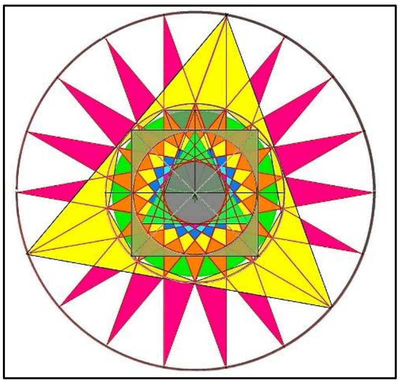
The next intermediate circle in . . .



Forms a Square



Now look to the square’s Inner Circle and the overall Inner Circle.



We have another Equi Triangle. IN FACT WE CAN HAVE 6 EQUILATERAL TRIANGLES IN PHASE.

In this illustration I have used four Concentric Circles belonging to the original 18 (2x9) point polygram to show how flexible and agile a plane regular shape can appear. In a Cymatics experiment which of all these shapes are going to appear and which should be the correct result for the input of the shape “frequency”?

If we knew the Input Frequency that Jenny used on each image along with some idea of the amplitude then we could attempt to identify the correct shape being produced.

THE OVERALL HARMONIC MATHEMATICS:

EQUILATERAL TRIANGLE x SQUARE x EQUILATERAL TRIANGLE

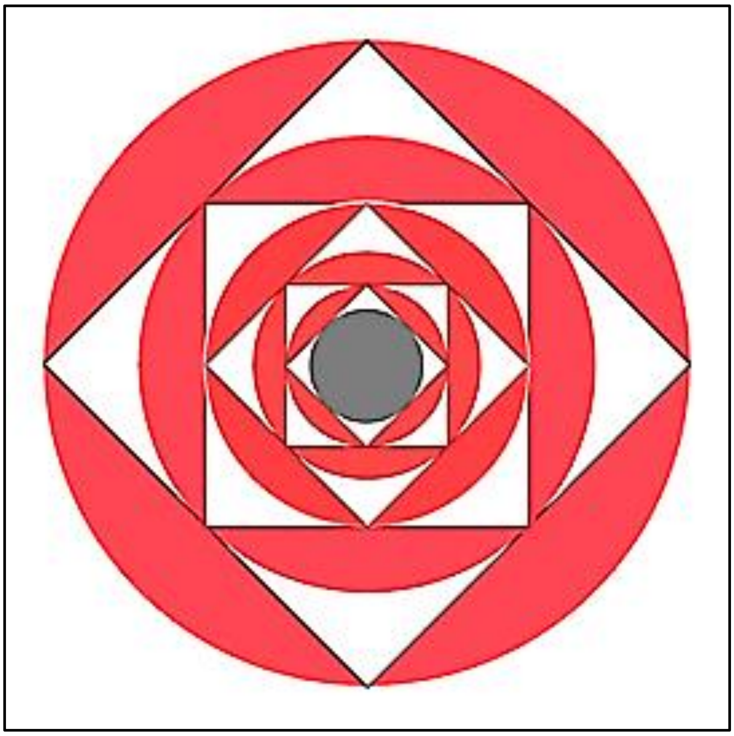
The Ratio for the Equilateral Triangle is 2.000000000
The Ratio for the Square is Square Root of 2; or 1.414213562
2.000000000 x 1.414213562 x 2.000000000 = 5.656854249
Thus are some of the Harmonics of Plane Regular Shape.

<u>*NONOGRAM RATIO* - 5.656854249</u>

Or 4 x √2 -–- *(2 x 2 x √2)*

Noting that 4 x √2 means 4 ***multiplied by*** √2 and <u>not</u> 4 ***times*** √2.

It is *√2 x √2 x √2 x √2 x √2 which is* **5 *times*** √2



A problem arises that:

Given that Plane Regular Shapes can have **Inner** Harmonic Shapes Along with the Primary **Outer** Shapes.

Given also that Plane Regular Shapes can have both Constructional and Mathematical Harmonics (also Shapes)

<u>Then</u>:
How can it be determined whether the images produced by an <u>audible frequency mechanism</u> such as with Cymatics tests are Outer Primary images or their Harmonic Inner images or actually Shapes-in-Phase?

- Will the Concentric Circles give us the answer?
- Will the *Hidden* ***<u>Mathematical Harmonics</u>*** reveal themselves in experiments such as Cymatics experiments?
- Will the **<u>Construction Harmonics</u>**, those inner shapes formed by the original tangents and the original pair of circles, be the only shapes revealed by a Cymatics experiment?

And if two "relevant" frequencies are played simultaneously:

- How can we ascertain how their respective Concentric Circles will mesh to form a new shape? Will they mesh one inside the other, or nest, and produce a result ***graphically***; or will they mathematically mesh to form a new ratio ***mathematically***? Hans Jenny addressed this problem.

In the Nonogram example above the 'non-visible' Harmonic Images exist inside of each other . . .

- The outer circle of the inner shape is the inner circle of the next outer shape whose outer circle is the inner circle of the next outer shape etc. This method gives us an overall outer circle and inner circle within which all the images exist nested in harmony. This type of meshing I call ***<u>Mathematical Harmonics</u>***; see the maths above.

CONSTRUCTION HARMONICS

THIS IMAGE IS EFFECTIVELY: TWO OUTER NONOGRAMS IN PHASE

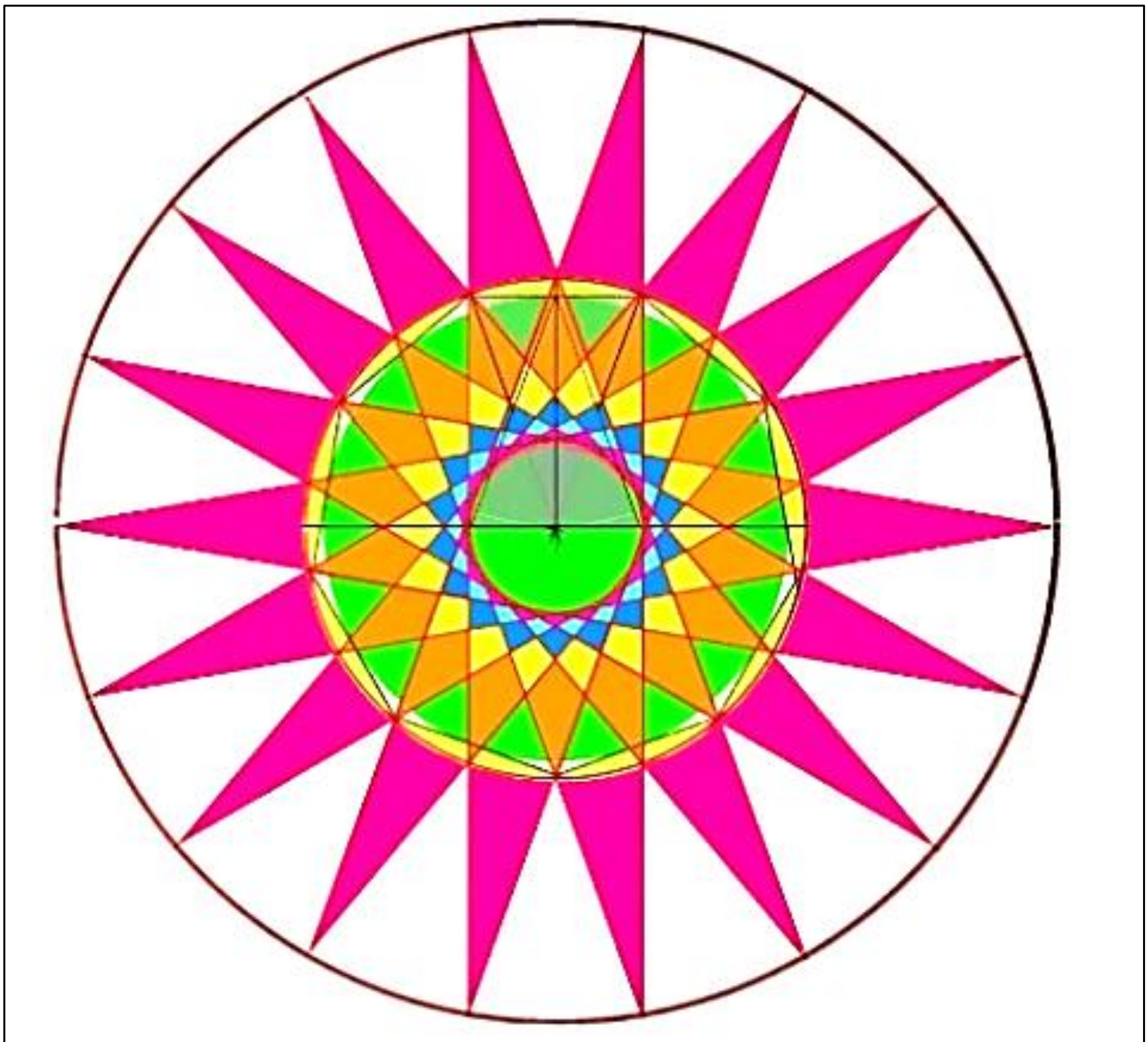


IMAGE DERIVED USING PTOLEMY'S CHORDS FOR A NONOGON

Within the image of the two **Nonograms-in-phase** there are other **Construction** harmonics at play:

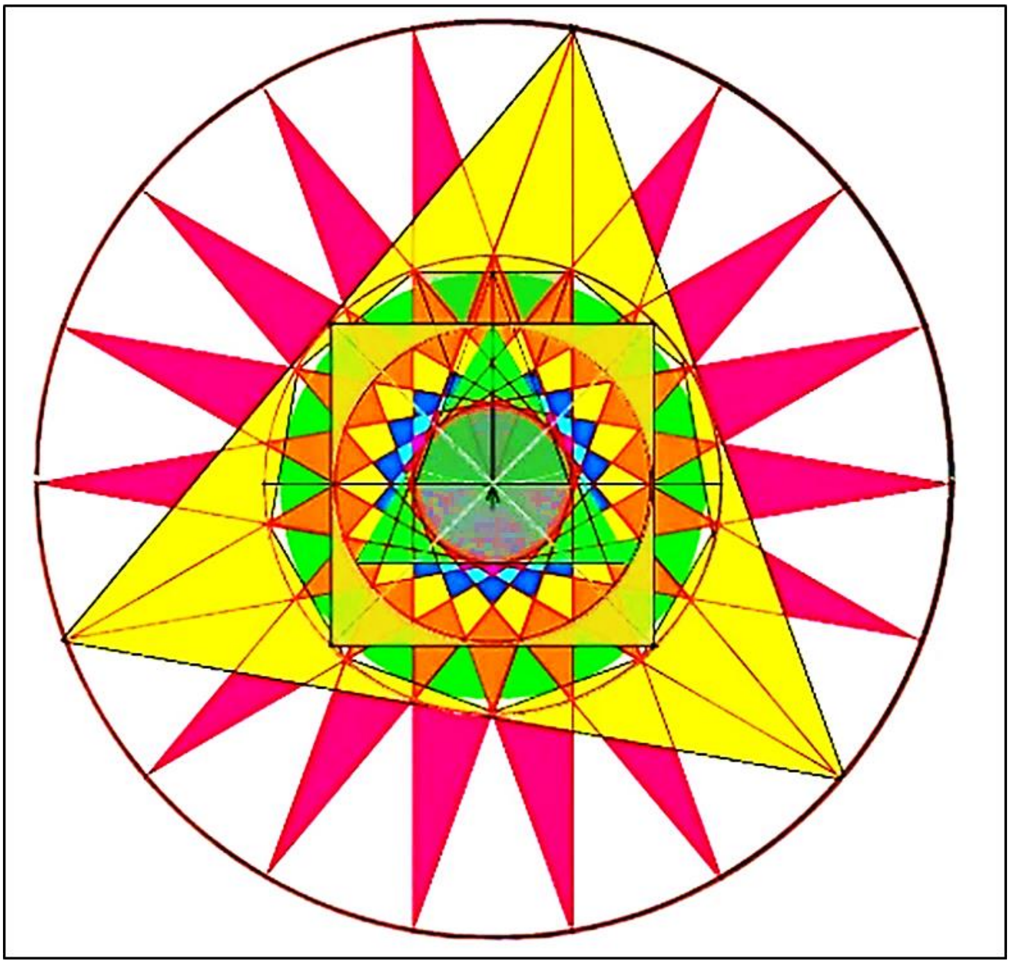
- Pink 9 x 2. 2 Nonograms **in phase**.
- Brown 18 x 1. 18 point polygram.
- Yellow 3 x 6. 6 Equilateral Triangles **in phase**.
- Dark Blue 18 x 1. 1 Inner 18 point polygram.
- Light Blue 9 x 2. 2 Inner Nonograms **in phase**.
- Purple 6 x 3. 3 Hexagons **in phase**.
- Inner shape 18 sided polygon x 1.

These are the **CONSTRUCTION HARMONICS**; they are formed by the tangents to the Inner Circle and form other shapes where they intersect the Intermediate *Harmonic* Circles; **they all share the same Inner Circle**.

THUS WE HAVE MANY OF THOSE CIRCLES THAT WE SEE IN CYMATICS EXPERIMENT IMAGES!

MATHEMATICAL HARMONICS

EFFECTIVELY: AN **EQUILATERAL TRIANGLE x SQUARE x EQUILATERAL TRIANGLE**



In this image the Intermediate Circles are highlighted to show the further 'unseen' Harmonics that exist between a Primary Shape's ***Construction Harmonics***. These Intermediate Circles are stacked such that each is both the Inner Circle of an outer shape and an Outer Circle of an inner shape. But, between all these Circles, the Outer, the Inner and all the Intermediate Circles, we can find yet other shapes that may also contribute to the final outer construction or Primary Shape.

These are the true ***Mathematical Harmonic Shapes***. They are unseen but their Ratios when multiplied together also give us the Ratio for the overall shape.

THE OVERALL HARMONIC MATHEMATICS:

EQUILATERAL TRIANGLE x SQUARE x EQUILATERAL TRIANGLE

The Ratio for the Equilateral Triangle is 2.000000000

The Ratio for the Square is Square Root of 2; or 1.414213562

2.000000000 x 1.414213562 x 2.000000000 = 5.656854249

NONOGRAM RATIO - 5.656854249 or 4 x √2 – *(2 x 2 x √2)*

Or (√2 x √2 x √2 x √2 x √2).

*MULTIPLICATION OF THE RATIOS OF THE **CONSTRUCTION HARMONIC** SHAPES FALL SHORT OF THE FINAL CONSTRUCTION SHAPE RATIO BY AN AREA FOR WHICH ONLY **MATHEMATICAL HARMONICS** WILL PROVIDE THE FINAL RATIO.*

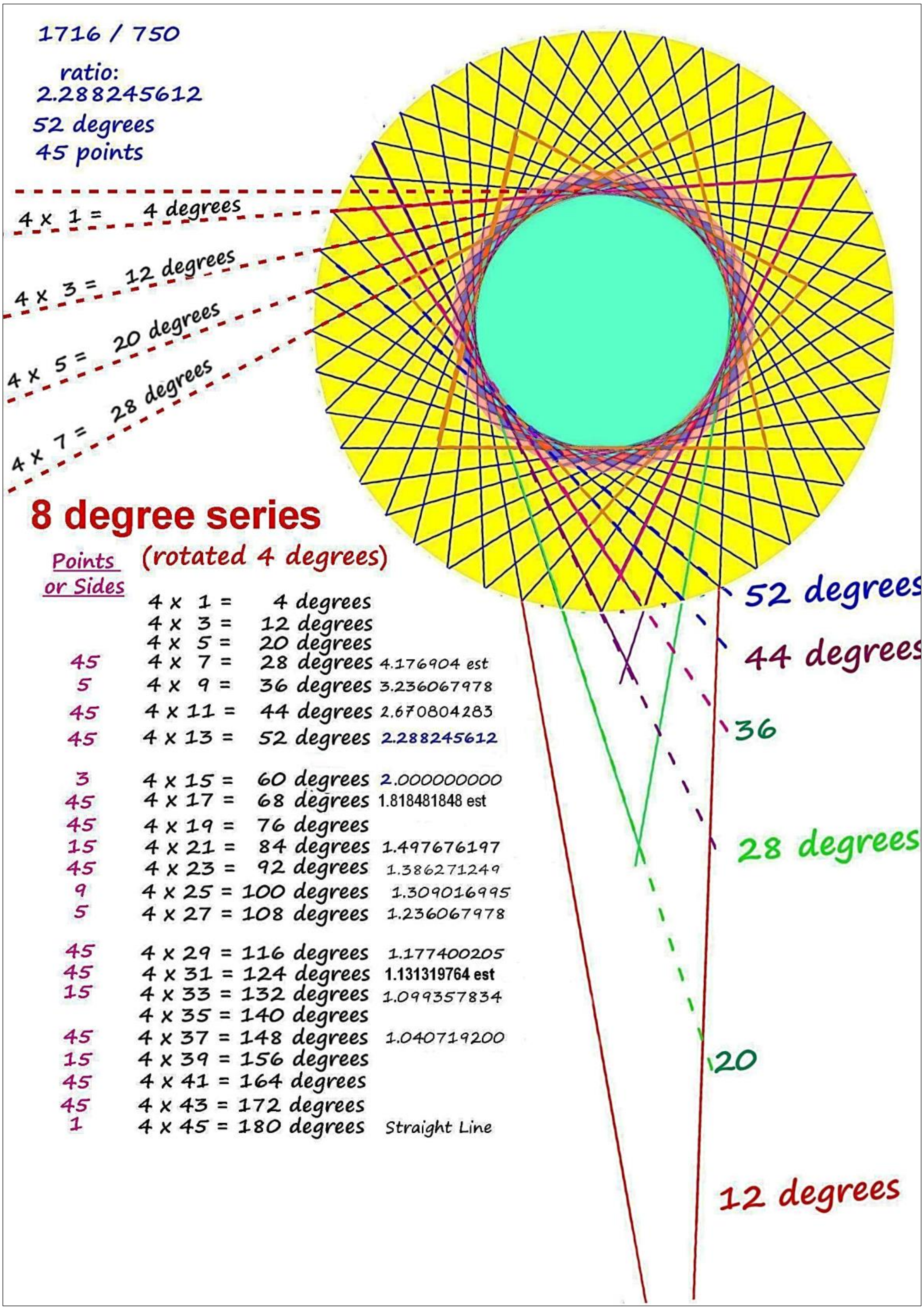
***CONSTRUCTION HARMONICS** ARE ALL BASED ON THE OVERALL INSCRIBING CIRCLE BEING THE DIVISOR FOR EACH RATIO.*

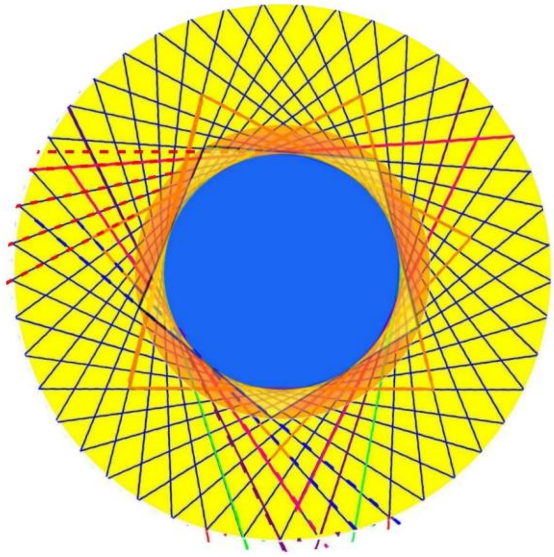
*THE RATIOS FOR THE HIDDEN **MATHEMATICAL HARMONICS** OF THE HIDDEN SHAPES, WHEN MULTIPLIED TOGETHER, WILL EQUAL THE RATIO OF THE OUTER SHAPE.*

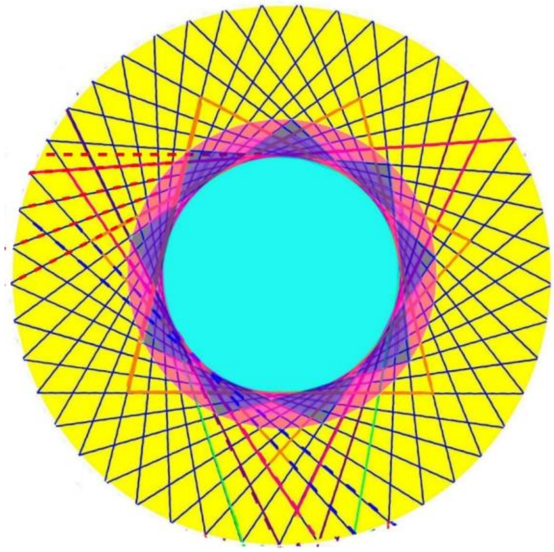
***MATHEMATICAL HARMONICS** USE THE CIRCLES THAT LINK THE APEXES OF THE INNER **CONSTRUCTION HARMONICS** AND MAY OR MAY NOT USE THE ULTIMATE INSCRIBING CIRCLE AS THE DIVISOR FOR THE RATIO. AS **SHAPE X SHAPE = SHAPE** ANY PAIR OF THESE **MATHEMATICAL HARMONICS'S** CIRCLES WILL ALSO PRODUCE A SHAPE.*

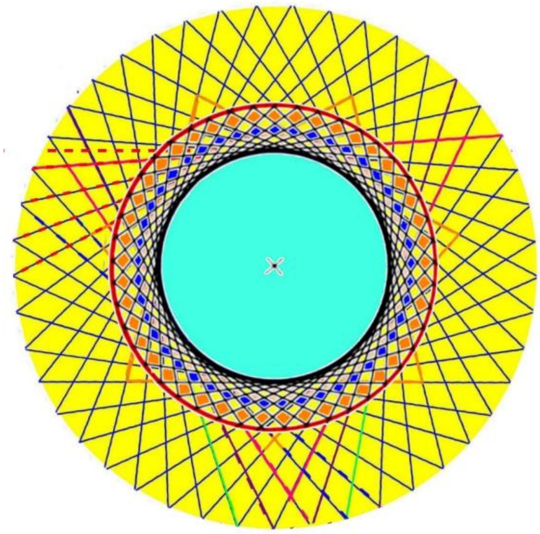
*I HAVE CHOSEN TO UTILISE TWO ADJACENT **MATHEMATICAL HARMONICS** TO PRODUCE A THIRD SHAPE TO ILLUSTRATE HOW SHAPE X SHAPE = SHAPE BUT **ANY PAIR** OF THESE CONCENTRIC CIRCLES, ADJACENT OR OTHERWISE, WILL PRODUCE A SHAPE.*

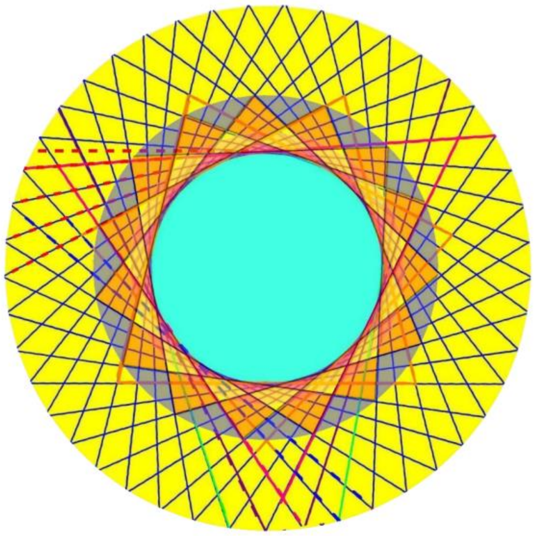
CONSTRUCTION HARMONICS

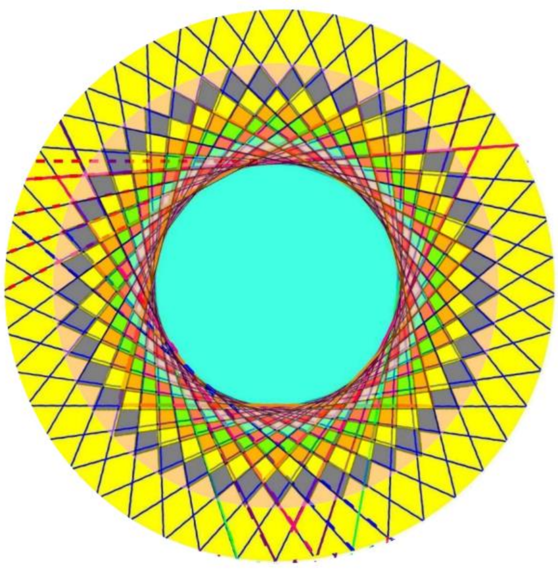


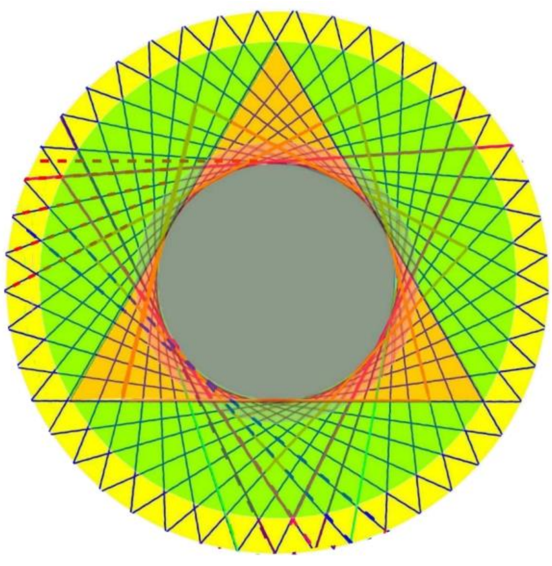


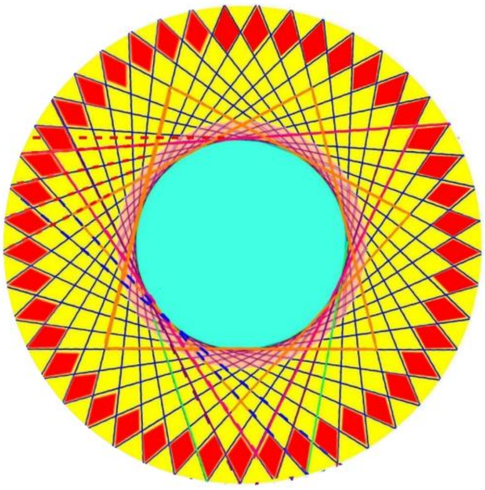


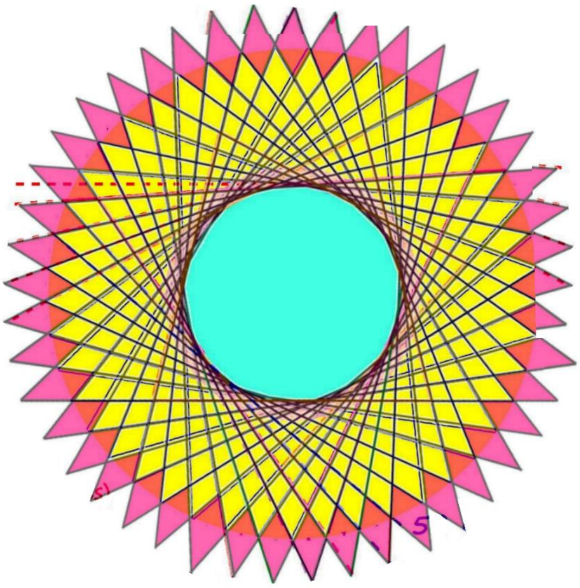


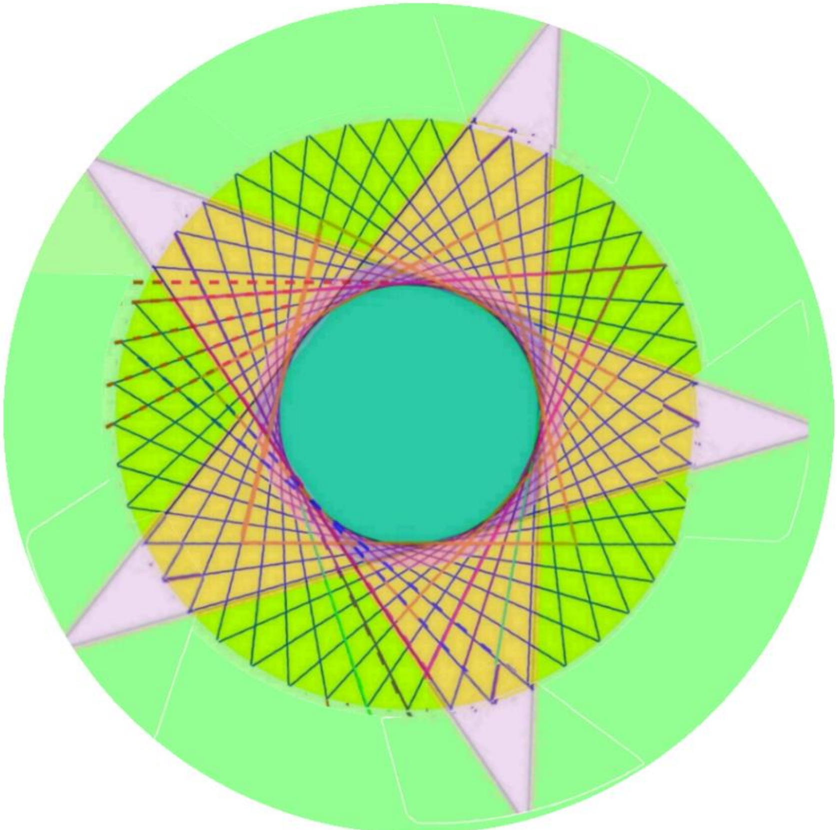




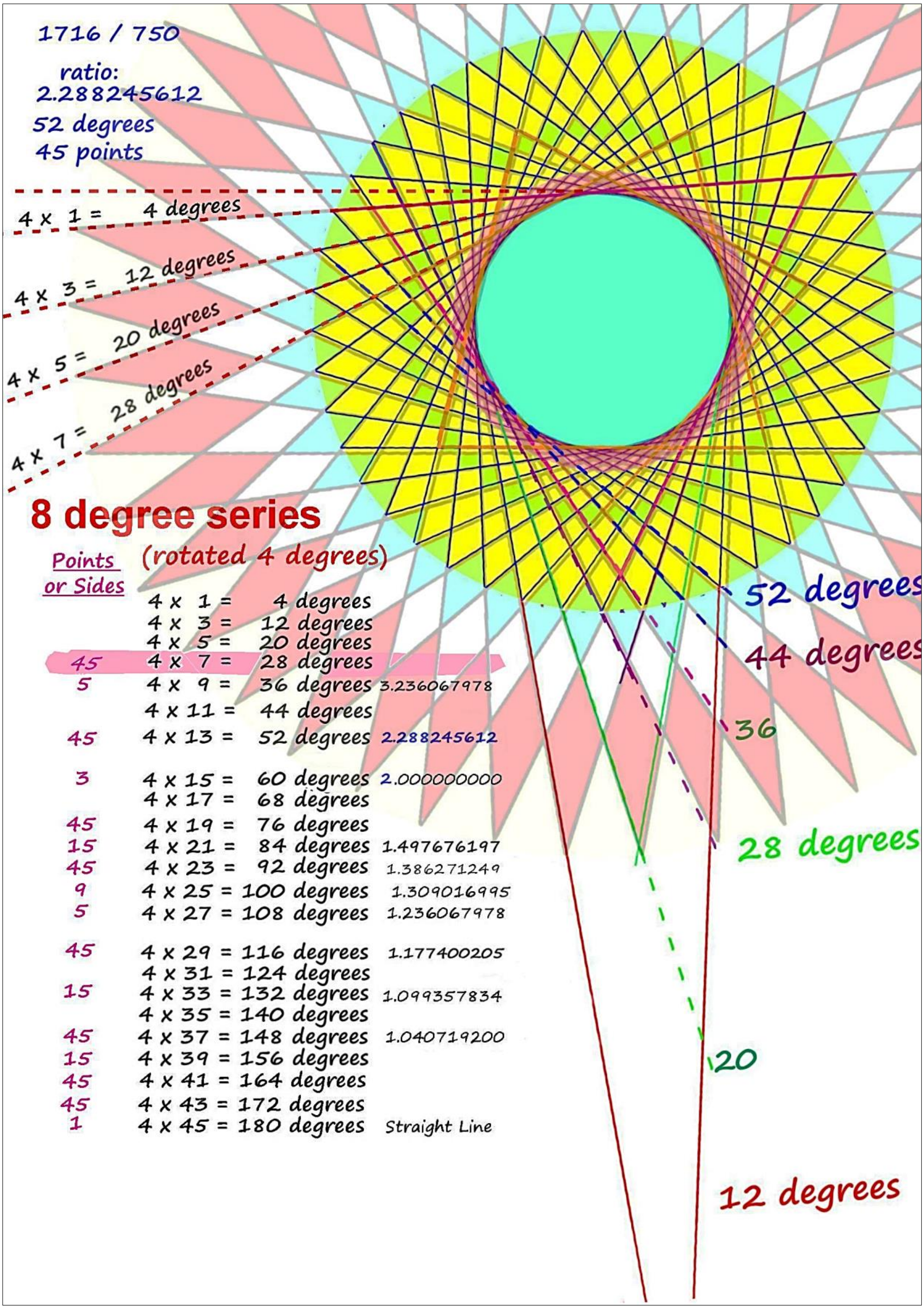




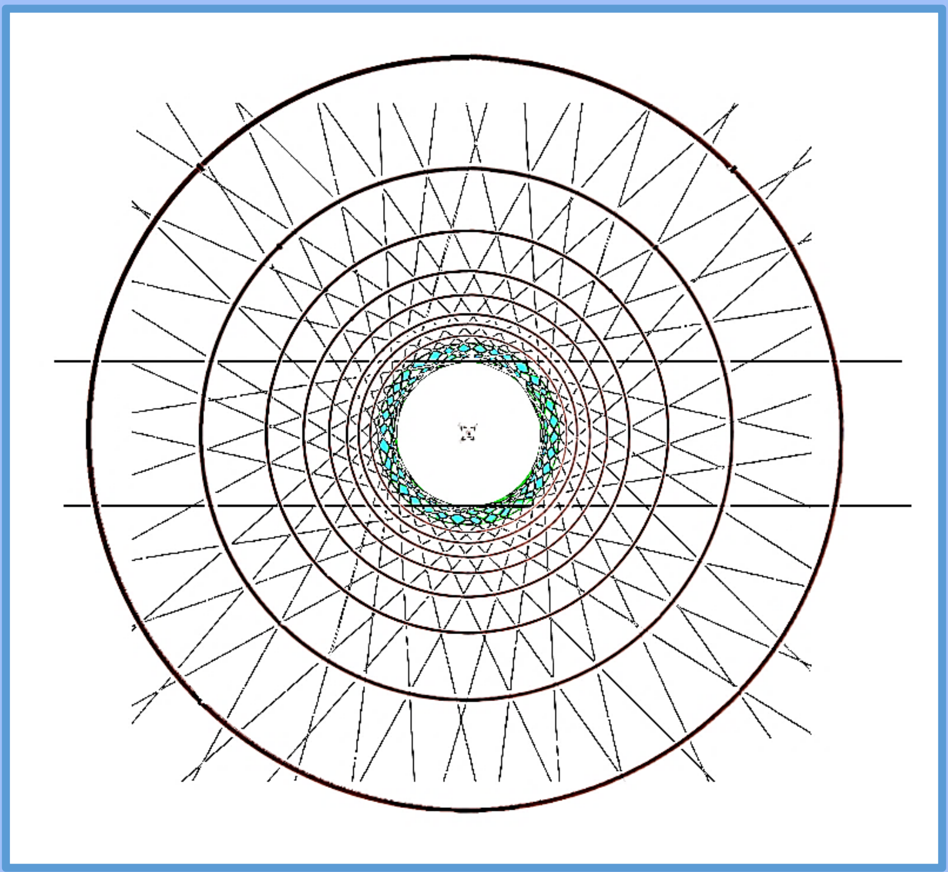




CONSTRUCTION HARMONICS



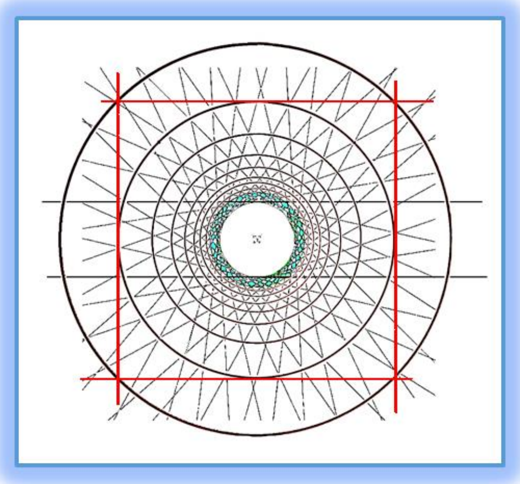
CONSTRUCTION HARMONICS & MATHEMATICAL HARMONICS



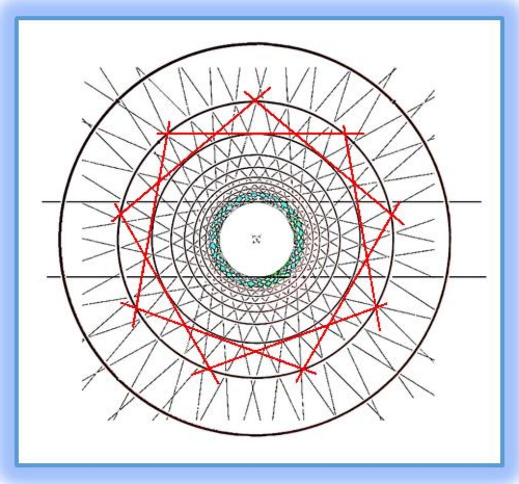
This image oozes harmonics and theorems:

- The circles indicate the boundaries for the 'dough in the doughnut' for the various ***MATHEMATICAL HARMONICS*** that are generally unseen in these shapes but may influence Cymatic results, and that reside between the apexes formed by the ***CONSTRUCTION HARMONICS***.
- The apexes that are also the outer boundaries of each of the many visible intermediate shapes that exist between the outer boundaries of the Circumscribing and Inscribing Circles;
- The theorem *SHAPE x SHAPE = SHAPE;* that enables dough contained in adjacent pairs of circles to be united to form yet another, larger dough in the doughnut giving yet another *MATHEMATICAL HARMONICS shape;*
- The knowledge that the ratios for all the *MATHEMATICAL HARMONICS* contained between the pairs of circles, when multiplied together, will total the ratio for the overall shape;
- The constant presence of the principles of *THE STONEHENGE THEOREM:*
  - *"When in sets of three or more concentric circles each adjacent pair produces a shape, then any pair of these circles, adjacent or otherwise, will produce a shape;*
  - *This is in the true spirit of the underlying theorem Shape x Shape = Shape."*

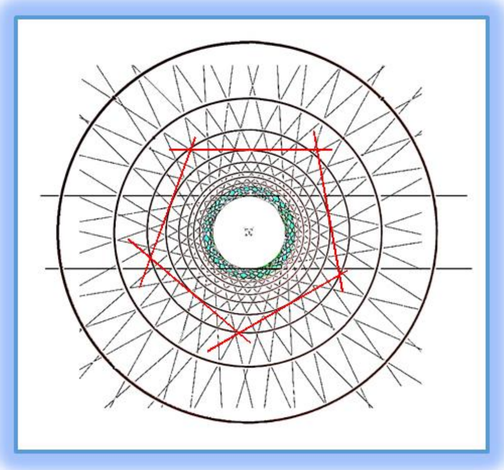
<u>SOME 'UNSEEN'</u> ***<u>MATHEMATICAL HARMONIC</u>*** *<u>SHAPES</u>*



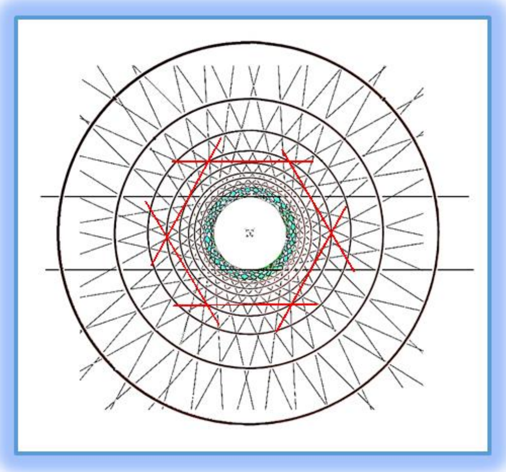
SQUARE 90^0



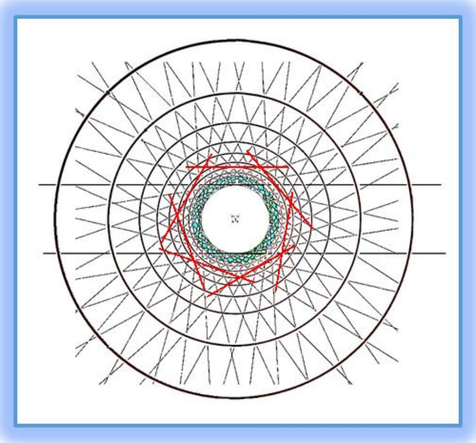
NONOGRAM 100^0



PENTAGON 110^0

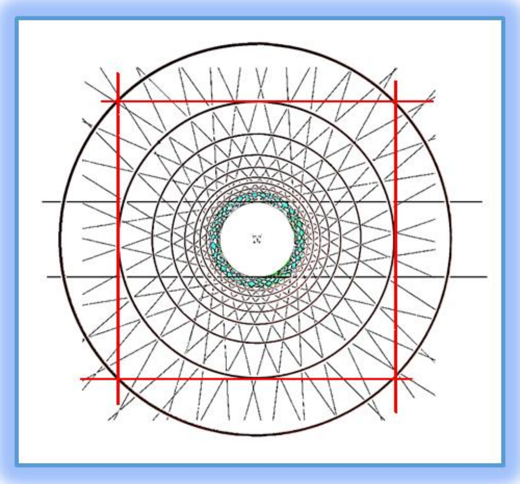


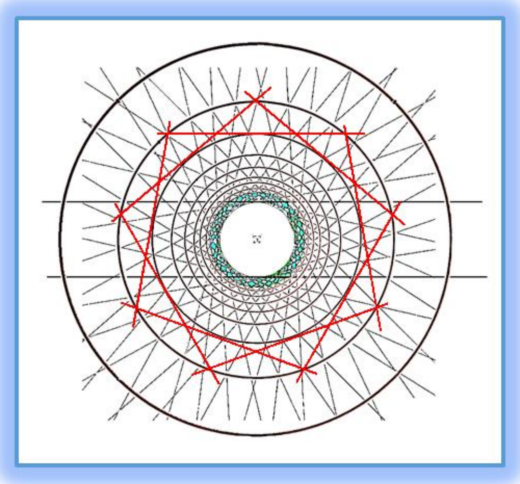
HEXAGON 120^0



SEPTAGON 130^0

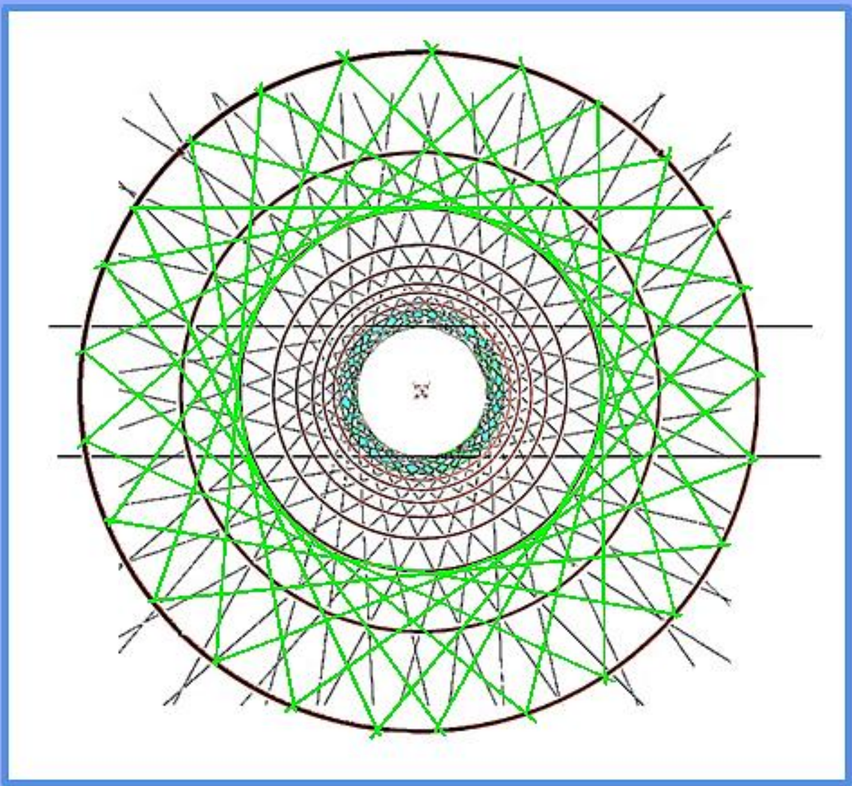
GRAPHICAL MATHEMATICS *WITH MATHEMATICAL HARMONICS*





SQUARE 90^0 X NONOGRAM 100^0

= 25 POINTS 65^0



25 POINTS 65^0 *Ratio* 1.851229586

100	inner nonogram	1.309016994000000	X	90	Square	1.414213562373100

65	25 pt polygram	1.851229586000000

My shape equations indicate that *"Degrees multiplied by number of points then divided by 360 should give a whole number or a number plus one-half. This gives 4.5 and indicates that the degrees above are 64.8^0.*

SOME HARMONICS IN AND AROUND

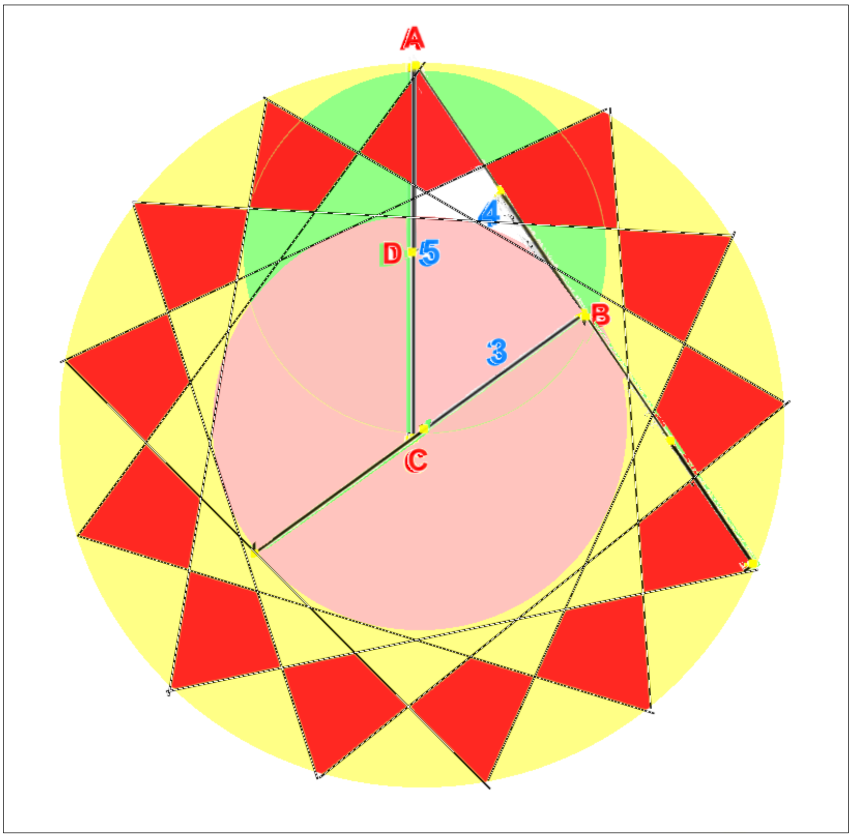
13 POINT OR SIDED

PLANE REGULAR SHAPES

SOME HARMONIES WITH 13 POINT POLYGONS AND POLYGRAMS

SHAPE DERIVED FROM '3 to 4 to 5' RIGHT ANGLED TRIANGLE

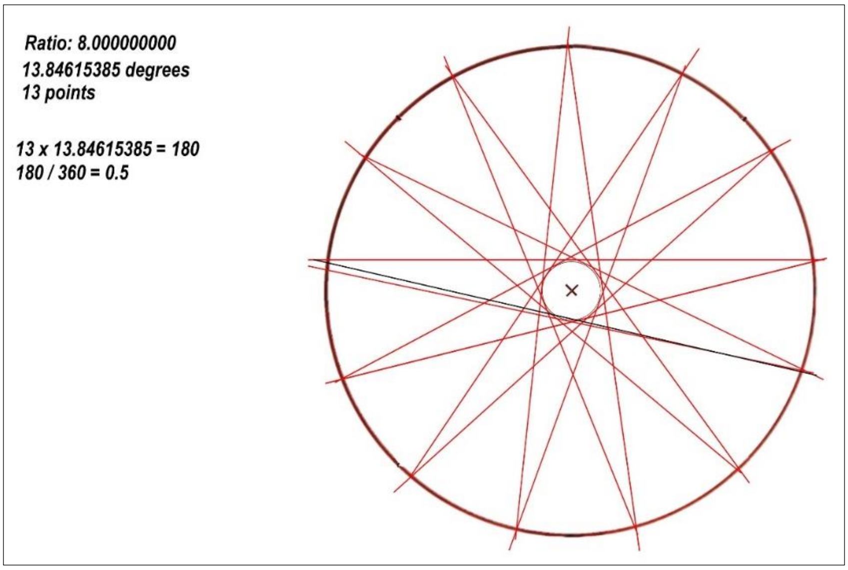
Ratio: 1.666666666 69.23076923 degrees 13 points

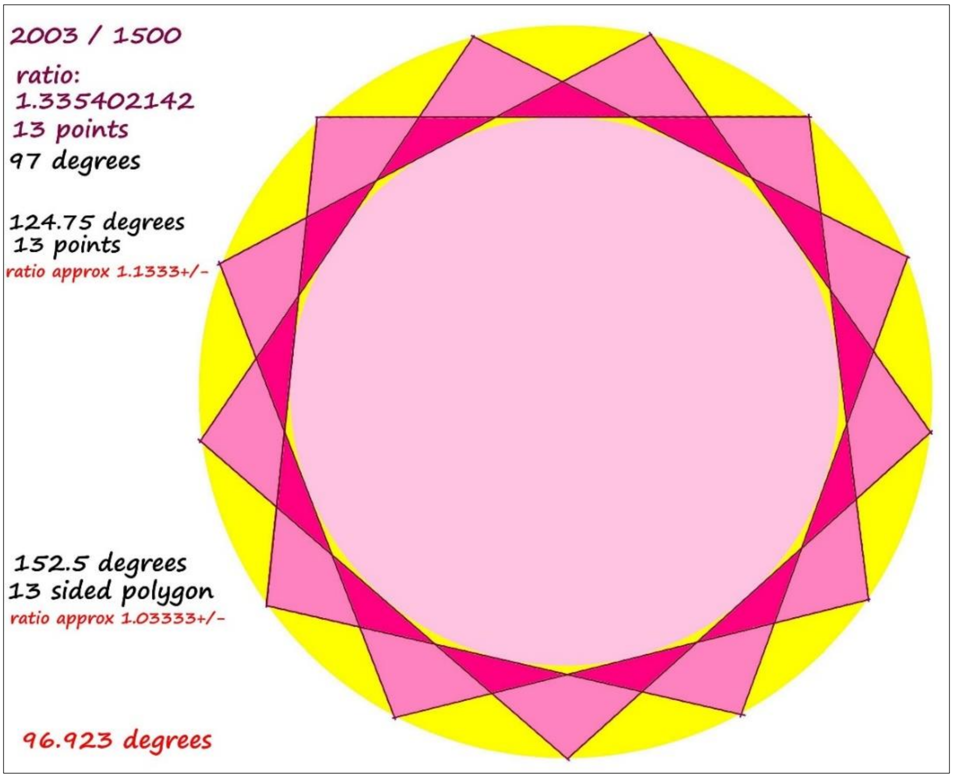


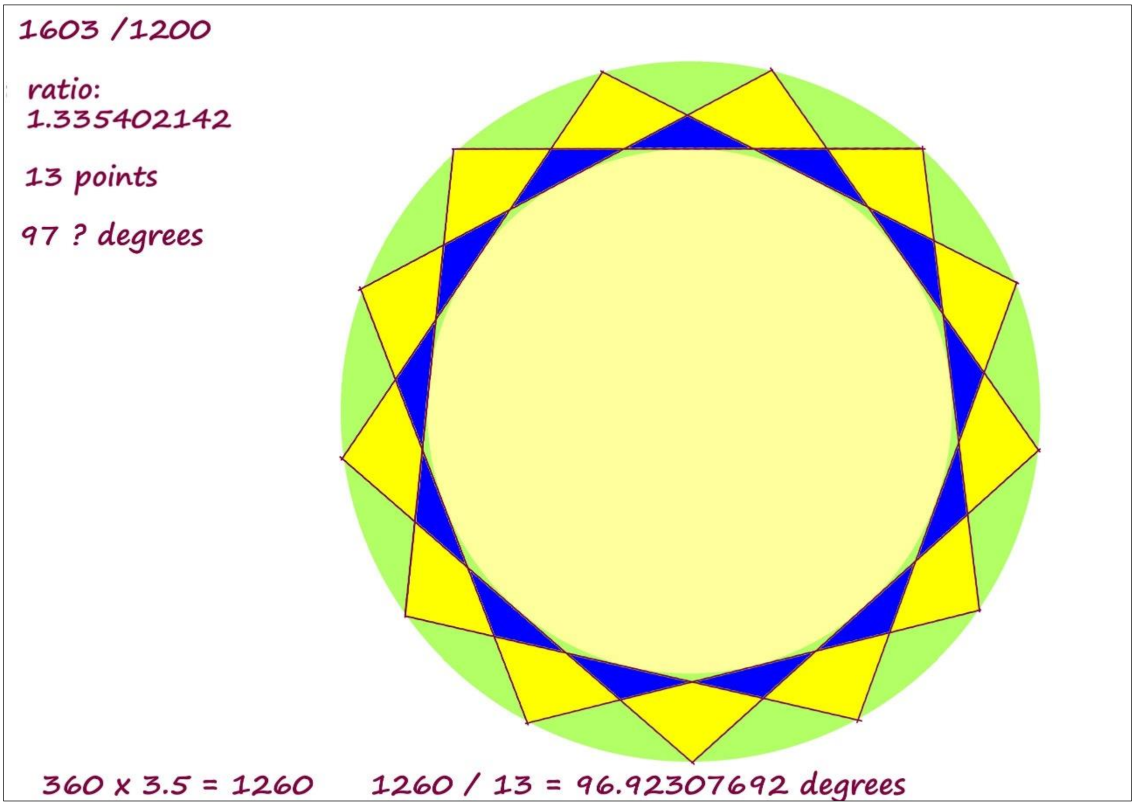
The Circumscribing Circle uses the Hypotenuse 5 as its radius.

The Inscribing Circle uses the side length 3 as its radius.

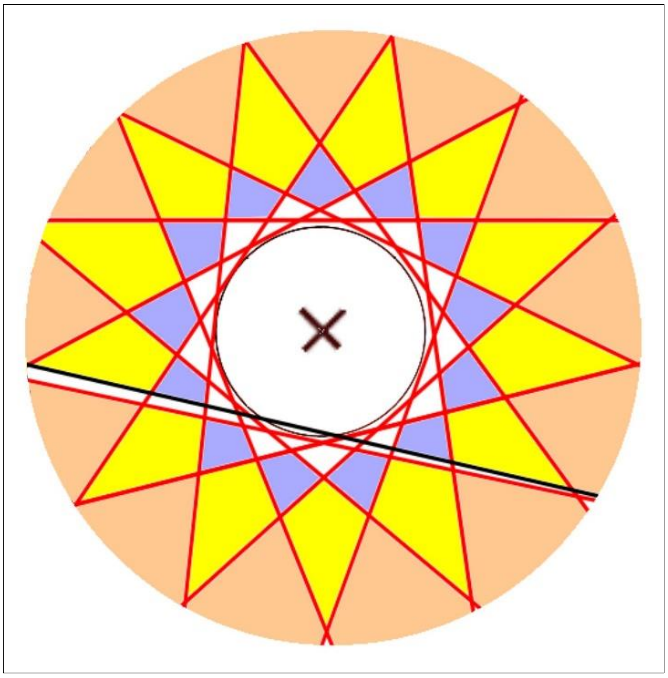
The remaining length of 4 is half the length of the side of the resulting shape.



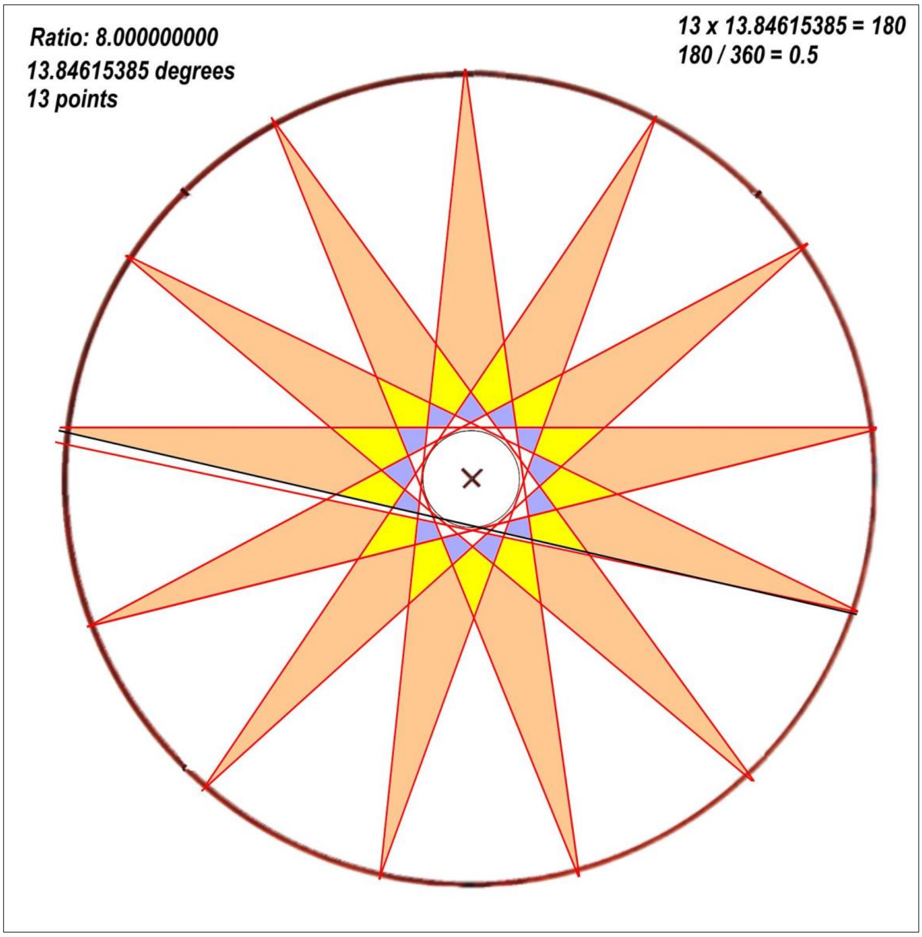

2003 / 1500
ratio:
1.335402142
13 points
97 degrees
124.75 degrees
13 points
ratio approx 1.1333+/-
152.5 degrees
13 sided polygon
ratio approx 1.03333+/-
96.923 degrees

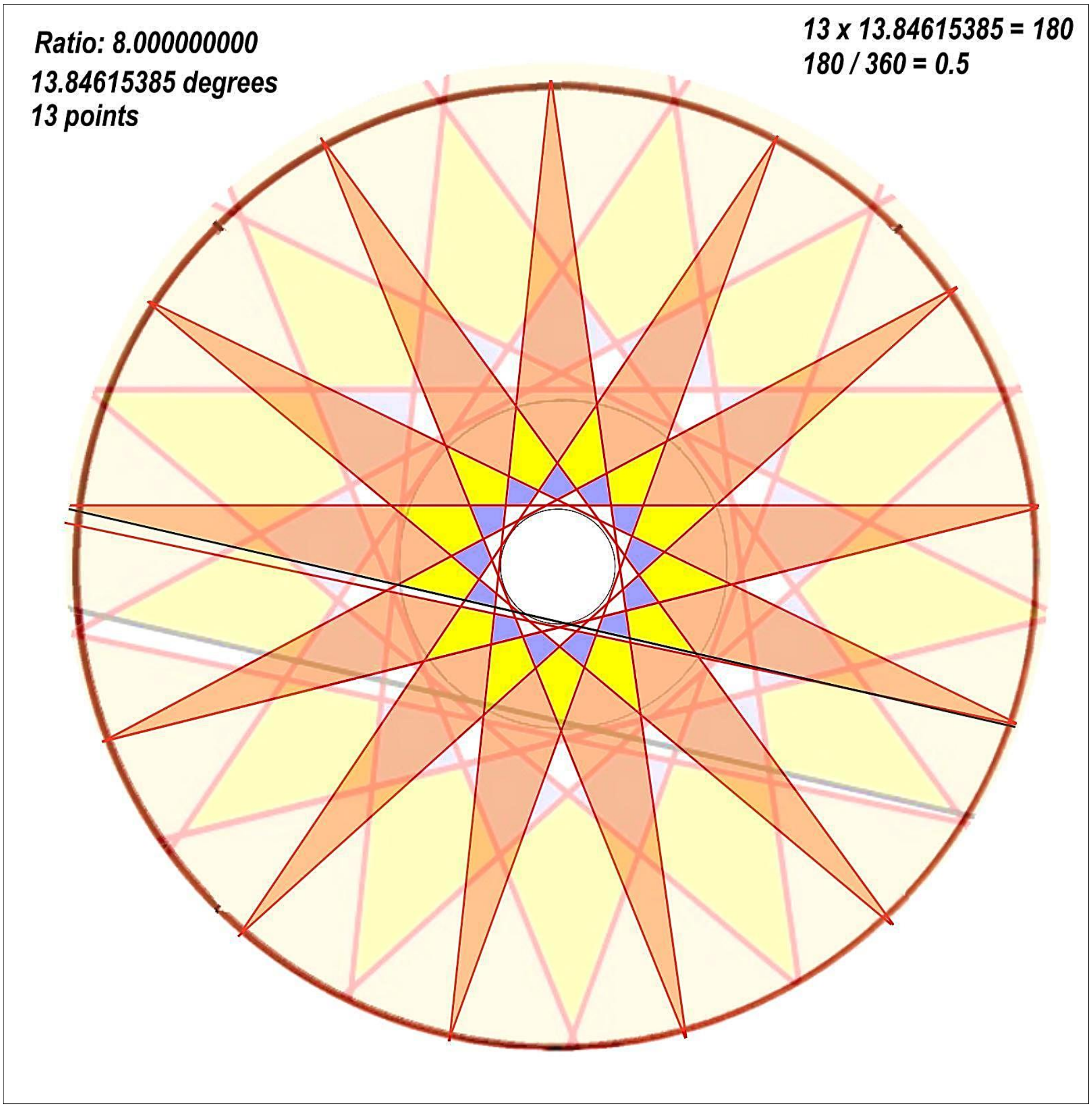

1603 /1200
ratio:
1.335402142
13 points
97 ? degrees
360 x 3.5 = 1260
1260 / 13 = 96.92307692 degrees

Ratio: 2.828427124 41.53846154 degrees 13 points



Ratio: 8.000000000 (or 2.828427154 x 2.828427154) 13.84615385 degrees 13 points

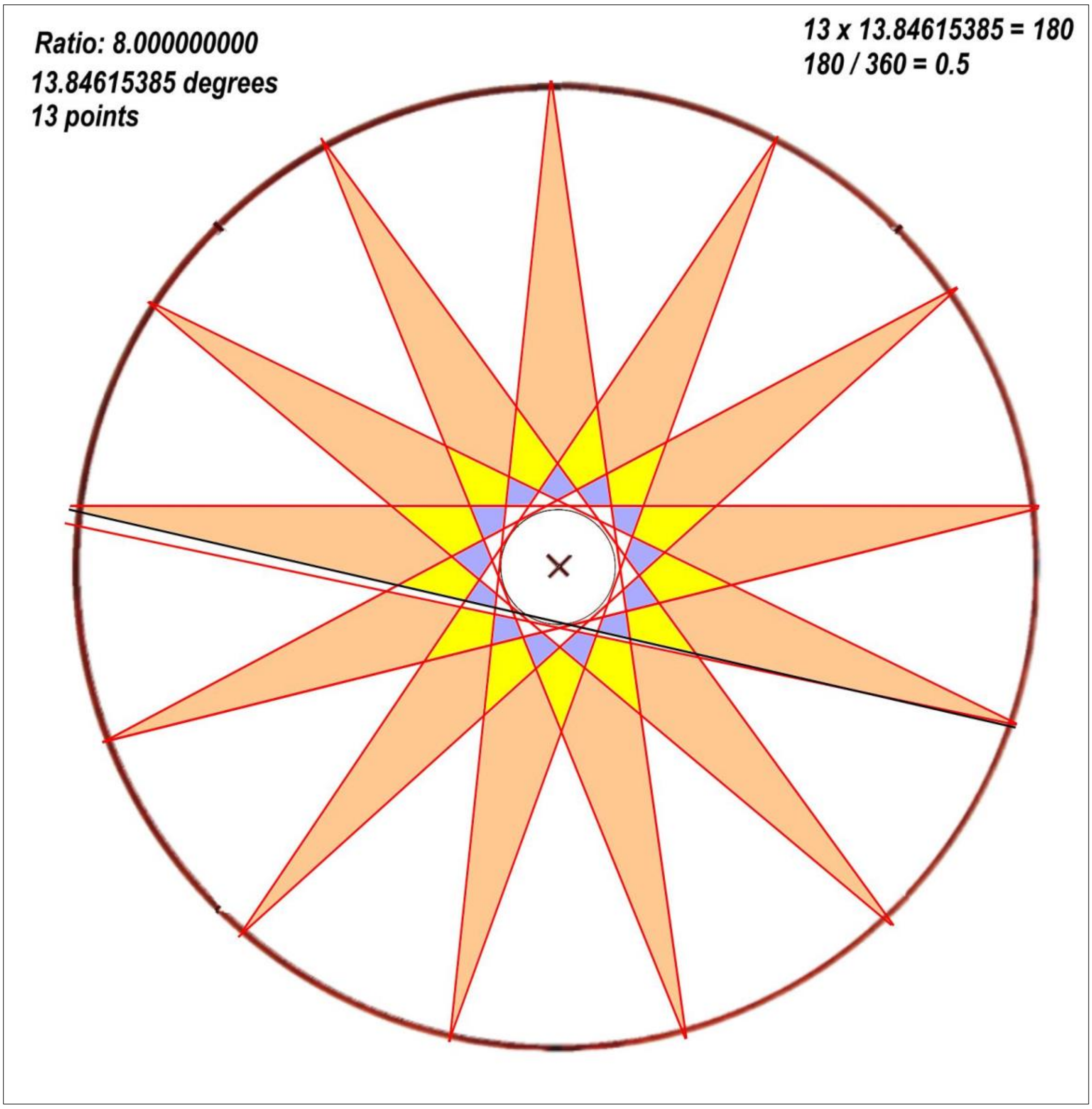




CONSTRUCTION HARMONICS			
13.846	13pts 13.84615385deg	8.000000000000000	calc
41	13pts 41.53846154deg	2.828427124746190	calc

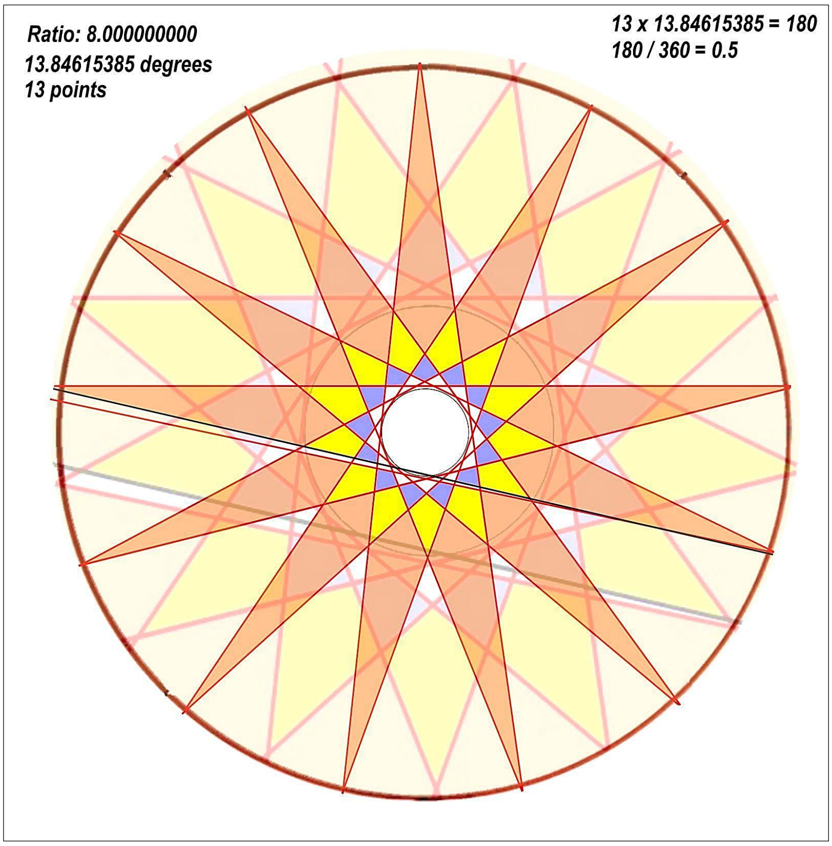
MATHEMATICAL HARMONICS		
41	13pts 41.53846154deg	2.828427124746190

Graphically and ***Mathematically***, in the above image, the 13 point shape with ratio 2.828427124 is both a ***<u>Construction</u>*** and a ***<u>Mathematical</u>*** Harmonic. This is because the ratio 2.828427124 squared equals the ratio 8.000000000 and they are both ratios for 13 point polygrams.



	Construction Harmonics			Mathematical Harmonies
	DEGREES	SHAPE	RATIO	DIFFERENTIAL
A	152	152.5deg 13 sided Gon	1.033333000000000	1.033333000000000
B	125	13pts 124.75 deg	1.133333333333330	1.096774547346620
C	97	13pts 96.923deg	1.333333333333330	1.176470588235290
D	69	13pts 69.23076923deg	1.666666666666660	1.250000000000000
E	41	13pts 41.53846154deg	2.828427124746190	1.697056274847720
F	13.846	13pts 13.84615385deg	8.000000000000000	2.828427124746190
				8.000000000000000

The Mathematical Harmonies, are the differentials between the adjacent Construction Harmonics and, when multiplied together, equal the ratio for the outer shape which is 8.000000000.



CONSTRUCTION HARMONICS			
13.846	13pts 13.84615385deg	8.000000000000000	calc
41	13pts 41.53846154deg	2.828427124746190	calc

MATHEMATICAL HARMONICS		
41	13pts 41.53846154deg	2.828427124746190

Graphically and Mathematically the 13 point shape with ratio 2.828427124 is both a Construction and a Mathematical Harmonic. This is because the ratio 2.828427124 squared equals the ratio 8.000000000 and they are both ratios for 13 point polygrams.

MATRIX OF 13 SIDED OR POINTED PLANE REGULAR SHAPES

		A	B	C	D	E	F
		1.033333000000000	**1.133333333333330**	**1.333333333333330**	**1.666666666666660**	**2.828427124746190**	**8.000000000000000**
A	**1.033333000000000**	1.000000000000000	1.096774547346620	1.290322996878380	1.612903746097980	2.737188423040970	7.741937981270320
B	**1.133333333333330**	0.911764411764709	1.000000000000000	1.176470588235290	1.470588235294120	2.495670992423120	7.058823529411790
C	**1.333333333333330**	0.774999750000002	0.850000000000000	1.000000000000000	1.250000000000000	2.121320343559650	**6.000000000000020**
D	**1.666666666666660**	0.619999800000002	0.680000000000001	0.800000000000001	1.000000000000000	1.697056274847720	**4.800000000000020**
E	**2.828427124746190**	0.365338385761919	0.400693842672376	0.471404520791030	0.589255650988787	1.000000000000000	2.828427124746190
F	**8.000000000000000**	0.129166625000000	0.141666666666666	0.166666666666666	0.208333333333333	0.353553390593274	1.000000000000000

RECIPROCALS OF MATRIX OF 13 SIDED OR POINTED PLANE REGULAR SHAPES

		A	B	C	D	E	F
		0.967742247658789	**0.882352941176473**	**0.750000000000002**	**0.600000000000002**	**0.353553390593274**	**0.125000000000000**
A	**0.967742247658789**	1.000000000000000	0.911764411764709	0.774999750000002	0.619999800000003	0.365338385761919	0.129166625000000
B	**0.882352941176473**	1.096774547346620	1.000000000000000	0.850000000000000	0.680000000000001	0.400693842672376	0.141666666666666
C	**0.750000000000002**	1.290322996878380	1.176470588235290	1.000000000000000	0.800000000000001	0.471404520791031	0.166666666666666
D	**0.600000000000002**	1.612903746097980	1.470588235294120	1.250000000000000	1.000000000000000	0.589255650988787	0.208333333333332
E	**0.353553390593274**	2.737188423040970	2.495670992423120	2.121320343559650	1.697056274847720	1.000000000000000	0.353553390593274
F	**0.125000000000000**	7.741937981270320	7.058823529411790	6.000000000000020	4.800000000000020	2.828427124746190	1.000000000000000

	Construction Harmonics		
	DEGREES	SHAPE	RATIO
A	152	152.5deg 13 sided Gon	1.033333000000000
B	125	13pts 124.75 deg	1.133333333333330
C	97	13pts 96.923deg	1.333333333333330
D	69	13pts 69.23076923deg	1.666666666666660
E	41	13pts 41.53846154deg	2.828427124746190
F	13.846	13pts 13.84615385deg	8.000000000000000

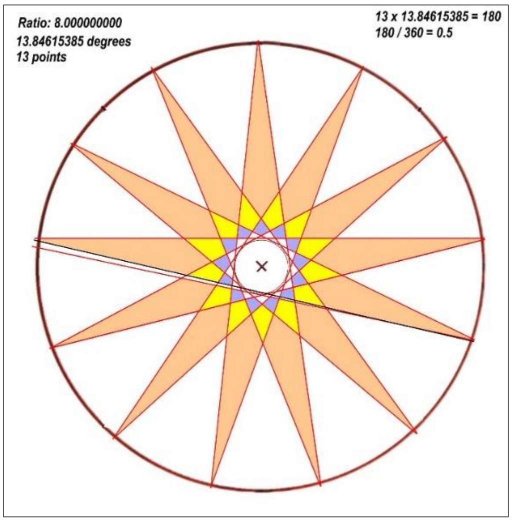
Mathematical Harmonies
DIFFERENTIAL
1.033333000000000
1.096774547346620
1.176470588235290
1.250000000000000
1.697056274847720
2.828427124746190
8.000000000000000

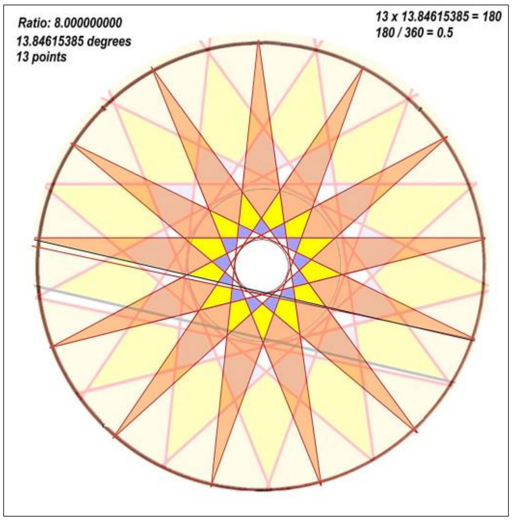
Construction Harmonics				Mathematical Harmonies	Error / Variance
jumping two	RATIO	DEGREES	SHAPE	RATIO	
A + B	1.133333333333330	125	13pts 124.75 deg	1.133333333333330	1.000000000000000
B + C	1.290322580645160	100	inner nonogram	1.309016994000000	1.014488170350000
C + D	1.470588235294120	84	84 degrees 15pts	1.497676197000000	1.018419813960000
D + E	2.947056274847720	40	18pts	2.936169614607910	1.003707776344270
E + F	4.800000000000020	24	24 degrees 30pts	4.846581983000000	1.009704579791660

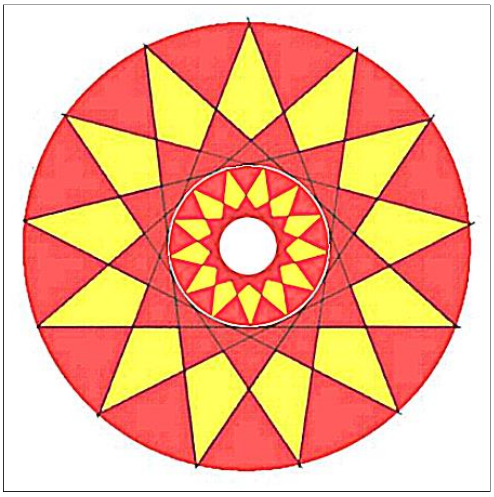
	Construction Harmonics		
	DEGREES	SHAPE	RATIO
A	152	152.5deg 13 sided Gon	1.033333000000000
B	125	13pts 124.75 deg	1.133333333333330
C	97	13pts 96.923deg	1.333333333333330
D	69	13pts 69.23076923deg	1.666666666666660
E	41	13pts 41.53846154deg	2.828427124746190
F	13.846	13pts 13.84615385deg	8.000000000000000

Mathematical Harmonies
DIFFERENTIAL
1.033333000000000
1.096774547346620
1.176470588235290
1.250000000000000
1.697056274847720
2.828427124746190
8.000000000000000

But if Shape x Shape = Shape the differentials in these charts should also be ratios for shapes.







THE RATIO 2.828427124 X 2.828427124

(√2 x √2 x √2) x (√2 x √2 x √2)

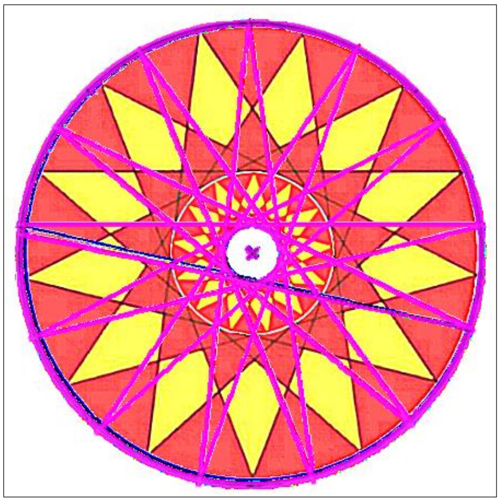
13 point polygram, ratio 2.828427124

Multiplied by

13 point polygram, ratio 2.828427124

Or this 13 point polygram Squared.

= Ratio 8.000000000.



MATHEMATICALLY & GRAPHICALLY:

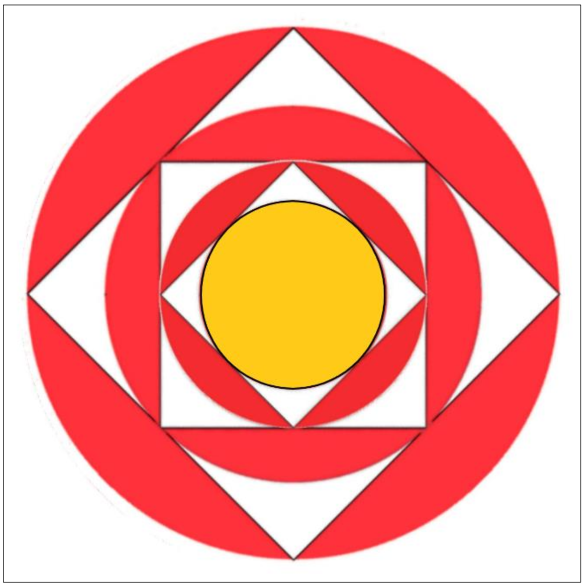
13 POINT POLYGRAM *RATIO* 2.828124372

x 13 POINT POLYGRAM *RATIO* 2.828124372

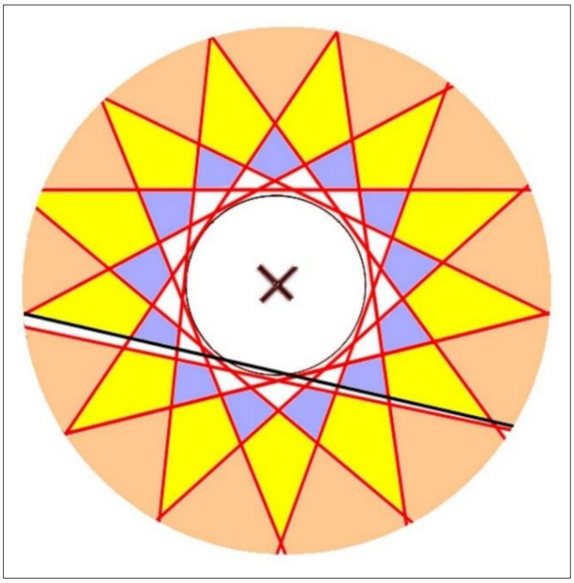
= 13 POINT POLYGRAM *RATIO* 8.000000000

SHAPE X SHAPE = SHAPE

THE RATIO 2.828427124

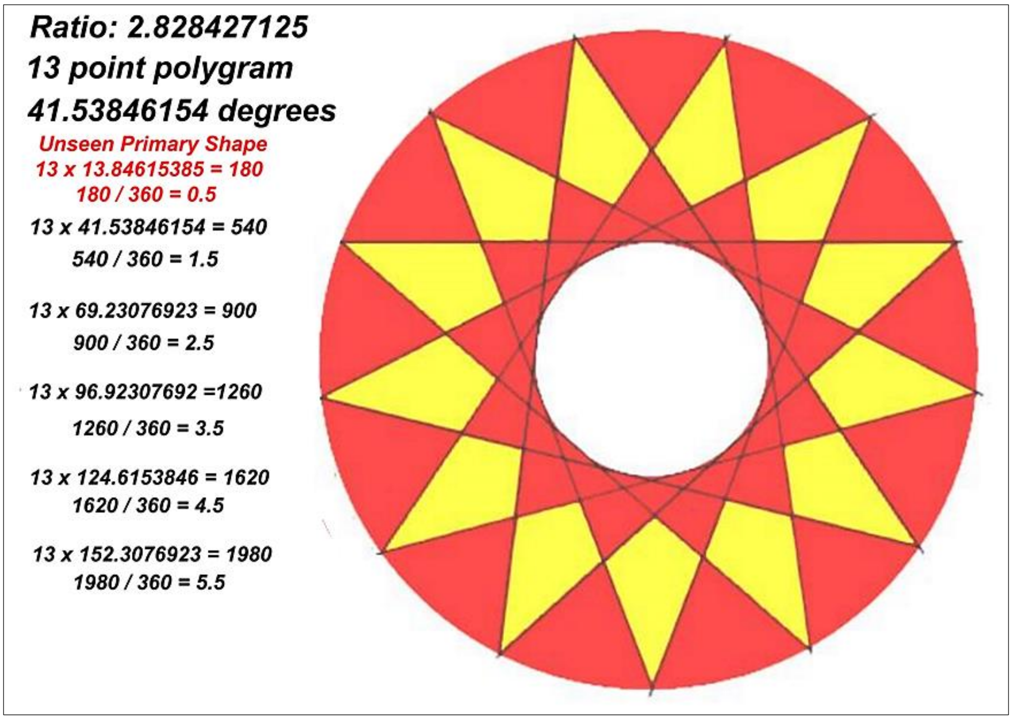


=



(√2 x √2 x √2)
(Or Square x Square x Square)

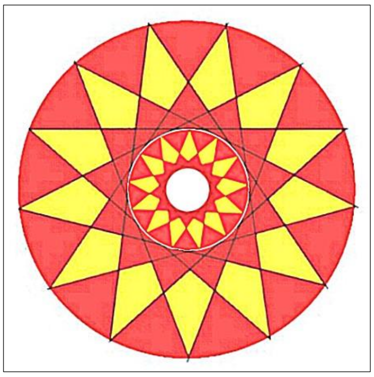
(Or Square x Equilateral Triangle)
(Or 13 point Polygram, ratio 2.828427124)

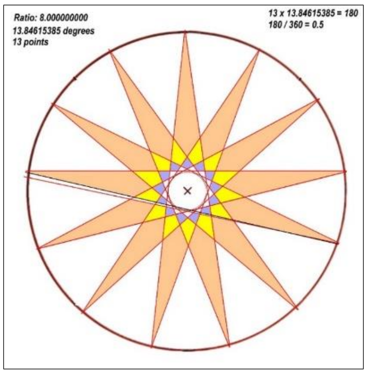


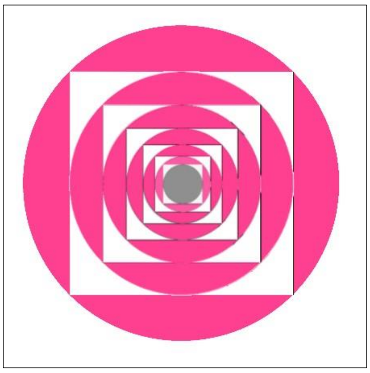
SHAPE X SHAPE = SHAPE

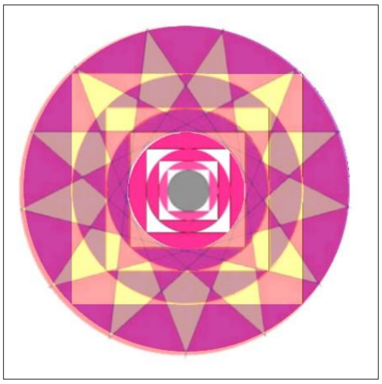
THE RATIO 8.000000000

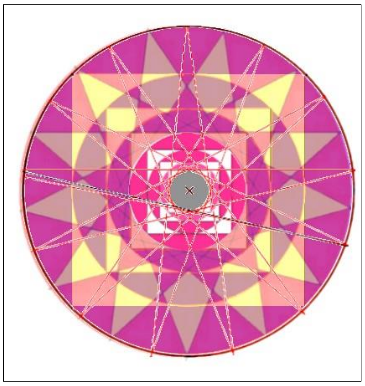
GRAPHICAL MATHEMATICS FOR 13 POINT POLYGRAM *RATIO 8.000000000*

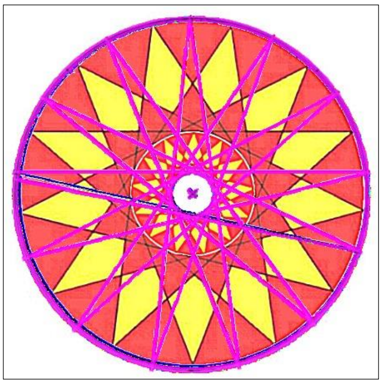


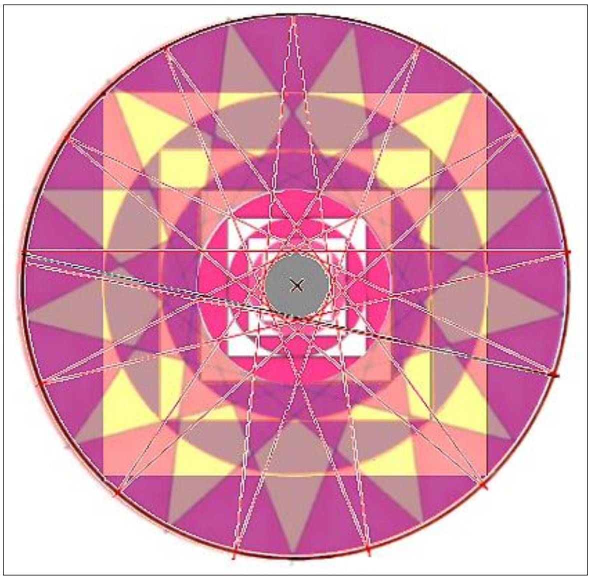






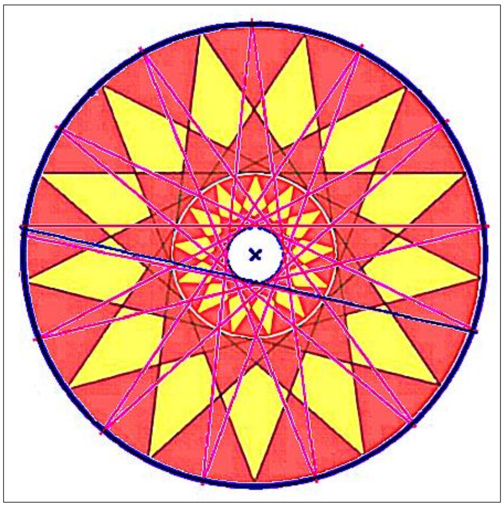


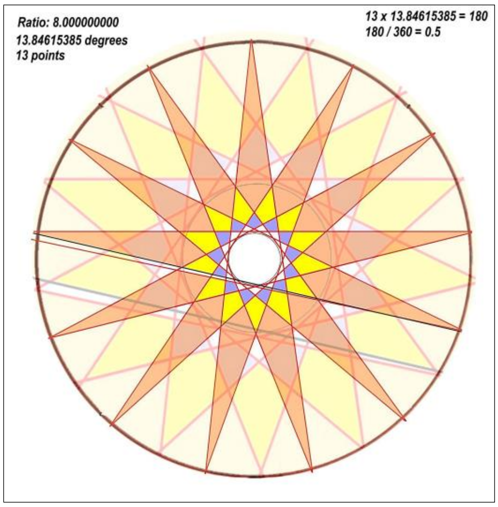




(√2 x √2 x √2) x (√2 x √2 x √2) = 8.000000000

NATURE'S CHEMISTRY.



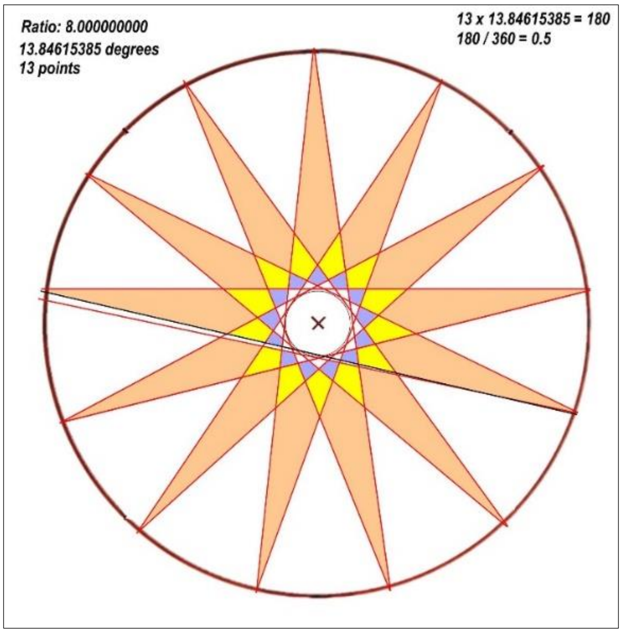


MATHEMATICALLY & GRAPHICALLY:

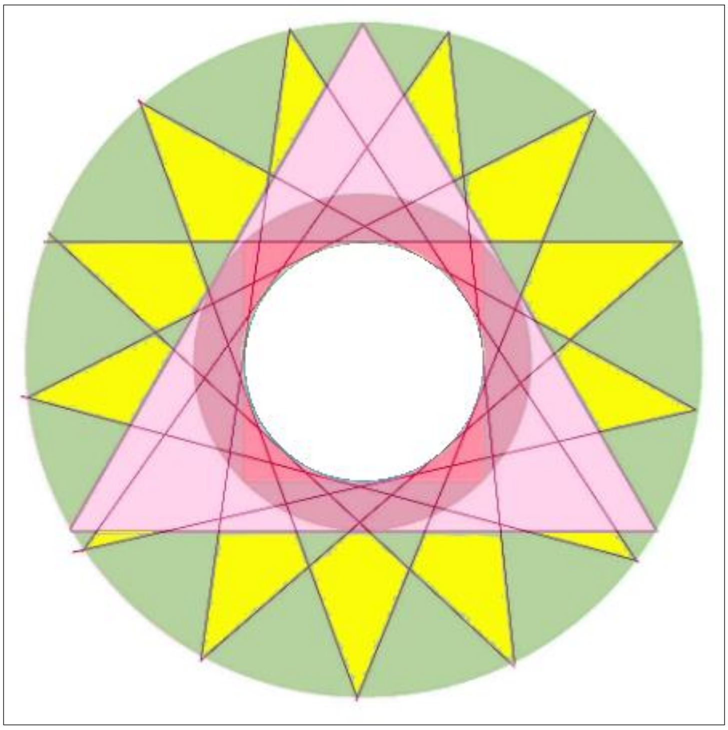
13 POINT POLYGRAM *RATIO* **1.290994448735800**
x 13 POINT POLYGRAM *RATIO* **1.290994448735800**
= 13 POINT POLYGRAM *RATIO* **1.666666666666660**

13 POINT POLYGRAM *RATIO* **1.666666666666660**
x 13 POINT POLYGRAM *RATIO* **1.666666666666660**
= 13 POINT POLYGRAM *RATIO* **2.777777777777760**

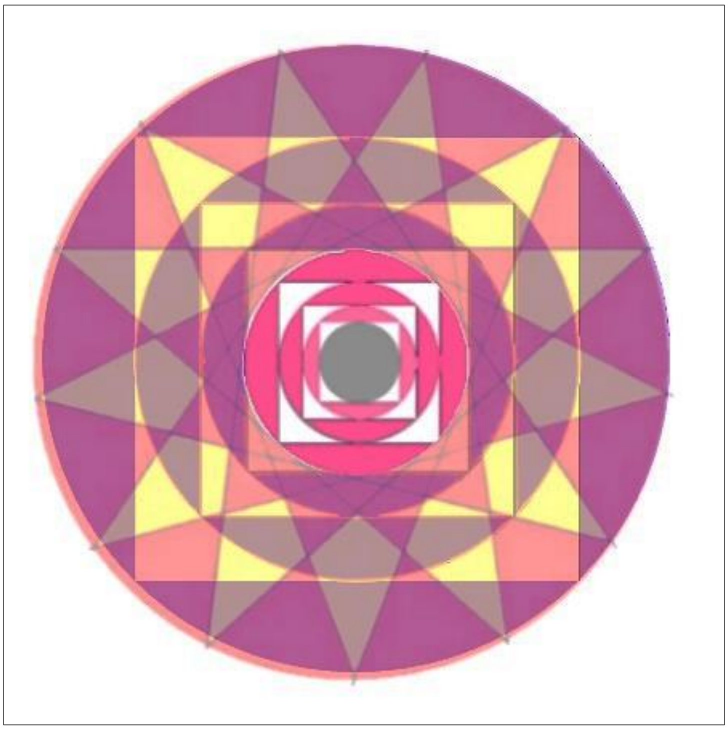
13 POINT POLYGRAM *RATIO* **2.828124372**
x 13 POINT POLYGRAM *RATIO* **2.828124372**
= 13 POINT POLYGRAM *RATIO* **8.000000000**



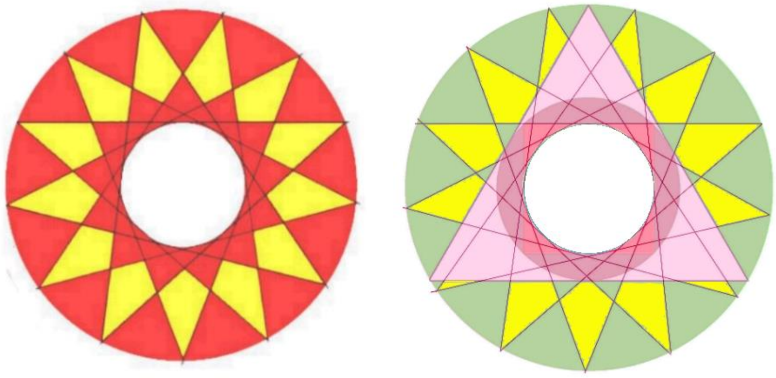
13 POINT POLYGRAM Ratio 2.828427124
Or, Mathematically, 2 x √2 (2x 1.414213562)
Or, Graphically, Equilateral Triangle x Square



Equilateral Triangle x Square
Or Square x Square x Square x Square x Square x Square

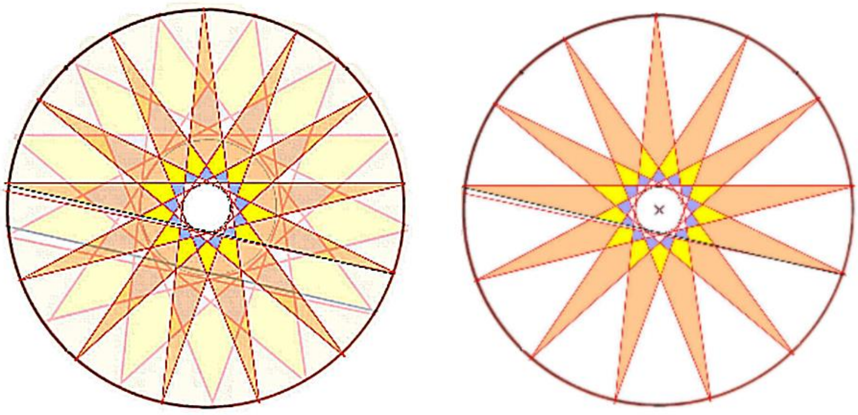


(√2 x √2 x √2) 13 point polygram, ratio 2.828427124
(Or √2 x 2: Square x Equilateral Triangle)
(*Square is nested inside Equilateral Triangle*)

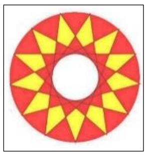
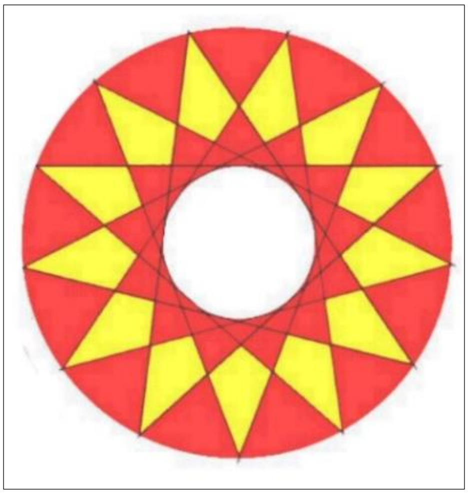


(√2 x √2 x √2) x (√2 x √2 x √2) = 13 point polygram, ratio 8.000000000
(Or √2 x √2 x √2 x √2 x √2 x √2) (Square x Square x Square x Square x Square x Square)

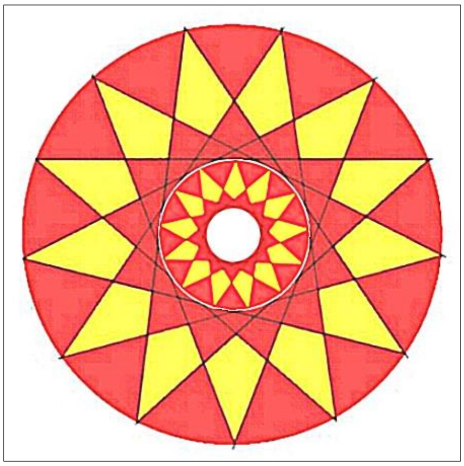
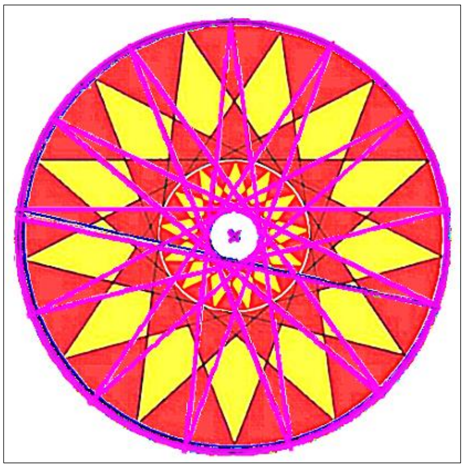
13 point polygram, ratio 2.828427124 **X** 13 point polygram, ratio 2.828427124
(Or 2.828427124 **X** 2.828427124) (Or √8 **X** √8) (Or $\sqrt{8}^2$)
= 13 point polygram, ratio 8.000000000



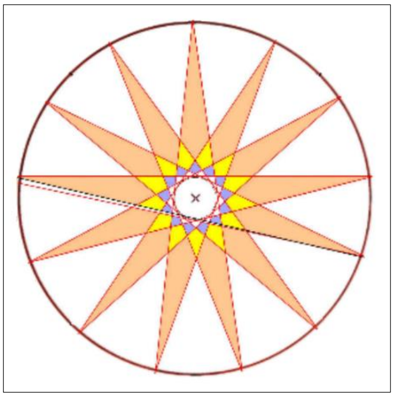
ILLUSTRATING HOW PHYSICAL SIZE IS IRRELATVE ***EXCEPT WHEN NESTING.***
IN ALL CASES THE RATIO REMAINS THE SAME.

 Multiplied by 

***13 point polygram, ratio 2.828427124 Squared**.*

Equals  Equals 

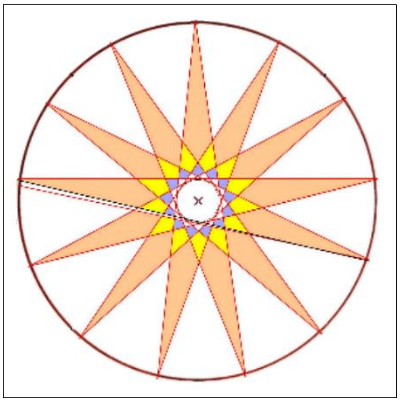
13 point polygram, ratio 2.828427124** Squared.* *Equals* ***13 point polygram, ratio 8.000000000



Which ultimately gives us Graphically and Mathematically.

13 point polygram, ratio 8.000000000

THE OUTER TWO SHAPES AND THEIR INDEX NUMBERS:



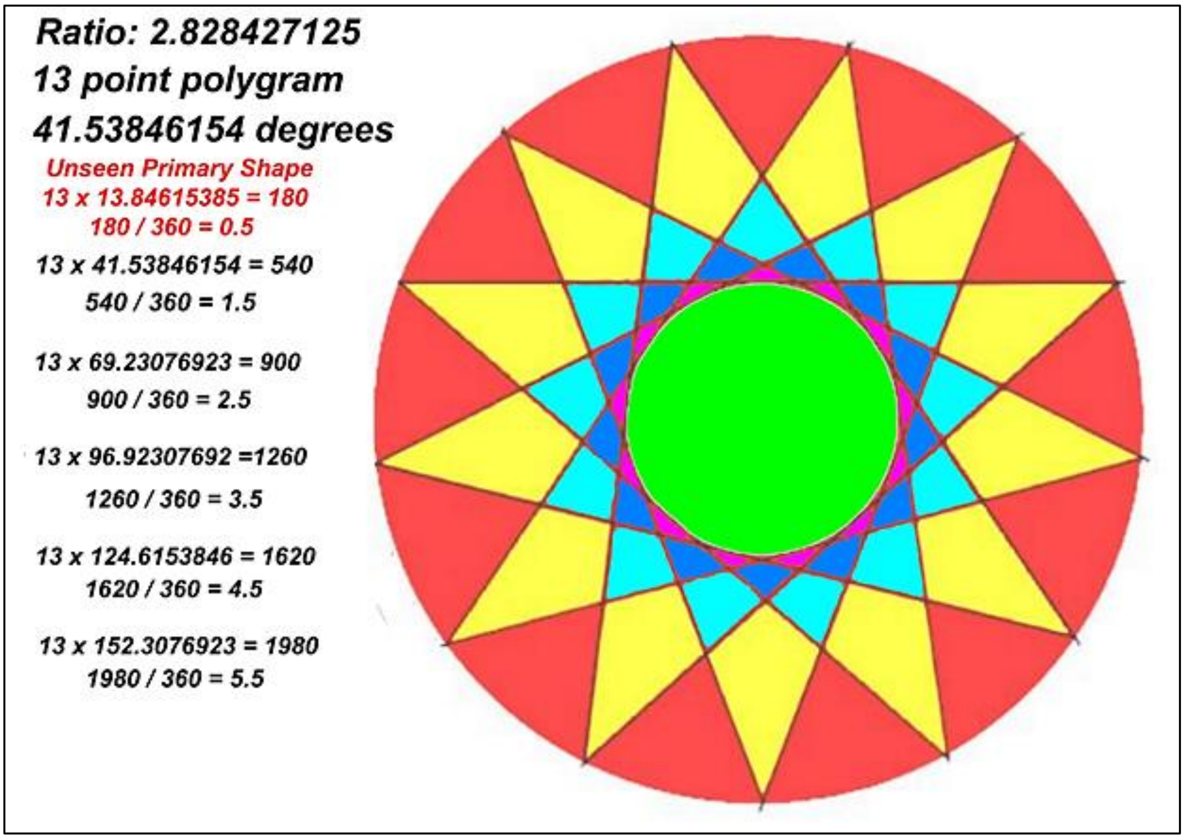
DEGREES	SHAPE	RATIO
41.538461540000000	13 SIDED POLLYGRAM 4	2.828427124746190
13.846153850000000	13 SIDED POLLYGRAM 5	8.000000000000000

INDEX NUMBER

DEG X POINTS /360
1.50
0.50

CALCULATING INDEX NUMBERS FOR SHAPES:

(DEGREES X NUMBER OF POINTS / 360)



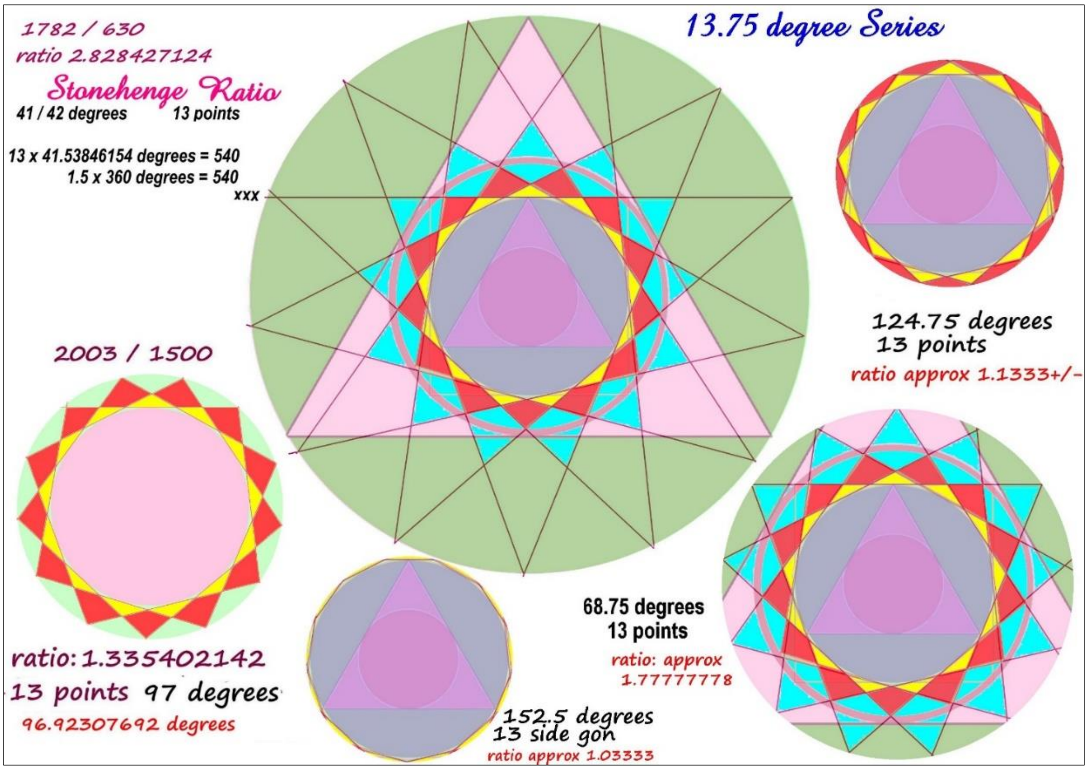
SOME IDEOSYNCRASIES OF 13 POINT POLYGRAMS AND POLYGONS: THEIR RATIOS AND DEGREES: AND THE NUMBERS 15384615 AND 3076923

Construction Harmonics		
DEGREES	**SHAPE**	**RATIO**
152.3076923	152.5deg 13 sided Gon	1.033333333333330
124.6153846	13pts 124.75 deg	1.133333333333330
96.92307692	13pts 96.923deg	1.333333333333330
69.23076923	13pts 69.23076923deg	1.666666666666660
41.53846154	13pts 41.53846154deg	2.828427124746190
13.84615385	13pts 13.84615385deg	8.000000000000000

15384615 x 2 = 30769230
15384615 / 5 = 3076923
30769230 / 2 = 15384615

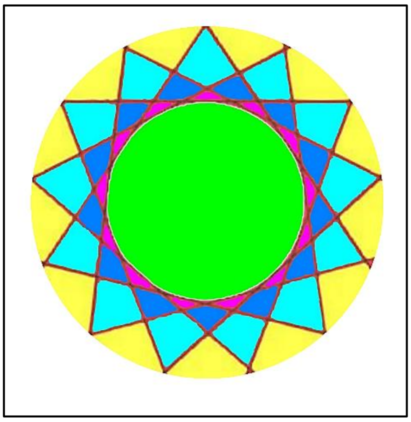
360 degrees / 13 = 27.6923076923077

AN EARLY GRAPHICAL RENDITION:



SOME MORE IDEOSYNCRASIES OF 13 POINT POLYGRAMS AND POLYGONS: THEIR RATIOS AND DEGREES AND INDEX NUMBERS:

THE INNER FOUR SHAPES:

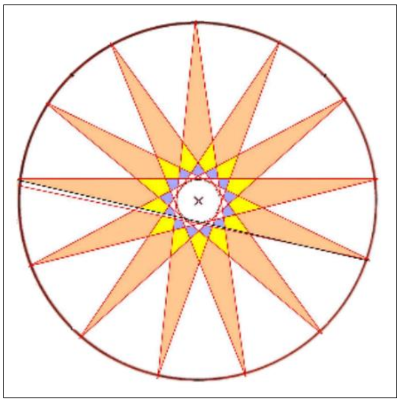


DEGREES	SHAPE	RATIO
152.307692300000000	13 SIDED POLLYGON	1.033333333333330
124.615384600000000	13 SIDED POLLYGRAM 1	1.133333333333330
96.923076920000000	13 SIDED POLLYGRAM 2	1.335402142000000
69.230769230000000	13 SIDED POLLYGRAM 3	1.666666666666660

INDEX NUMBER

DEG X POINTS /360
5.50
4.50
3.50
2.50

THE OUTER TWO SHAPES:



DEGREES	SHAPE	RATIO
41.538461540000000	13 SIDED POLLYGRAM 4	2.828427124746190
13.846153850000000	13 SIDED POLLYGRAM 5	8.000000000000000

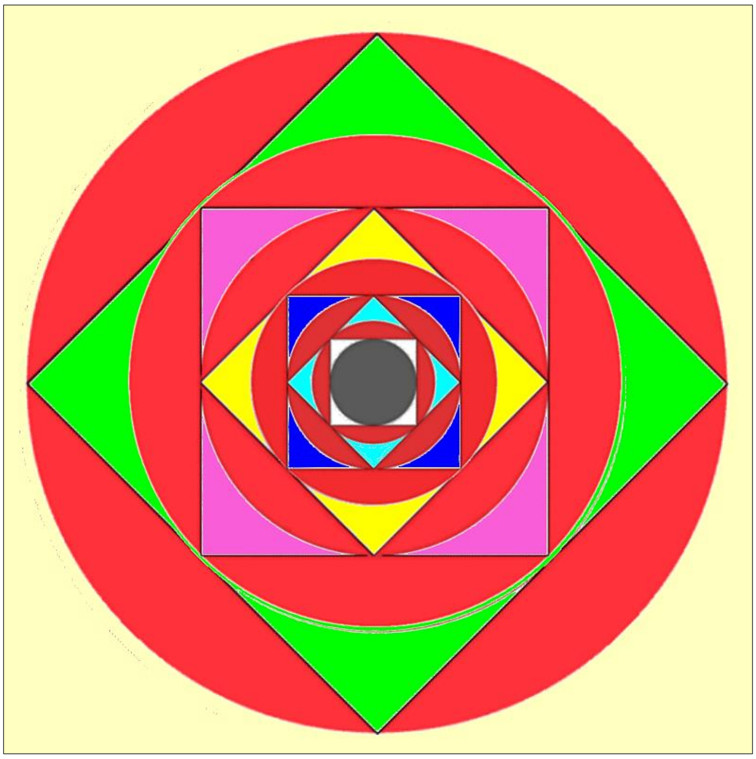
INDEX NUMBER

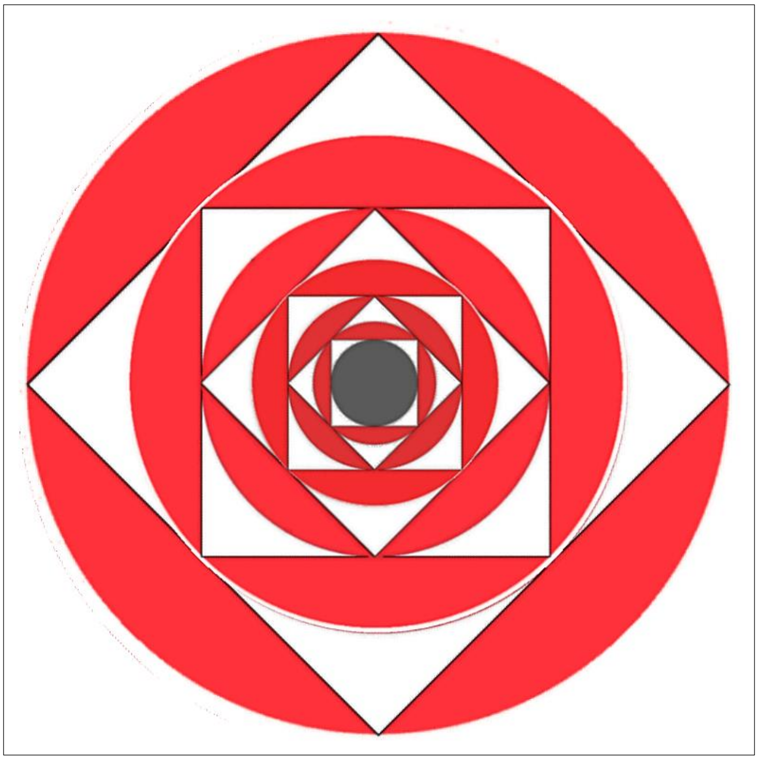
DEG X POINTS /360
1.50
0.50

ALL 13 POINT OR SIDED SHAPES:

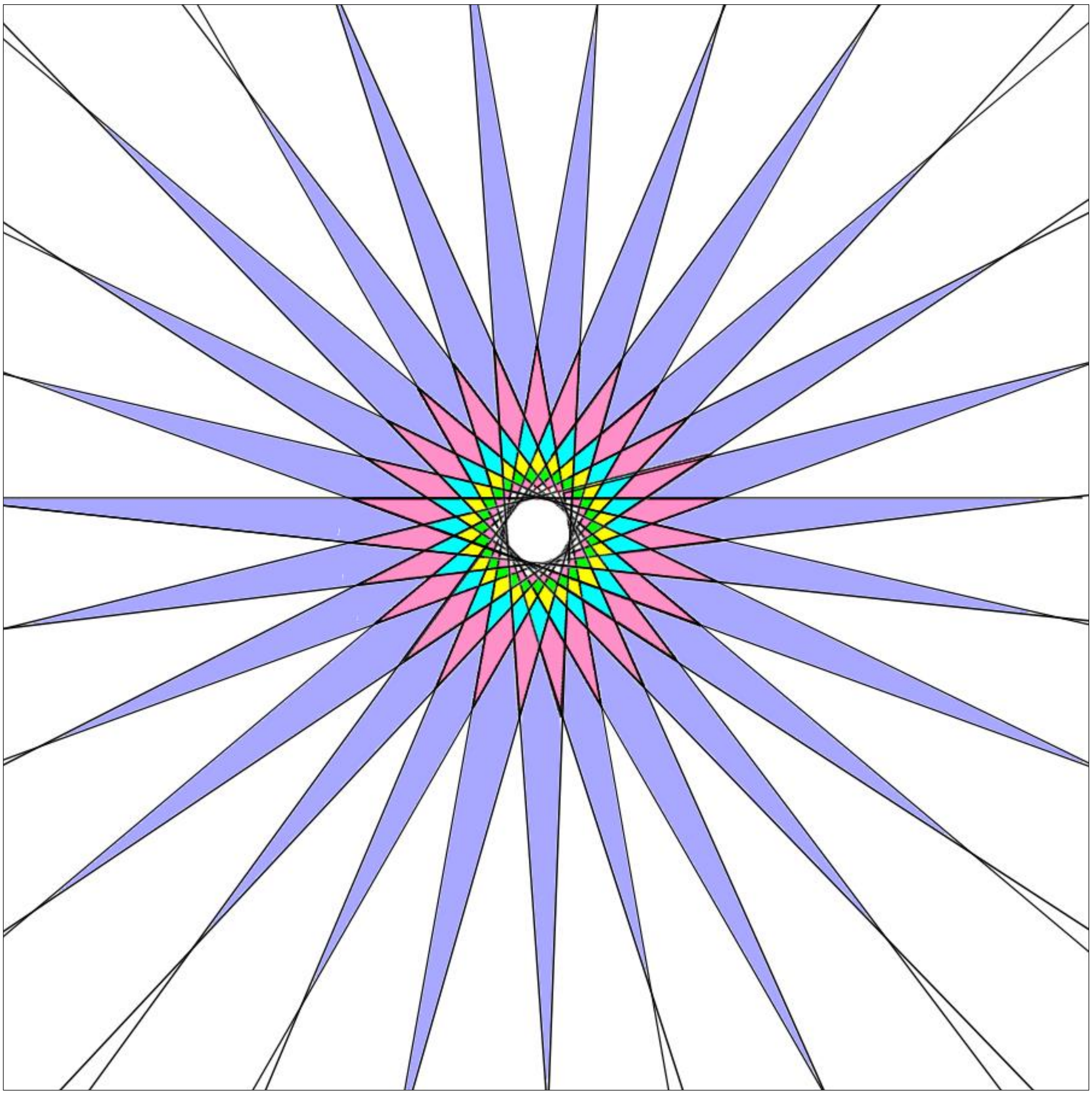
DEGREES	SHAPE	RATIO	INDEX NUMBER DEGREES X 13 / 360
152.307692300000000	13 SIDED POLLYGON	1.033333333333330	5.50
124.615384600000000	13 POINT POLLYGRAM 1	1.133333333333330	4.50
96.923076920000000	13 POINT POLLYGRAM 2	1.335402142000000	3.50
69.230769230000000	13 POINT POLLYGRAM 3	1.666666666666660	2.50
41.538461540000000	13 POINT POLLYGRAM 4	2.828427124746190	1.50
13.846153850000000	13 POINT POLLYGRAM 5	8.000000000000000	0.50

√2 x √2 x √2 x √2 x √2 x √2

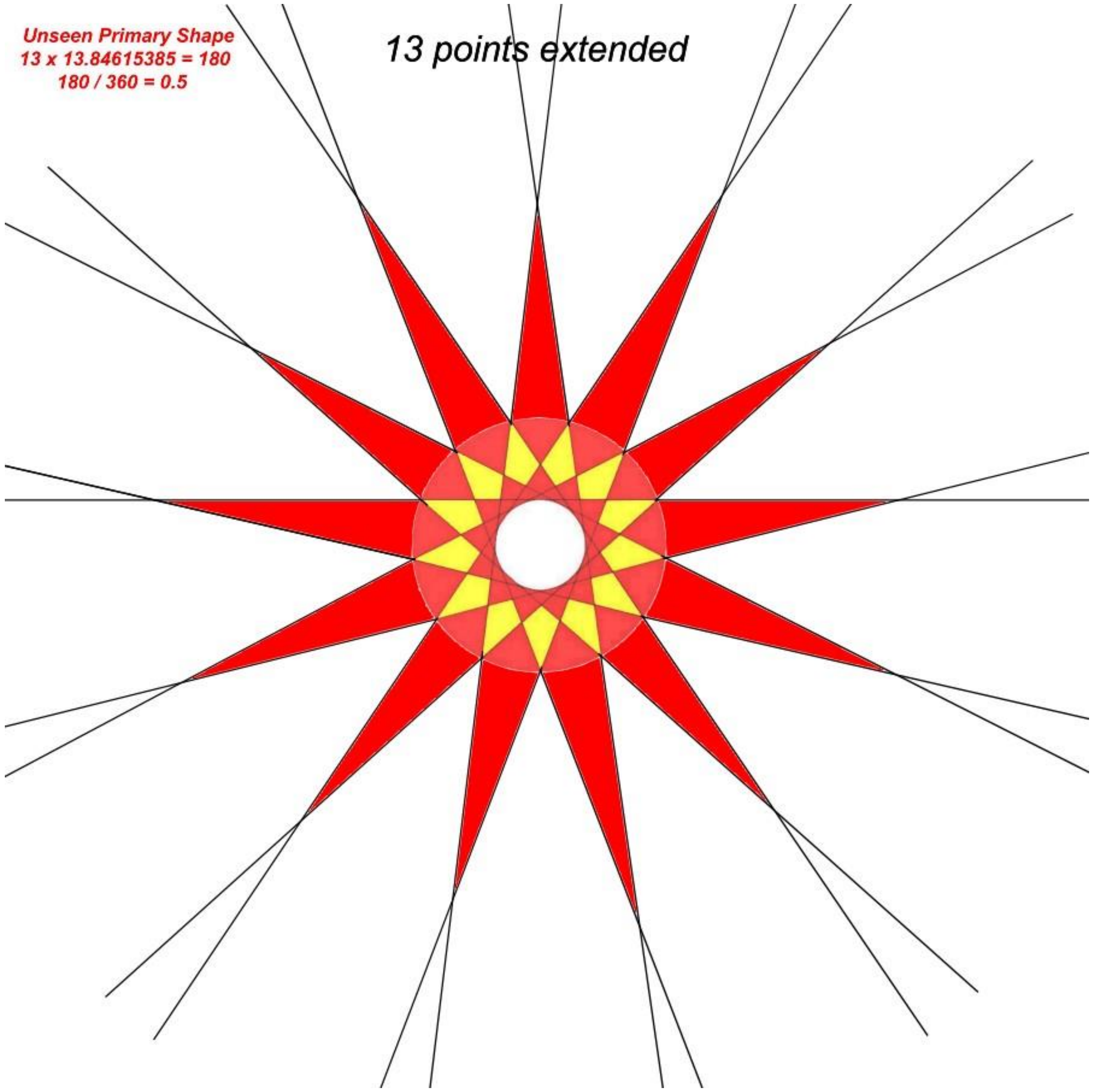




27 POINT POLYGRAM

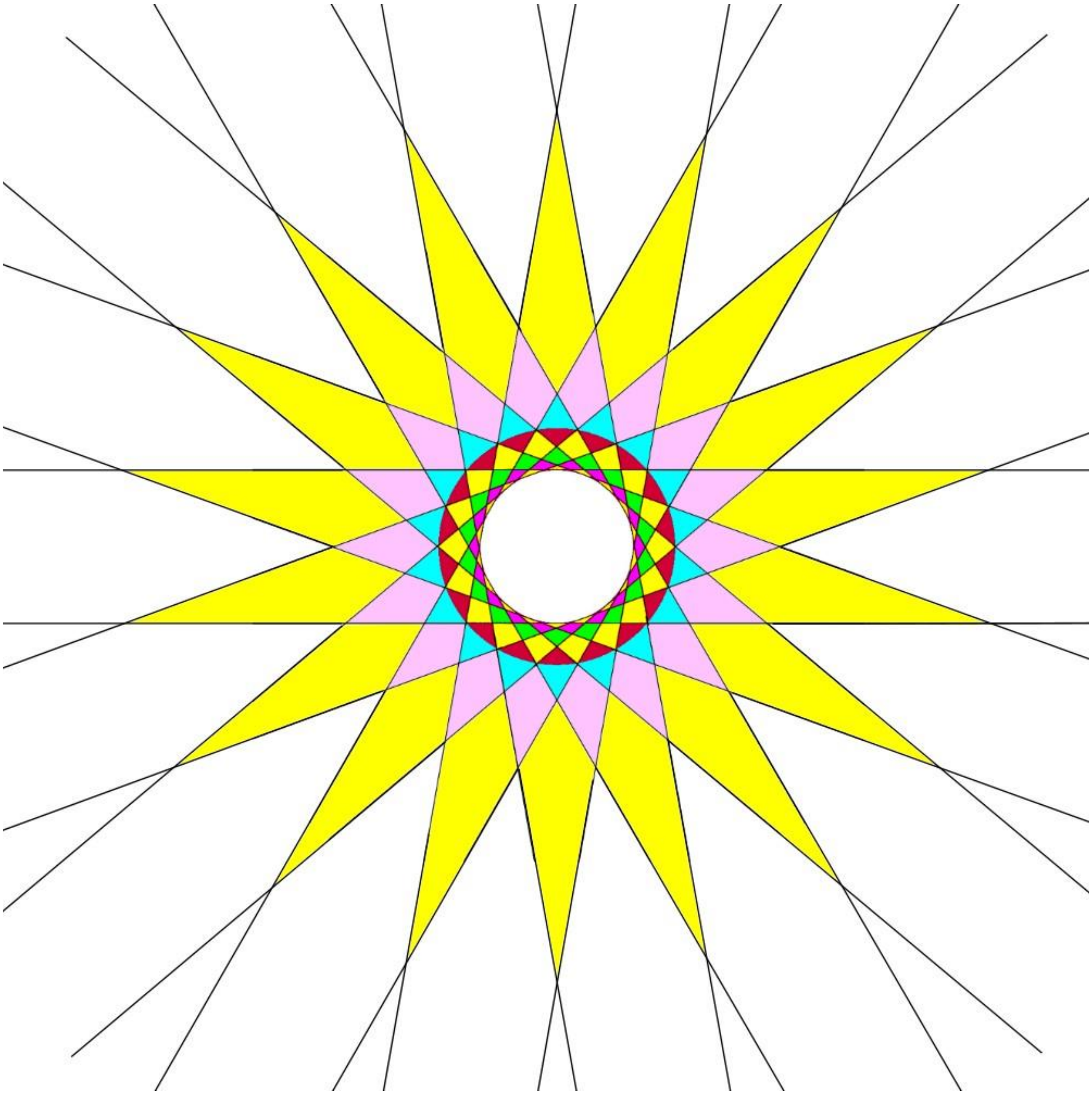


SIDES FAN OUT AND NEVER INTERSECT AGAIN.



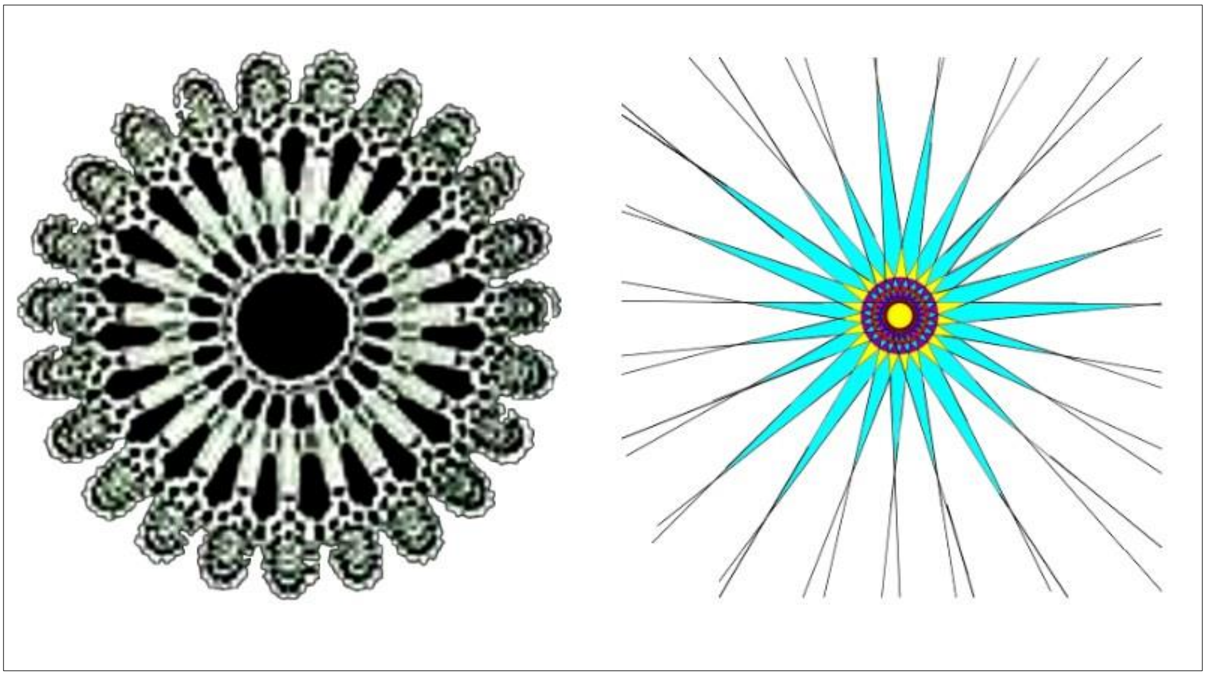
ONE 13 POINT <u>PRIMARY</u> POLYGRAM WITH SIDES EXTENDED.

FURTHER EXTENSION OF THESE SIDES WILL NOT PRODUCE ANY FURTHER SHAPES. THEY WILL EXTEND OUT INTO THE UNIVERSE WITHOUT CROSSING AGAIN.



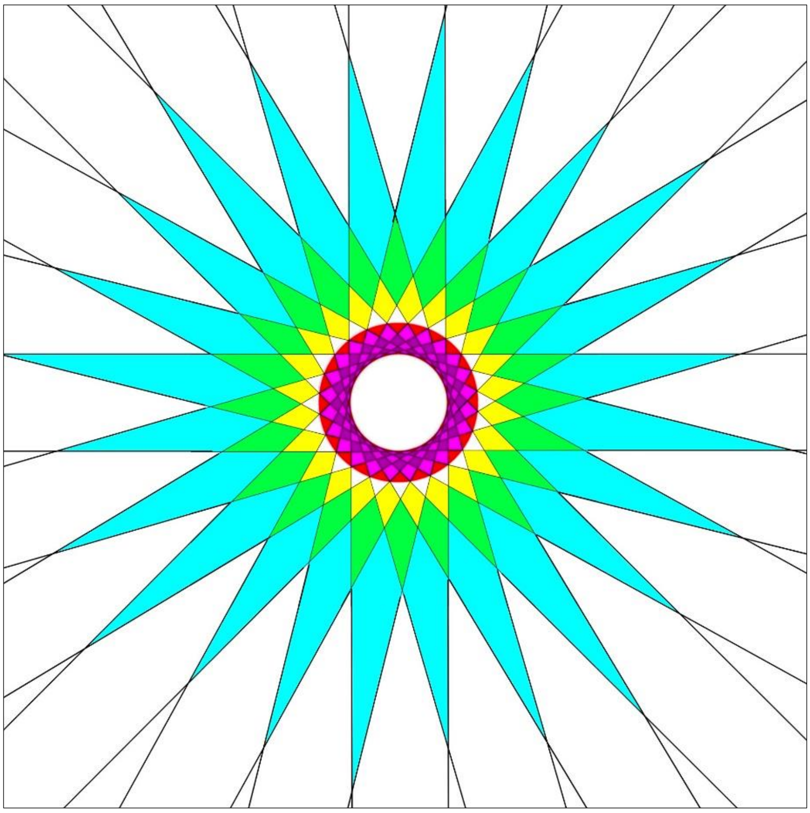
TWO 9 POINT POLYGRAMS IN PHASE.
SIDES BECOME PARALLEL AND EXTEND TO INFINITY WITHOUT CROSSING AGAIN.

23 POINT POLYGRAM



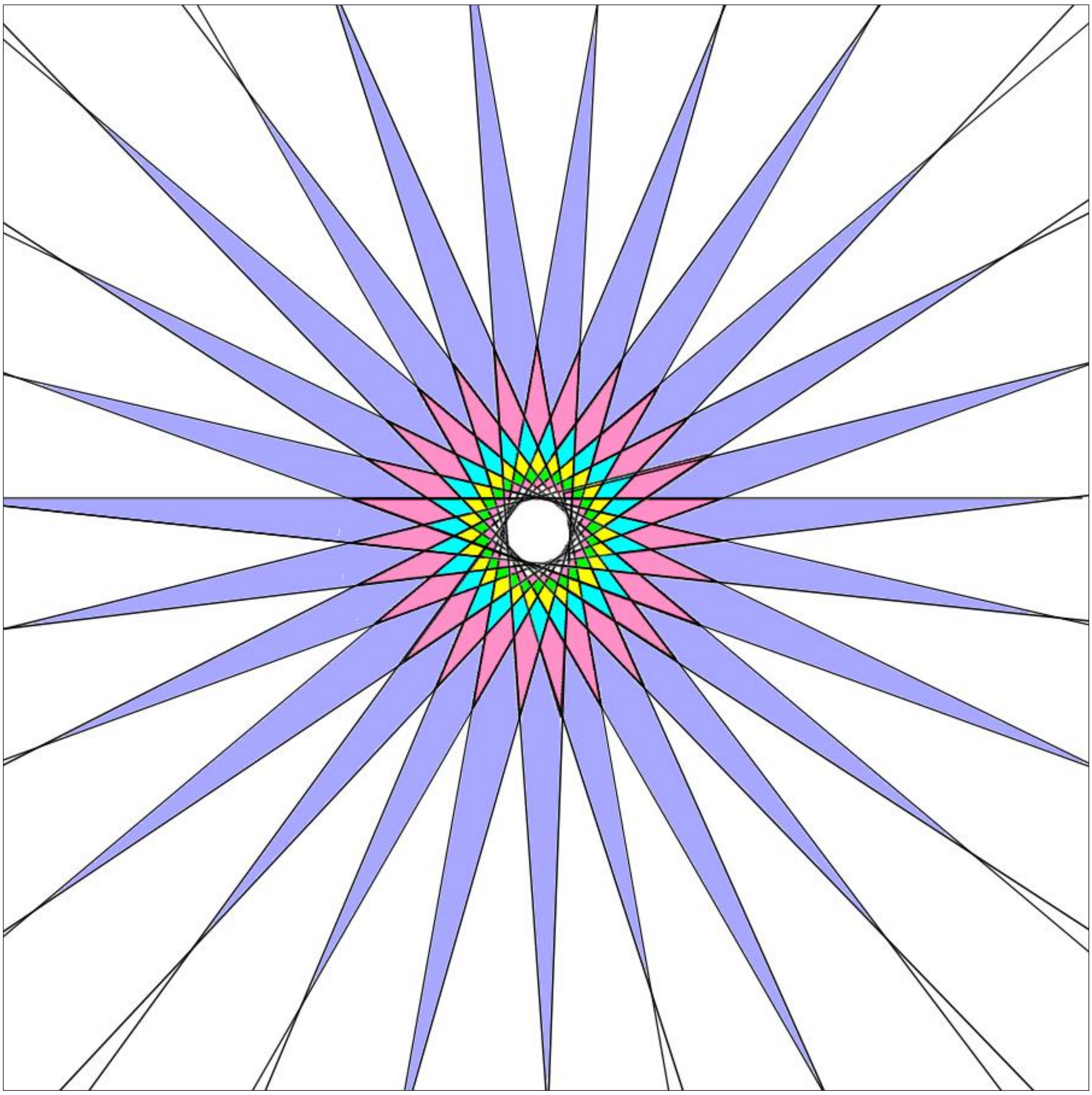
SIDES FAN OUT AND NEVER INTERSECT AGAIN.

24 POINT POLYGRAM



SIDES BECOME PARALLEL AND EXTEND TO INFINITY.

27 POINT POLYGRAM



SIDES FAN OUT AND NEVER INTERSECT AGAIN.

THE INDEX NUMBER CODE

How Index Numbers can highlight patterns in the Ranking of Plane Regular Shapes:

Each Regular Shape, be it a Polygon or Polygram, has a specific number associated with it apart from its Ratio that can be calculated from an equation that would seem to communicate the shape's relationship to the constant 360 degrees in a circle.

Variations of this Equation are as follows:

$$\text{Index} = \frac{\text{Polygram Angle x No. of points}}{360}$$

$$\text{Index} = \frac{\text{Polygon Angle x No. of sides}}{360}$$

For Polygons there is another Equation which somehow produces the same result:

$$\text{Index} = \frac{\text{Sides} - 2}{2}$$

To be able to highlight any patterns that might exist in the marshalling or ranking of Regular Shapes there needs to be a level playing field upon which to base the ranking. When all the following variables are considered there is only one that demonstrates stable, non-volatile features.

Some of the Variables

- Polygons are usually referred to by their number of sides.
- Polygrams are usually named by their number of points or angles.
- When arrayed in order of the degrees of the angles of their points, Polygrams in general do not immediately reveal any particular discernable pattern.
- The Polygon can only be constructed from sides which are enumerated by *whole*, real, finite Integers and cannot be constructed of fractional numbers of sides.
- An "Ordered" list of Polygons can therefore reflect an ordered list of *whole*, real Integers, a standard pattern.
- Using the equations above, an "Ordered" list of ***Index Numbers*** for Polygons can be developed.
- The base order in this "Ordered" list of ***Index Numbers*** for Polygons is naturally enough derived from the repetition of the simple (n+1) pattern of the Integers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 . . . . 98, 99, 100 . . . ∞.
- As the "Ordered" list of ***Index Numbers*** for Polygons is derived from the Integers in their *"natural",* hierarchical, ascending state there should be nothing artificial or orchestrated in the results and any patterns that result may be simply identified; as well as explained.
- ***A stable, non-volatile variable is therefore the "ordered" List of Polygons.***

Another important concept to consider at this stage is that when dealing with the analysis and categorisation of 'Regular Shapes' we are only operating between 0 and 180 degrees of the 360 degrees of the Circle. Any operation over 180 degrees is merely a mirror image of the results from the area between 0 and 180 degrees. Another important concept to consider at this stage is that when all this analysis is done it can be seen that the concept of 0 (zero) does not exist herein. It does not, and can not, arise for, in angular terms, the Singularity is a straight line. The integer 2 can give us an angle, a cross (which is in effect an angle), or parallel lines. Basically the lowest number or integer that can be assigned to a Polygon is 3. This is the Equilateral Triangle with 3 sides, each pair embracing 60 degrees. If we view the angle representing this triangle against the Singularity or straight line we are left with 120 degrees which we have otherwise found to be the degrees contained within adjacent sides of the Hexagon. In this context it can be seen that the Hexagon is the ***Complementary*** Shape to the Equilateral Triangle. Its equation would be: 3 x **2** = 6.

Next in order of integers is the number 4 which represents the **square** which we know contains angles of 90 degrees. Its ***Complementary*** Shape must therefore also contain 90 degrees and it must therefore mirror itself. Is this the origin of the observed phenomena of the *Equilibrium around the Square*? Its equation would be: 4 x **1** = 4.

Moving down the line we have the integer or number 5 which portrays the **Pentagon**. We know that pairs of the Pentagon's sides border 108 degrees. Its ***Complementary*** Shape must therefore contain 72 degrees which we will find in the points of the Decagram. Somehow we have derived a 10 pointed regular shape from a 5 sided polygon. This is a simple relationship reflecting the equation:

5 x **2** = 10.

The next integer is 6 which in Polygon terms is the **Hexagon** which we found above as a ***Complementary*** Shape for the Equilateral Triangle with 3 sides and angles and of course reciprocates this prior relationship. Its equation would thus be:

6 x **0.5** = 3

The Integer 7, the **Septagon**, (or Heptagon, depending upon which language is being used) is more complex having degrees which calculate to a repeating fraction. Its ***Complementary*** Shape, also with degrees which calculate to a repeating fraction, is the Polygram with 14 sides giving the equation:

7 x **2** = 14.

8 is the integer for the **Octogon** which has angles with 135 degrees . Its ***Complementary*** Shape thus has 45 degrees which we know to be the Octagram with 8 points. In this case the equation is:

8 x **1** = 8.

Applying the integer 9 to a Polygon produces the **Nonogon** with 140 degrees. Its ***Complementary*** Shape thus has 40 degrees which we know are contained in the points of an 18 pointed Polygram and therefore give the resulting equation:

9 x **2** = 18.

Next in order is 10, the number for the **Decagon** which has angles of 144 degrees which leaves us 36 degrees for the angles of the ***Complementary*** Shape and we know this must be the Pentagram and an equation:

10 x **0.5** = 5.

The pattern "2,1,2,0.5"

Already a pattern is appearing in the allocation of the number associated with the ***Complementary*** Shape when it is compared with its originating Polygon (or Integer). This pattern "**2,1,2,0.5**" is not readily explainable but it will be seen to be present throughout the whole range of Polygons (Integers) **from 3 to ∞**. The term ∞ or infinity is here applicable as analysis will show that Polygons (and their Integers) will continue to approach infinity before their angles achieve the 180 degrees of the straight line. But, one cannot '*reach*' Infinity; it is not a destination or rendevous.

Index & Degree Relationships .... Polygon Codes and Polygram Derivation Relationship

Patterns of Polygrams Produced

Index	Details of Original Degrees			Original plus	From Original Degrees divided by Index			New	sides or	distribution		
	Degrees	Polygon	Ratios	New Degrees	New Degrees	Polygram/gon	Ratios	Index	points			
0.5	60	Equilateral Triangle 3 sides	2.000000000	180	120	Hexagon	1.144122806	2	6	6		
1	90	square 4 side	1.414213562	180	90	Square	1.414213562	1	4		4	
1.5	108	pentagon 5 side	1.236067977	180	72	Decagram	1.713525493	2	10	10		
2	120	hexagon 6 side	1.144122806	180	60	Equi Tri	2.000000000	0.5	3			3
2.5	128.571428	heptagon 7 side	1.099357835	179.9999992	51.4285712	14 pts ??		2	14	14		
3	135	octogon 8 side	1.080363027	180	45	Octagram	2.618033989	1	8		8	
3.5	140	nonogon 9 side	1.059016995	180	40	18 pts	2.885438198	2	18	18		
4	144	decagon 10 side	1.049828233	180	36	Pentagram	3.236067977	0.5	5			5
4.5	147.2727273	11 sided gon	1.047178767	180	32.72727273	22 pts ??		2	22	22		
5	150	12 sided gon	1.038092722	180	30	12 point polygram	3.853220324	1	12		12	
5.5	152.3076923	13 sided gon	1.035472873	180	27.69230769	26 pts ??		2	26	26		
6	154.2857142	14 sided gon	1.031027796	179.9999999	25.7142857	Septagram	4.576491223	0.5	7			7
6.5	156	15 sided gon	1.030252993	180	24	30pts	4.846581983	2	30	30		
7	157.5	16 sided gon	1.020156458	180	22.5	16pts	5.236067977	1	16		16	
7.5	158.8235294	17 sided gon	1.017581875	180	21.17647059	34 pts ??		2	34	34		
8	160	18 sided gon	1.015013790	180	20	Nonogram	5.656854249	0.5	9			9
8.5	161.0526315	19 sided gon	1.002530099	179.9999999	18.94736841	38pts	6.111456184	2	38	38		
9	162	20 sided gon		180	18	20		1	20		20	
9.5	162.8571429	21 sided gon		180	17.14285714	42pts ??		2	42	42		
10	163.6363636	22		180	16.36363636	11		0.5	11			11
10.5	164.3478261	23		180	15.65217391	46		2	46	46		
11	165	24		180	15	24		1	24		24	
11.5	165.6	25		180	14.4	50		2	50	50		
12	166.1538462	26		180.0000001	13.84615385	13		0.5	13			13
12.5	166.6666667	27		180	13.33333333	54		2	54	54		
13	167.1428571	28		180	12.85714285	28		1	28		28	
13.5	167.5862069	29		180	12.4137931	58		2	58	58		
14	168	30		180	12	15		0.5	15			15
14.5	168.3870968	31		180	11.61290323	62		2	62	62		
15	168.75	32		180	11.25	32		1	32		32	
15.5	169.0909091	33		180	10.90909091	66		2	66	66		
16	169.4117647	34		180	10.58823529	17		0.5	17			17
16.5	169.7142857	35		180	10.28571428	70		2	70	70		
17	170	36		180	10	36		1	36		36	
17.5	170.2702703	37		180	9.729729731	34		2	74	74		
18	170.5263158	38		180	9.473684211	17		0.5	19			19
18.5	170.7692308	39		180	9.230769232	78		2	78	78		
19	171	40		180	9	40		1	40		40	
19.5	171.2195122	41		180	8.780487805	82		2	82	82		
20	171.4285714	42		180	8.57142857	21		0.5	21			21
20.5	171.627907	43		180	8.372093024	86		2	86	86		
21	171.8181818	44		180	8.181818181	44		1	44		44	
21.5	172	45		180	8	90		2	90	90		

When the "variables" were first listed above, the following was included:-

- *"When arrayed in order of the degrees of the angles of their points, Polygrams in general do not immediately reveal any particular discernable pattern."*

It can be seen now that the Polygrams that are ***Complementary*** Shapes to the ordered list of Polygons (or the Integers) are a unique list in that only one Polygram of each denomination, or number of points, will be produced. From further analysis these can be shown to be the ***principal*** polygrams. For a set of Polygrams containing similar numbers of points the ***principal*** polygram will be the one with the smallest angle in the set. Each set of Polygrams containing similar numbers of points will thus be contained within each set's ***principal*** polygram. Therefore, in some manner, it may be deduced that **all** the regular shapes can be derived from an *Ordered List of Polygons or from a list of integers.*

If we try to reconcile this version of the equation for the Index Number for a Polygon:

$$\text{Index} = \frac{\text{Sides} - 2}{2}$$

- we should start at the ordered list of Polygons which we see starts with the Equilateral Triangle with 3 sides. The numbers 1 and 2 are missing; thus the presence in the equation of the term "**Sides – 2**"?

- As we must restrict ourselves to 180 degrees and the Singularity (**1**) of the Straight Line we are dealing with only half of the Circle thus the **division by 2?**

- It will be seen that the Index Numbers for Polygons are in a sequence made up of increments of **0.5**.

Is all this not a reflection of the Index Numbers for the ***Complementary*** Shapes or ***principal*** polygrams "**2,1,2,0.5**"?

It can also be seen that when analysis commences with an ordered list of Polygons (or Integers) then their angles are also present in an ordered way. The angles for the ***Complementary*** Shapes are also present in an ordered way albeit in reverse orientation to that of the Polygons. This is not exactly a profound statement but each contribution to identifying patterns in the classification of regular shapes should be noted.

As the ***Complementary*** Shapes above are only the ***principal*** polygrams then, naturally enough, not all regular shapes are listed in the above table. It is intriguing to find from my previous ***Graphical*** analysis using the Ratios of the Concentric Circles that many (but not all) of the missing shapes and their angles have already been identified. Bearing in mind the orientations of the lists of degrees in the angles, these missing shapes may be inserted in this Table to produce a more informative Table which may possibly be expanded using new patterns if or when they are revealed. When this is done, and using the equation for Polygrams:

$$\text{Index} = \frac{\text{Polygram Angle x No. of points}}{360}$$

we can then ascertain whether a pattern alteration exists in the *Index Numbers for Polygrams* still listed in descending order of their angles; inserted between the ***principal*** polygrams and thus still incorporating the basic order imposed by using the order of the Integers (or Polygons).

This equation, when applied to the ***principal*** polygrams, actually produces the same Index Numbers as the **2,1,2,0.5** Multipliers identified in the transformation of the Polygons (or Integers) into ***Complementary*** Shapes or ***principal*** polygrams above.

This is therefor the basis of a theorem:

> *When dealing with **principal** polygrams, the **multipliers** produced by the ratios of the number of sides of the originating Polygons to the numbers of points of the **Complementary** Shapes are equal to the **Index Numbers** of the resulting **Complementary** Shapes or **principal** polygrams.*

The Index Numbers for Polygrams other than ***principal*** *polygrams do not follow this theorem.*

A heading in the following Tables is titled "Genome of Shape". I have based this name upon the fact that there are four basic multipliers or Index Numbers for *the **Complementary** Shapes or **principal** polygrams, namely* **2, 1, 2,** & **0.5** just as in the biological Genome which has four main indicators, **A**, **C**, **T**, **G**. It can be seen how the four multipliers can be used to indicate and identify *the **Complementary** Shapes or **principal** polygrams.*

The above analysis required prior knowledge of Polygrams and their angles to allocate the ***Complementary*** *Shapes or* ***principal*** *polygrams* that might result from the originating Polygons (or Integers). Perhaps, before we try to proceed further, we should step back and reabsorb the data we have so far produced.

- We started with an ordered list of whole Integers (Polygon sides) i.e. 1,2,3,4,5,6 . . . . to ∞. (n+1)
- We assumed prior knowledge of the Angle for each Polygon but we could have used the equation:

$$\text{Polygon Angle} = \frac{\text{Index} \times 360}{\text{No. of sides}}$$

  but this required knowledge of the Index Numbers.
- I had previously discovered *Index Numbers* through Graphical application of the Concentric Circles.
- A pattern (**2,1,2,0.5**) in the *Multiplier* for the number of points associated with the ***Complementary*** Shape has been revealed.
- This same pattern (**2,1,2,0.5**) proves to also apply to the *Index Numbers* for the ***Complementary*** Shapes.
- These ***Complementary*** Shapes are found to be ***principal*** *polygrams* that contain all related regular shapes.

---------------- IXI ----------------

I actually calculated my first *Index Numbers for Regular Shapes* based on information obtained by applying the ***Ratios of the Concentric Circles*** using an underscore in a graphics text editor to make a line which could only be rotated 1 whole degree at a time.***This was inaccurate for shapes with angles with anything other than whole degrees.*** I did however discover that, in accurate results for shapes contaning angles made of whole numbers, when I multiplied the perceived number of points in the shape by the 'degrees' in its points and divided the total by 360 I always ended up with an '*Index Number*' which was either a whole number or a whole number plus one-half. There was never 'plus one-eighth', or one-quarter or one-seventh or one-third or some incommensurable value; **always a whole number or a whole number plus one-half**. Using this as an 'hypothesis', whenever inaccuracies arose because the number of degrees possibly involved fractions (or even incommensurables), I found that if I adjusted my resulting 'index' number to the nearest **whole number or a whole number plus one-half** I could remove the inaccuracy. Reverse engineering then gave the correct figure for the angle. This method could often be checked by *graphically* finding out the number of degrees by which my graphical method was out , and then **dividing** this number by the 'seeming' correct number of points in the resulting shape. This would give the adjustment +/- to be made to the number of whole degrees that would be needed to make the **graphical** method comply.This was mainly a trial and error method which has later proved to be correct. These later discoveries of the nature and thus of the uses of *Index Numbers* has totally verified the above. (Also note that **½,** one-half, involves **1, 2,** & **0.5**.)

---------------- IXI ----------------

Is this the basis of another theorem?

All Index Numbers shall be whole numbers or whole numbers plus one-half.

This methodology harks back to the findings of Kepler when he sought to ascertain the harmonics of the heavens:

"………plus a little more" was his comment when fitting the regular solids between the Planets.

Personally I have found that it is in analysing this "little more" that many solutions (or patterns) are found. This 'little more' is often the cause of the exception to the rule that seems to show up to confound you but, after further analysis, confirms that you are on the right path. In addition, these exceptions, when analysed, seem to provide the essence for new hypotheses, theorems or further equations to enable further progress in the *Quest*

DEVELOPING ‘INDEX NUMBERS’

DEVELOPING 'INDEX NUMBERS':

Polygon Codes

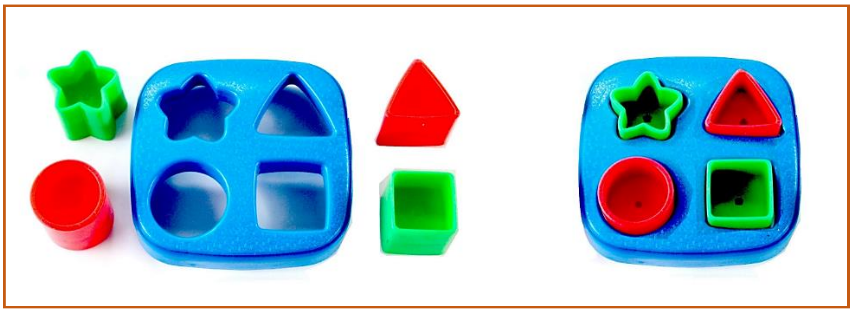
& *INDEX NUMBERS*

SORTED BY

	Degrees	Polygram Points / Polygon Sides	Shape Ratio		Index: Polygon Index	Index: Polygram Index	Polygon Sides: Degrees to Index multiplier	
	180	straight line / never reached	1.000000000000000					
	179 ~ 180	Towards ∞	1.000000.... ∞					
Cymatic Analysis								
polygon	179	360 sided gon			179		1	
primary	1	360 pts				1	1	
polygon	178	180 sided gon			89		2	
primary	2	180				1	2	
polygon	177	120 sided gon			59		3	
harmonic	33	120pts	3.496128197000000			11	3	
primary	3	120				1	3	
polygon	176	90 sided gon			44		4	
harmonic	88	90pts	1.442719099000000			22	4	
primary	8	90				2	4	CHECK
polygon	175	72 sided gon			35		5	
primary	5	72				1	5	
polygon	174	60 sided gon			29		6	
harmonic	78	60pts	1.586064544342490			13	6	
harmonic	66	60pts	1.851229586000000			11	6	
primary	6	60				1	6	
polygon	172	45 sided gon			21.5		8	
harmonic	164	45 pts				20.5	8	
harmonic	148	45pts	1.040719200441880			18.5	8	
harmonic	76	45pts				9.5	8	
harmonic	68	45	1.798907440	est		8.5	8	
harmonic	52	45pts	2.288245610000000			6.5	8	
harmonic	44	45 pts	2.661681542000000	est		5.5	8	
primary	4	45				0.5	8	
polygon	171	40 sided gon			19		9	CHECK
harmonic	63	40pts	1.926610162000000			7	9	
harmonic	27	40pts	4.236067978000000			3	9	
primary	9	40				1	9	
polygon	170	36 sided gon			17		10	
harmonic	70	36pts	1.748064098			7	10	
harmonic	50	36pts	2.380952381000000			5	10	
primary	10	36				1	10	

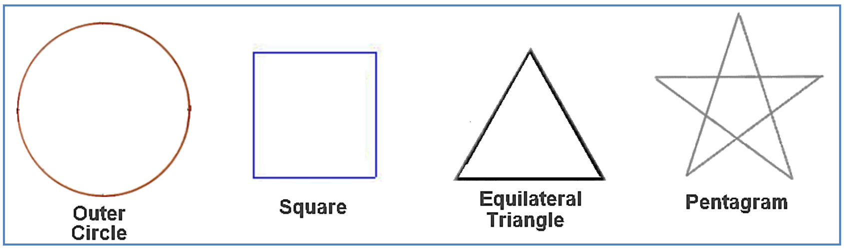
polygon	168	30 sided gon			14		12	
harmonic	48	30pts	2.472135954999580			4	12	
primary	24	30pts	4.846581983000000			2	12	
	12		missing			1	12	CHECK
polygon	167.1428571	28 sided gon			13		12.85714286	
primary	12.857142857	28				1	12.85714286	
polygon	165	24 sided gon			11		15	
harmonic	75	24pts	1.650647824000000			5	15	
primary	15	24				1	15	
polygon	162	20 sided gon	1.013333300000000	est	9		18	
harmonic	54	20pts	2.243033988816490			3	18	
primary	18	20pts	6.344258170675030			1	18	
polygon	160	18 sided gon			8		20	
harmonic	80	18pts	1.558660372143240			4	20	
primary	40	18pts	2.936169614607910			2	20	
	20		missing			1	20	CHECK
polygon	157.50	16 sided gon	1.020156458000000		7		22.5	
harmonic	67.50	16pts	1.807692308000000	est		3	22.5	
primary	22.50	16pts	5.236067977499790			1	22.5	
polygon	156	15 sided gon	1.030000000000000	est	6.5		24	
harmonic	84	15pts	1.497676197000000			3.5	24	
primary	12	15				0.5	24	
polygon	152.50	13 sided gon	1.033333000000000	est	5.5		27.72727273	CHECK
harmonic	69.23076923	13pts				2.5	27.69230769	
primary	13.846153846	13				0.5	27.69230769	
polygon	150	12 sided gon	1.038092722000000		5		30	
primary	30	12pts	3.853220324000000			1	30	
polygon	147.375	11sided gon	1.047142857000000		4.5		32.75	CHECK
harmonic	81.818181818	11pts	1.527864046000000			2.5	32.72727273	
harmonic	49.090909091	11pts ???	2.423290987000000			1.5	32.72727273	
primary	16.363636360	11				0.5	32.72727272	
polygon	144	decagon	1.053333300000000	est	4		36	
primary	72	10pts decagram	1.713525493000000			2	36	
polygon	140	nonogon	1.059016995000000		3.5		40	
harmonic	100	inner nonogram	1.309016994000000			2.5	40	
primary	20	nonogram	5.656854249492380			0.5	40	
polygon	135	octogon	1.080363027000000		3		45	
primary	45	octogram	2.618033989000000			1	45	
polygon	128.572418570	septagon			2.5		51.42896743	
harmonic	77.14285714	7pts ϕ golden mean	1.618033989000000			1.5	51.42857143	
primary	25.71428571	septagram	4.576491223248880			0.5	51.42857143	
polygon	108	pentagon	1.236067977499790		1.5		72	
primary	36	pentagram	3.236067977499790			0.5	72	

INTRODUCTION TO ANALYSIS BY HARMONICS



Are not these infants' building blocks?
Are not they also the components of the Philosopher's Stone?

The Square; the Circle; the Pentagram; and the Equilateral Triangle.

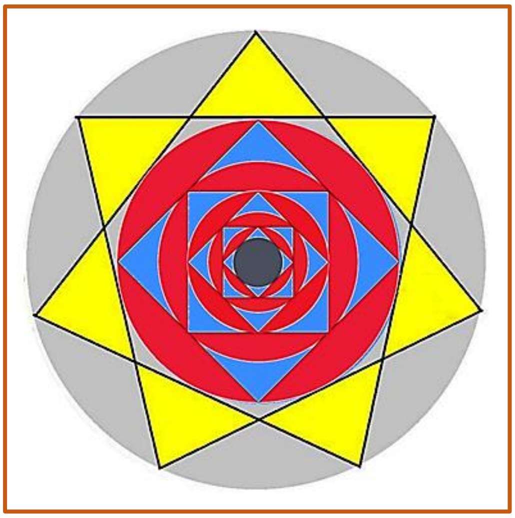


RATIOS	1.000000000		1.414213562		2.000000000		3.236067978
	1	x	**√2**	x	**(√2 x √2)**	x	**(√2 x √2 x Φ)**

1.000000 x 1.414213562 x 2.000000 x 3.236067978 = **9.152982446**

What shape has a Ratio ***9.152982446****?*

√2 x **(√2 x √2)** x **(√2 x √2 x Φ)**



This is a **Graphical** rendition of a **Mathematical Harmonic.**
The construction lines do not indicate the answer; just the circles.
Each Square has a Ratio of **√2.** **We have 5 nested squares.**
The Inner Septagram has a Ratio of **Φ.**

Five nested squares represents the Quadrature.
Five nested squares represents the Ratio for the Nonogram.
The image is of five nested squares multiplied by Phi (Golden Mean)

There is now a new overall Circumscribing to Inscribing Circle Ratio -- Nonogram Ratio x Phi

5.656854249 x 1.618033989 =9.152982446

My Shape Theorems:

"Plane Regular Shapes make Plane Regular Shapes **and** *Plane Regular Shapes are only made from Plane Regular Shapes".*

I have ultimately extended this theorem to further theorems:

"Any pair of the circles derived from the interaction of the Vesica Piscis with the 2:1 right angled triangle will produce a shape ratio and its corresponding polygon or polygram, and the repetitive multiplication of these ratios mathematically or graphically by the √2 will produce further shape ratios".

AND

"A further facet to the above theorem is that *the shape ratios that result from the above Vesica Piscis theorem will indicate total correlation with the frequencies of piano / music notes after allowing for a differential and a constant."*

AND

(My Stonehenge Theorem)

"In any set of three or more Concentric Circles if a shape ratio exists between all adjacent pairs of these circles then shape ratios exist between any pairs of these circles+. (Refer the Matrix)

Arguments have existed for many years that Φ is in all shape. This is not exactly the case. It may be found in one or two dimensions taken randomly in other shapes but these applications of Φ are unrelated individual measurements and do little to generate a genome or system of shape. How can we use these ratios from differing parts of shapes for comparison purposes? With my system using the ratios of the pairs of concentric circles, each pair of which exist in a ratio that is unique to *one* shape only, then the ratio IS the whole shape not just a part of it.

This is not Trigonometry as we know it (but Ptolemy Claudius in 150ad went terribly close to discovering it with his system of chords); it's not Calculus as we know it; it's not Algebra as we know it; it's not Geometry as we know it; it's not the Fibonacci Sequence as we know it; it's not Number Theory as we know it but it contains features of all areas of mathematics.

THE MAGIC THAT IS THE MATRIX

(If the Shape Theorem is universally applicable)

MATRIX OF KNOWN CORRECT RATIOS

MULTIPLICATION MATRIX			pentagram 3.236067977499790	13pts 41.53846154deg 2.828427124746190	Equilateral Triangle 2.000000000000000	Square 1.414213562373100	pentagon 1.236067977499790
36	pentagram	3.236067977499790	10.472135954999600	9.152982445082950	6.472135954999580	4.576491222541490	4.000000000000000
41	13pts 41.53846154deg	2.828427124746190	9.152982445082950	8.000000000000000	5.656854249492380	4.000000000000010	3.496128195590570
60	Equilateral Triangle	2.000000000000000	6.472135954999580	5.656854249492380	4.000000000000000	2.828427124746200	2.472135954999580
90	Square	1.414213562373100	4.576491222541470	4.000000000000000	2.828427124746190	2.000000000000010	1.748064097795280
108	pentagon	1.236067977499790	4.000000000000000	3.496128195590570	2.472135954999580	1.748064097795290	1.527864045000420

IF A SHAPE MULTIPLIED BY A SHAPE EQUALS A THIRD SHAPE then the Matrix results should all be Shapes:

18degrees	20pts	6.472135954999560
20degrees	nonogram	5.656854249492380
29.032258deg	31pts	4.000000000000000
33degrees	120pts	3.496128197000000
41.53846154deg	13pts	2.828427124746190
48degrees	30pts	2.472135954999580
69.23076923deg	13pts	1.666666666666660
81.818181deg	11pts	1.527864046000000

These results were taken from my "Degree – Shape – Ratio" suggested Genome of Shape

	36	pentagram	3.236067977499790
multiplied by	108	pentagon	1.236067977499790
equals			**4.000000000000000**

Angle	Shape	Ratio
29.032258deg	31pts	4.000000000000000

Ratio = √2 x √2 x √2 x √2 (or Square x Square x Square x Square)

	36	pentagram	3.236067977499790
divided by	108	pentagon	1.236067977499790
equals			**2.618033988749890**

Angle	Shape	Ratio
		2.618033988749890

√2 X √2 X √2 X √2	4.000000000000000
divided by Φ^2	2.618033988749890
equals pentagon ^{2}	**1.527864045000420**

Angle	Shape	Ratio
81.818181deg	11pts	1.527864046000000

	108	pentagon	1.236067977499790
multiplied by	108	pentagon	1.236067977499790
equals			**1.527864045000420**

Angle	Shape	Ratio
81.818181deg	11pts	1.527864046000000

	36	pentagram	3.236067977499790
multiplied by	36	pentagram	3.236067977499790
equals			10.472135954999600

Angle	Shape	Ratio
		3.236067977499790
		10.472135954999600

MATRIX BASED SOLELY ON PENTAGON & PENTAGRAM

MULTIPLICATION MATRIX			pentagram 3.236067977499790	pentagon 1.236067977499790
36	pentagram	3.236067977499790	10.472135954999600	**4.000000000000000**
108	pentagon	1.236067977499790	**4.000000000000000**	1.527864045000420

Angle	Shape	Ratio
81.818181deg	11pts	1.527864045000420
29.032258deg	31pts	4.000000000000000

	4.000000000000000
divided by	**2.618033988749890**
equals	**1.527864045000420**

MATRIX BASED SOLELY ON √2 AND ITS DERIVITIVES

				√2 X √2 X √2	√2 X √2	√2
MULTIPLICATION MATRIX				13pts 41.53846154deg	Equilateral Triangle	Square
				2.828427124746190	2.000000000000000	1.414213562373100
41	13pts	41.53846154deg	2.828427124746190	8.000000000000000	5.656854249492380	4.000000000000010
60	Equilateral Triangle		2.000000000000000	5.656854249492380	4.000000000000000	2.828427124746200
90	Square		1.414213562373100	4.000000000000000	2.828427124746190	2.000000000000010

THE SQUARE & THE GOLDEN MEAN – NATURALLY ASSOCIATED

pentagram	3.236067977499790
divided by Φ	1.618033988749890
equals √2 X √2	2.000000000000000

Φ	1.618033988749890
divided by pentagon	1.236067977499790
equals $\Phi^2/2$	1.309016994374950

Φ	1.618033988749890
multiplied by pentagon	1.236067977499790
equals √2 X √2	2.000000000000000

RELATIONSHIP BETWEEN POLYGONS & POLYGRAMS

Index	Details of Original Degrees			Original plus New Degrees	From Original Degrees divided by Original Index			New Index
	Degrees	Polygon	Ratios		New Degrees	Polygram/gon	Ratios	
				180				

Giving the means to derive all the shapes with apex angles up to 179+ degrees.

Index & Degree Relationships.....from Polygons to 7 Concentric Circles

Index	Details of Original Degrees			Original plus New Degrees	From Original Degrees divided by Index			New Index
	Degrees	Polygon	Ratios		New Degrees	Polygram/gon	Ratio	
0.5	60	Equilateral Triangle 3 sides	2.000000000	180	120	hexagon	1.144122806	2
1	90	square 4 side	1.414213562	180	90	square 4 side	1.414213562	1
1.5	108	pentagon 5 side	1.236067977	180	72	decagram	1.713525493	2
2	120	hexagon 6 side	1.144122806	180	60	Equi Tri	2.000000000	0.5
2.5	128.571428	heptagon 7 side	1.099357835	179.9999992	51.4285712	14 pts ??		2
3	135	octogon 8 side	1.080363027	180	45	Octagram	2.618033989	1
3.5	140	nonogon 9 side	1.059016995	180	40	18 pts	2.885438198	2
4	144	decagon 10 side	1.049828233	180	36	Pentagram	3.236067977	0.5
4.5	147.2727273	11 sided gon	1.047178767	180	32.72727273	22 pts ??		2
5	150	12 sided gon	1.038092722	180	30	12 point polygram	3.853220324	1
5.5	152.3076923	13 sided gon	1.035472873	180	27.69230769	26 pts ??		2
6	154.2857142	14 sided gon	1.031027796	179.9999999	25.7142857	septagram (25.7deg)	4.576491223	0.5
6.5	156	15 sided gon	1.030252993	180	24	30pts	4.846581983	2
7	157.5	16 sided gon	1.020156458	180	22.5	16pts	5.236067977	1
7.5	158.8235294	17 sided gon	1.017581875	180	21.17647059	34 pts ??		2
8	160	18 sided gon	1.015013790	180	20	nonogram	5.656854249	0.5
8.5	161.0526315	19 sided gon	1.002530099	179.9999999	18.94736841	38pts	6.111456184	2
9	162	20 sided gon		180	18	20		1
9.5	162.8571429	21 sided gon		180	17.14285714	42pts ??		2

This spreadsheet can be expanded infinitely, using all the embedded codes contained in polygon index numbers, and in their degrees.

The "New Index" column provides us with the origin of the ***"2 – 1 – 2 – 0.5"*** code. This code then enables the derivation of all primary shapes up to 179+ degrees and beyond towards infinity.

This simple spreadsheet may be expanded ad infinitum.

I have expanded my spreadsheet to 4603 steps

2300.5	179.9217901	4603	1.000000094	1.0000000000041070	0.138888888894593
899	179.8	1800	1.000000618	1.000000000688160	0.2
599	179.7	1200	1.000001392	1.000000002326430	0.3
539	179.6666667	1080	1.000001719	1.000000003193040	0.333333333
499	179.64	1000	1.000002006	1.000000004024110	0.36
479	179.625	960	1.000002177	1.000000004549510	0.375
449	179.6	900	1.000002477		0.4
359	179.5	720	1.000003874		0.5
299	179.4	600	1.000005583		0.6
269	179.3333333	540	1.000006897		0.666666667
249	179.28	500	1.000008048		0.72
239	179.25	480	1.000008735		0.75
224	179.2	450	1.000009943		0.8
199	179.1	400	1.000012594		0.9
179	179	360	1.000015562		1

Index & Degree Relationships .... Polygon Codes and Polygram Derivation

Patterns of Polygrams Produced

Index	Details of Original Degrees			Original plus New Degrees	From Original Degrees divided by Index			New Index	sides or points	distribution			
	Degrees	Polygon	Ratios		New Degrees	Polygram/gon	Ratios						
0.5	60	Equilateral Triangle 3 sides	2.000000000	180	120	Hexagon	1.144122806	2	6	6			
1	90	square 4 side	1.414213562	180	90	Square	1.414213562	1	4		4		
1.5	108	pentagon 5 side	1.236067977	180	72	Decagram	1.713525493	2	10	10			
2	120	hexagon 6 side	1.144122806	180	60	Equi Tri	2.000000000	0.5	3			3	
2.5	128.571428	heptagon 7 side	1.099357835	179.9999992	51.4285712	14 pts ??		2	14	14			
3	135	octogon 8 side	1.080363027	180	45	Octagram	2.618033989	1	8		8		
3.5	140	nonogon 9 side	1.059016995	180	40	18 pts	2.885438198	2	18	18			
4	144	decagon 10 side	1.049828233	180	36	Pentagram	3.236067977	0.5	5			5	
4.5	147.2727273	11 sided gon	1.047178767	180	32.72727273	22 pts ??		2	22	22			
5	150	12 sided gon	1.038092722	180	30	12 point polygram	3.853220324	1	12		12		
5.5	152.3076923	13 sided gon	1.035472873	180	27.69230769	26 pts ??		2	26	26			
6	154.2857142	14 sided gon	1.031027796	179.9999999	25.7142857	Septagram	4.576491223	0.5	7			7	
6.5	156	15 sided gon	1.030252993	180	24	30pts	4.846581983	2	30	30			
7	157.5	16 sided gon	1.020156458	180	22.5	16pts	5.236067977	1	16		16		
7.5	158.8235294	17 sided gon	1.017581875	180	21.17647059	34 pts ??		2	34	34			
8	160	18 sided gon	1.015013790	180	20	Nonogram	5.656854249	0.5	9			9	
8.5	161.0526315	19 sided gon	1.002530099	179.9999999	18.94736841	38pts	6.111456184	2	38	38			
9	162	20 sided gon		180	18	20		1	20		20		
9.5	162.8571429	21 sided gon		180	17.14285714	42pts ??		2	42	42			
10	163.6363636	22		180	16.36363636	11		0.5	11			11	
10.5	164.3478261	23		180	15.65217391	46		2	46	46			
11	165	24		180	15	24		1	24		24		
11.5	165.6	25		180	14.4	50		2	50	50			
12	166.1538462	26		180.0000001	13.84615385	13		0.5	13			13	
12.5	166.6666667	27		180	13.33333333	54		2	54	54			
13	167.1428571	28		180	12.85714285	28		1	28		28		
13.5	167.5862069	29		180	12.4137931	58		2	58	58			
14	168	30		180	12	15		0.5	15			15	
14.5	168.3870968	31		180	11.61290323	62		2	62	62			
15	168.75	32		180	11.25	32		1	32		32		
15.5	169.0909091	33		180	10.90909091	66		2	66	66			
16	169.4117647	34		180	10.58823529	17		0.5	17			17	
16.5	169.7142857	35		180	10.28571428	70		2	70	70			
17	170	36		180	10	36		1	36		36		
17.5	170.2702703	37		180	9.729729731	34		2	74	74			
18	170.5263158	38		180	9.473684211	17		0.5	19			19	
18.5	170.7692308	39		180	9.230769232	78		2	78	78			
19	171	40		180	9	40		1	40		40		
19.5	171.2195122	41		180	8.780487805	82		2	82	82			
20	171.4285714	42		180	8.57142857	21		0.5	21			21	
20.5	171.627907	43		180	8.372093024	86		2	86	86			
21	171.8181818	44		180	8.181818181	44		1	44		44		
21.5	172	45		180	8	90		2	90	90			

Index & Degree Relationships .... Polygon Codes and Polygram Derivation

Patterns of Polygrams Produced

Index	Details of Original Degrees			Original plus New Degrees	From Original Degrees divided by Index			New Index	sides or points	distribution		
	Degrees	Polygon	Ratios		New Degrees	Polygram/gon	Ratios					
22	172.173913	46		180	7.826086957	23		0.5	23			23
22.5	172.3404255	47		180	7.659574468	94		2	94	94		
23	172.5	48		180	7.5	48		1	48		48	
23.5	172.6530612	49		180	7.346938776	98		2	98	98		
24	172.8	50		180	7.2	25		0.5	25			25
24.5	172.9411765	51		180	7.058823529	102		2	102	102		
25	173.0769231	52		180	6.923076923	52		1	52		52	
25.5	173.2075472	53		180	6.79245283	106		2	106	106		
26	173.3333333	54		180	6.666666667	27		0.5	27			27
26.5	173.4545455	55		180	6.545454545	110		2	110	110		
27	173.5714286	56		180	6.428571429	56		1	56		56	
27.5	173.6842105	57		180	6.315789474	114		2	114	114		
28	173.7931034	58		180	6.206896552	29		0.5	29			29
28.5	173.8983051	59		180	6.101694915	118		2	118	118		
29	174	60		180	6	60		1	60		60	
29.5	174.0983607	61		180	5.901639344	122		2	122	122		
30	174.1935484	62		180	5.806451613	31		0.5	31			31
30.5	174.2857143	63		180	5.714285714	126		2	126	126		
31	174.375	64		180	5.625	64		1	64		64	
31.5	174.4615385	65		180	5.538461538	130		2	130	130		
32	174.5454545	66		180	5.454545455	33		0.5	33			33
32.5	174.6268657	67		180	5.373134328	134		2	134	134		
33	174.7058824	68		180	5.294117647	68		1	68		68	
33.5	174.7826087	69		180	5.217391304	138		2	138	138		
34	174.8571429	70		180	5.142857143	35		0.5	35			35
34.5	174.9295775	71		180	5.070422535	142		2	142	142		
35	175	72		180	5	72		1	72		72	
35.5	175.0684932	73		180	4.931506849	146		2	146	146		
36	175.1351351	74		180	4.864864865	37		0.5	37			37
36.5	175.2	75		180	4.8	150		2	150	150		
37	175.2631579	76		180	4.736842105	76		1	76		76	
37.5	175.3246753	77		180	4.675324675	154		2	154	154		
38	175.3846154	78		180	4.615384615	39		0.5	39			39
38.5	175.443038	79		180	4.556962025	158		2	158	158		
39	175.5	80		180	4.5	80		1	80		80	
39.5	175.5555556	81		180	4.444444444	162		2	162	162		
40	175.6097561	82		180	4.390243902	41		0.5	41			41
40.5	175.6626506	83		180	4.337349398	166		2	166	166		
41	175.7142857	84		180	4.285714286	84		1	84		84	
41.5	175.7647059	85		180	4.235294118	170		2	170	170		
42	175.8139535	86		180	4.186046512	43		0.5	43			43
42.5	175.862069	87		180	4.137931034	174		2	174	174		
43	175.9090909	88		180	4.090909091	88		1	88		88	
43.5	175.9550562	89		180	4.04494382	178		2	178	178		
44	176	90		180	4	45		0.5	45			45
44.5	176.043956	91		180	3.956043956	182		2	182	182		
45	176.0869565	92		180	3.913043478	92		1	92		92	
45.5	176.1290323	93		180	3.870967742	186		2	186	186		
46	176.1702128	94		180	3.829787234	47		0.5	47			47
46.5	176.2105263	95		180	3.789473684	190		2	190	190		
47	176.25	96	1.000224014	180	3.75	96		1	96		96	
47.5	176.2886598	97		180	3.711340206	194		2	194	194		
48	176.3265306	98		180	3.673469388	49		0.5	49			49
48.5	176.3636364	99		180	3.636363636	198		2	198	198		
49	176.4	100	1.000206186	180	3.6	100		1	100		100	

SOME CALCULATED INDEX NUMBERS:

SORTED BY NUMBER OF POINTS

SHAPE		INDEX NUMBER CALCULATION	
POINTS	DEGREES	POINTS X DEGREES	/ BY 360 INDEX No
7	25.7143	180	0.5
7	77.14286	540	1.5
8	135	1080	3
8	45	360	1
9	140	1260	3.5
10	72	720	2
11	49.09091	540	1.5
11	114.5455	1260	3.5
12	150	1800	5
12	30	360	1
13	69.23077	900	2.5
13	96.92308	1260	3.5
13	41.53846	540	1.5

SORTED BY INDEX NUMBER

SHAPE		INDEX NUMBER CALCULATION	
POINTS	DEGREES	POINTS X DEGREES	/ BY 360 INDEX No
7	25.7143	180	0.5
8	45	360	1
12	30	360	1
7	77.14286	540	1.5
11	49.09091	540	1.5
13	41.53846	540	1.5
10	72	720	2
13	69.23077	900	2.5
8	135	1080	3
11	114.5455	1260	3.5
13	96.92308	1260	3.5
9	140	1260	3.5
12	150	1800	5

SORTED BY NUMBER OF DEGREES

SHAPE		INDEX NUMBER CALCULATION	
POINTS	DEGREES	POINTS X DEGREES	/ BY 360 INDEX No
7	25.7143	180	0.5
12	30	360	1
13	41.53846	540	1.5
8	45	360	1
11	49.09091	540	1.5
13	69.23077	900	2.5
10	72	720	2
7	77.14286	540	1.5
13	96.92308	1260	3.5
11	114.5455	1260	3.5
8	135	1080	3
9	140	1260	3.5
12	150	1800	5

ALL 13 POINT OR SIDED SHAPES:

DEGREES	SHAPE	RATIO	INDEX NUMBER DEGREES X 13 / 360
152.307692300000000	13 SIDED POLLYGON	1.033333333333330	5.50
124.615384600000000	13 POINT POLLYGRAM 1	1.133333333333330	4.50
96.923076920000000	13 POINT POLLYGRAM 2	1.335402142000000	3.50
69.230769230000000	13 POINT POLLYGRAM 3	1.666666666666660	2.50
41.538461540000000	13 POINT POLLYGRAM 4	2.828427124746190	1.50
13.846153850000000	13 POINT POLLYGRAM 5	8.000000000000000	0.50

SOME SHAPES SQUARED

SHAPE X SHAPE = SHAPE

SHAPE SQUARED = SHAPE X SHAPE

SHAPES			SHAPES SQUARED		
Deg	Shape	Ratio	Ratio^2	Shape	Deg
90	Square	1.414213562373100	2.000000000000000	Equilateral Triangle	60
60	Equilateral Triangle	2.000000000000000	4.000000000000000	31pts	29.0323
144	10pts 144deg decagon	1.054412604487850	1.111785940502840	15pts	127
127	15pts 132 deg ???	1.111785940502840	1.236067977904130	pentagon	108
108	5pt pentagon 108deg	1.236067977904130	1.527864045000420	11pts	81.8182
103	14 pt polygram 102.85714deg	1.272019649514070	1.618033988749890	7pts ϕ	77.1429
77	7pts ϕ 77.14285714deg	1.618033988749890	2.618033988749870	35pts	46.2857
45	8pts octogram 45deg	2.613125930000000	6.828427126038360	53pts	17 +/- deg
120	hexagon	1.154700538379250	1.333333333333330	13pts	96.9230
97	13pts 96.923deg	1.333333333333330	1.777777777777780	13pts	69.2308
112	16pts 112.5deg 1.205357143	1.202330151451340	1.445597793089000	45pts	1.4483

Note: 6.828427126 less 4.000000000 equals 2.828427126, the ratio for a 13 point polygram.
And 4.000000000 equals 2^2 or Equilateral Triangle squared.
And 4.000000000 is itself the ratio for a 31 point polygram.

*However, the result 1.777777777 is **not** the ratio for a 13 point polygram.*
The polygram referred to was a 13 point polygram with a ratio 1.6666666666 which is identified in the list of Right Angled Triangles (denomination of 3 to 4 to 5) on Plimpton 322. So, this 13 point polygram when squared does not produce another 13 point polygram. I have yet to ascertain the shape that has a ratio of 1.777777777, but if Shape multiplied by Shape equals Shape then the result should be a Shape..

A SIGNATURE FEATURE IN THE GRAPHICAL SQUARING PROCESS

With the squaring of intermediate or secondary shapes the construction lines in the ***internal shape*** in the graphical squaring process will extend to produce the resulting shape in this squaring exercise.

With a primary shape as an ***internal shape*** in the graphical squaring process its construction lines will **not** extend to produce a resulting shape in this squaring process, except where the primary shape appears as **multiple phases with itself**.

A primary shape, where it appears in a Cymatics experiment result **as multiple phases with itself**, must exist as an ***internal shape*** in the graphical process and the overall external shape can be identified by extending the construction lines outwards.

A STUDY OF SHAPES IN PHASE

SHAPES IN PHASE

SHAPES	PHASES 2	3	4	5	6	7	8	9	10
	RESULTING POINTS								
EQUILATERAL TRIANGLE	6	9	12	15	18	21	24	27	30
SQUARE	8	12	16	20	24	28	32	36	40
PENTAGRAM	10	15	20	25	30	35	40	45	50
HEXAGON	12	18	24	30	36	42	48	54	60
SEPTAGRAM	14	21	28	35	42	49	56	63	70
OCTAGRAM	16	24	32	40	48	56	64	72	80
NONOGRAM	18	27	36	45	54	63	72	81	90
DECAGRAM	20	30	40	50	60	70	80	90	100

RESULTANT DENOMINATIONS OF SHAPES' POINTS	
6	36
8	40
9	42
10	45
12	48
14	49
15	50
16	54
18	56
20	60
21	63
24	64
25	70
27	72
28	80
30	81
32	90
35	100

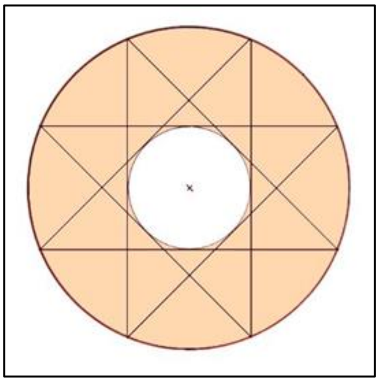
SOME POSSIBLE PHASES IN THE 72 POINT (MULTIPOINT) POLYGRAM

E.G. 72 POINTS		2x36	3x24	4x18		6x12		8x9	9x8	12x6	18x4	24x3

An important feature when dealing with multiples copies of a shape in phase is the ***'Dough in the Doughnut'*** concept. All shapes in phase operate within the area of this doughnut, whether there are 3 copies, 5 copies, 10 copies etc. A particular 'doughnut' has the same ratio regardless of the number of copies of a shape in phase exist within its boundaries. So, the ratio is virtually the doughnut whatever it contains, a single shape or multiples-in phase.

Understanding the '*Dough in the Doughnut'* concept:

The *dough in the doughnut* represents the limit of the sphere of influence or activity of the shape as it is formed by the continuous tangent. This tangent operates between these two limits to form the shape that is unique to the pair of circles in this particular ratio. Many theories are concerned with areas of shapes but this 'Dough in the Doughnut' theory makes no reference at all to area; it is a sphere of influence defined by a ratio that has no unit of measurement. The constant π takes no part in this theory of shape.

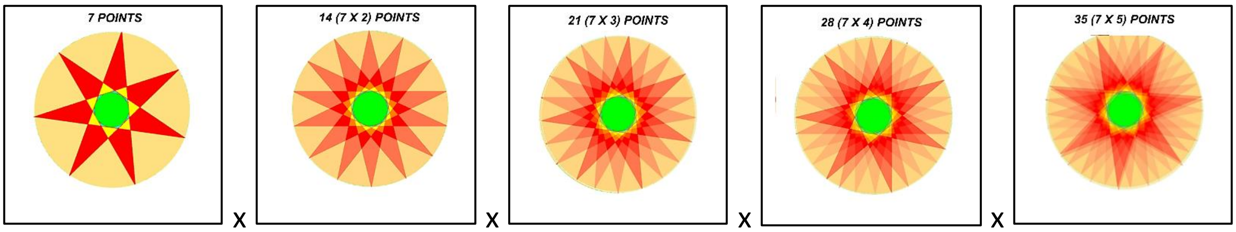


This image shows how all the 'construction' tangents that form the Octagram shape are formed and operate within the zone of the 'dough' only.

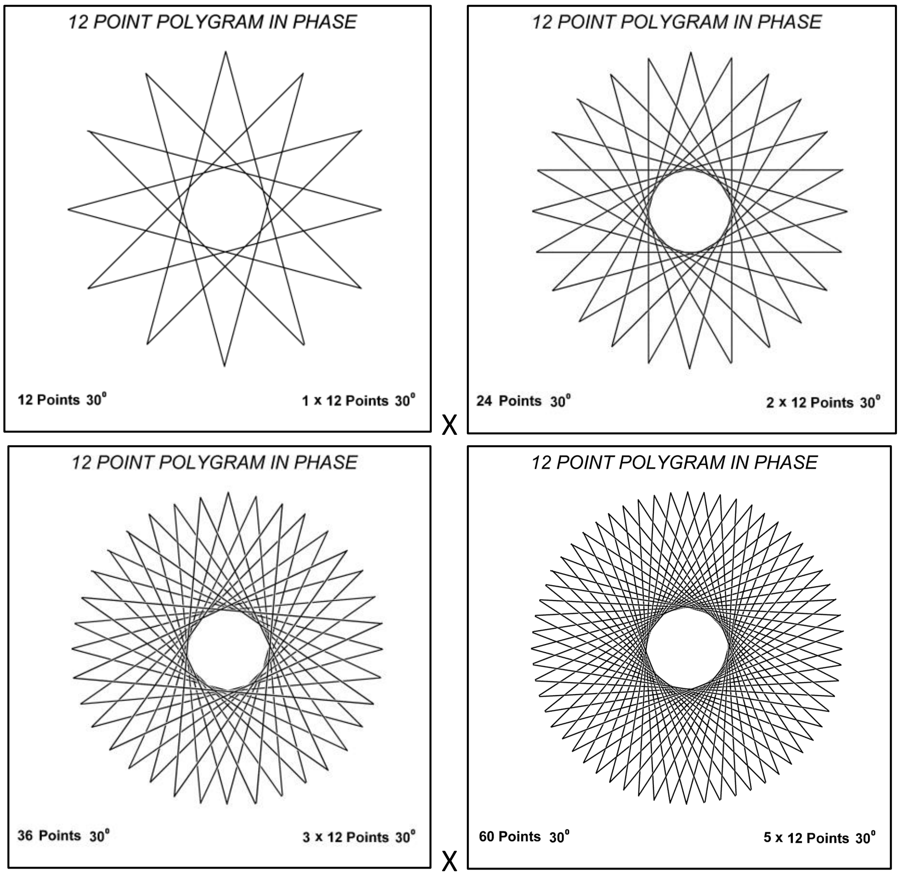
Wider or narrower widths of 'dough' will form other shapes provided that the continuous construction tangent eventually returns again to the first or original **point of commencement**.

The centre of the inscribing circle is always vacant or empty. Without an **inscribing** circle there would be no shape; so, **without a vacant or empty centre there can be no plane regular shape**. – *"The Hole in the Doughnut".*

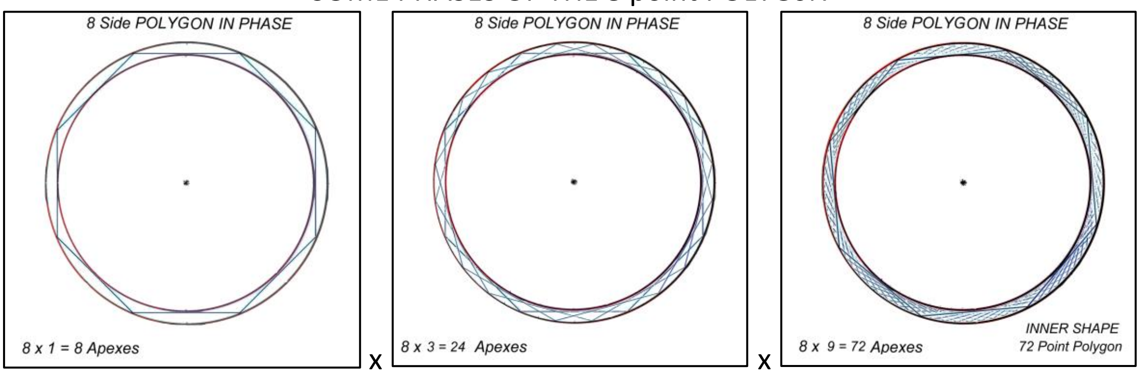
SOME SHAPES-IN-PHASE USING THE SEPTAGRAM



SOME PHASES OF THE 12 point POLYGRAM

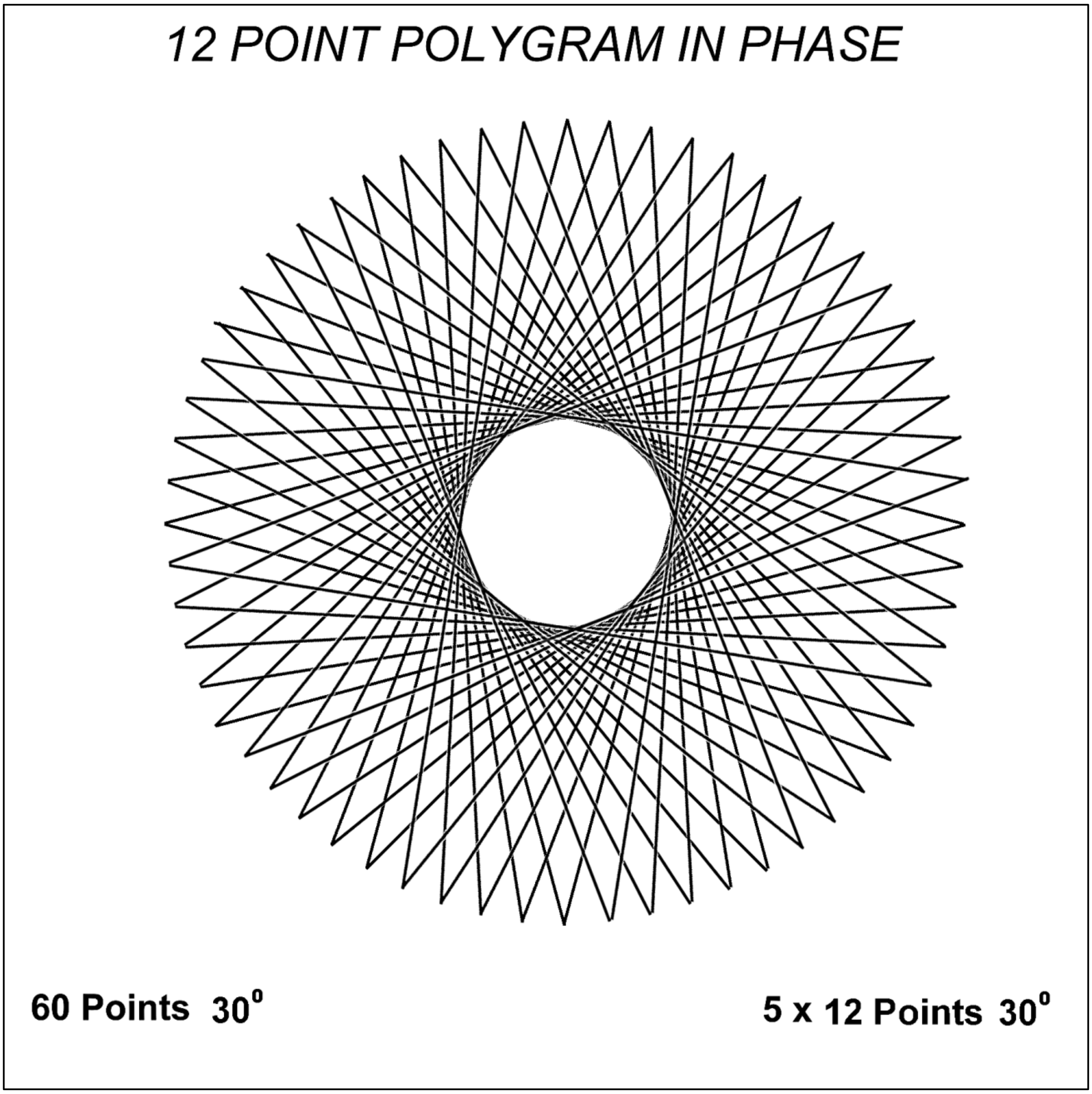


SOME PHASES OF THE 8 point POLYG0N



Regardless of the number of phases in each of the sets above the outer to inner circle ratios remain the same. The presence of shapes in phase indicates that the actual shape being illustrated is the multiple of the phases of the inner shape. Shapes in Phase are simply a step on the way to ultimate shapes present.

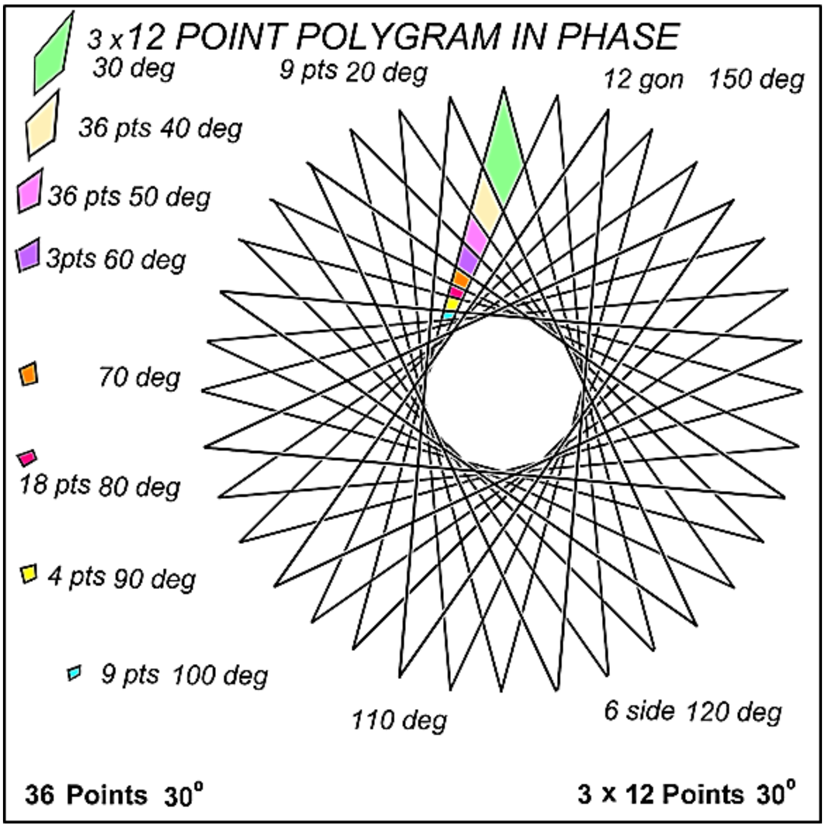
THE 12 POINT POLYGRAM WITH 5 PHASES



Can you see circles in this image? – Is this an Escher like effect?

These are the intermediate circles that indicate the dough in the doughnut for each of the invisible **Mathematical Harmonics** which multiply together to form the overall ratio for the overall shape.These invisible yet omnipresent circles are formed by the **Construction Harmonics** of the overall shape. These circles show themselves at the apex points of the construction lines for each internal Construction Harmonic Shape. ***They actually become visible in Cymatics research when using water as a medium to display frequency initiated shapes.*** Lauterwasser's Water Sound Images abound with these circles as do the Arachnoidiscus and Coscinodiscus Diatoms.

THE 12 POINT POLYGRAM WITH 3 PHASES



THE INNER HARMONICS OF THE 12 POINT POLYGRAM WITH 3 PHASES

THE HARMONICS OF 3 X 12 POINT POLYGRAMS IN PHASE

THE GRAPHICAL HARMONICS OF THE 3 X 12 POINT POLYGRAMS IN PHASE		CONSTRUCTION HARMONICS	MATHEMATICAL HARMONICS	THE HIDDEN SHAPES OF THE MATHEMATICAL HARMONICS	
	INTEGER MULTIPLES	INCOMMENSURABLES	INCOMMENSURABLES	INCOMMENSURABLES	
DEGREES	POINTS / SIDES	RATIO	*HARMONIC MULTIPLIER between Construction Harmonics*	SHAPE	NEAREST RATIO
10 degrees	36 points	--------------			
20	4 x 9 points	5.656854249			
30	3 x 12 points	3.853220324	1.468084816	86 deg?	
40	2 x 18 points	2.936169614	1.312328929	99 deg 40pts	1.316074013116280
50	36 points	2.381421133	1.232948500	pentagon 108deg	1.236067977499790
60	12 x 3 points	2.000000000	1.190710567	11pts 114.545454 deg	1.190710563000000
70	36 points	1.748064098	1.144122806	122 deg?	
80	2 x 18 points	--------------	#VALUE!		
90	9 x 4 points	1.414213562	#VALUE!		
100	4 x 9 points	1.309016994	1.080363027		
110	--------------	1.211645495	1.080363026		
120	6 x 6 side hexagon	1.154700538	1.049315779	145 / 146 DEGREES	
130	--------------	--------------	#VALUE!		
140	4 x 9 side nonogon	1.059016995	#VALUE!		
150	3 x 12 side polygon	1.038092722	1.020156459	157.5 deg	16 sided gon

A WORK IN PROGRESS – REQUIRES A GENOME OF SHAPE. – (Caution: some ratios may be estimates).

MY FABRIC OF THE COSMOS
&
MATHEMATICS OF THE UNIVERSE

MY FABRIC OF THE COSMOS . . . IN MULTI-POINT POLYGRAMS:

CONSTRUCTION HARMONICS

THEY HAVE A COMMON INSCRIBING CIRCLE

THEY HAVE COMMON CONSTRUCTION LINES

THESE CONSTRUCTION LINES MAY BE EXTENDED OUTWARDS UNTIL THE OUTER PRIMARY SHAPE IS ATTAINED. THESE LINES WILL THEN BECOME PARALLEL OR RADIATE INTO SPACE WITHOUT EVER CROSSING AGAIN

INNER PRIMARY SHAPES IN A MULTIPOINT POLYGRAM CAN ONLY EXIST AS MULTIPLES IN PHASE

Refer to Bohr's Round Circles for Electron travel.
Refer to Heisenberg's Forward and Back Electron travel
Refer to Dirac's Elliptic Electron travel (as per Kepler)
Refer to Dirac's Beautiful Mathematics

MATHEMATICAL HARMONICS

THERE ARE NO COMMON INSCRIBING CIRCLES

EACH SHAPE HAS ITS OWN SPECIFIC PAIR OF UNSEEN CIRCLES

THEY RESIDE BETWEEN ADJACENT OUTER CIRCLES OF OF ADJACENT CONSTRUCTION HARMONICS SHAPES.

THEY ARE THE HARMONIC MULTIPLIERS OF THE THE CONSTRUCTION HARMONICS RATIOS.

THEY ARE INVISIBLE IN THE SHAPE UNTIL CALCULATED AND DRAWN INTO THE MULTIPOINT SHAPE.

AS *Shape x Shape = Shape* THEN ANY SET OF NON ADJACENT CONSTRUCTION HARMONICS SHAPES SHOULD ALSO PRODUCE MATHEMATICAL HARMONICS

AS THESE HARMONIC SHAPES ARE "NESTED" THEY CAN FILL A CIRCULAR VOID IN MUCH THE SAME MANNER AS HEXAGONS CAN FILL A PLANE.

EACH 'NESTED' SHAPE'S EMPTY FIELDS MAY BE FILLED BY MULTIPLES OF THE SHAPE IN PHASE AD INFINITUM. GAPS IN THE 'NESTED' CONSTRUCTION HARMONIC SHAPES ARE THE FIELD OF INFLUENCE OF THE SHAPE AND MAY BE VIEWED AS "*THE DOUGH IN THE DOUGHNUT*" *OF THAT SHAPE.*

RE: SHAPES IN PHASE & DIATOMS

The majority of Diatoms analyzed appear to be even numbered multiples of prime shapes in phase such that one could miss noting the fact that Diatoms seem to develop from Prime Numbered Shapes.

QUANTUM LEAPS (if they exist) in FREQUENCY INDUCED PLANE REGULAR SHAPES

This chart has been produced as far as my current *GENOME OF SHAPE* will allow.
A complete and accurate *GENOME OF SHAPE* would produce more accurate information.
It is hoped that this minimal amount of info should give indications of possibilities.

HARMONICS WITHIN THE 36 POINT PRIMARY POLYGRAM (10 DEGREES)

SHAPE x SHAPE = SHAPE

QUANTUM LEAPS (if they exist) in FREQUENCY INDUCED PLANE REGULAR SHAPES

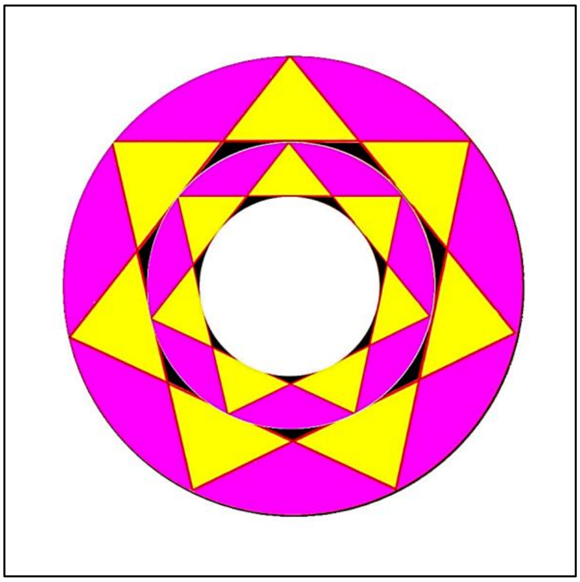
	MATHEMATICAL HARMONICS *MATHEMATICAL HARMONIC*	*Quantum jump one* *A x B*	SHAPE	*Quantum jump two* *A x B x C*	SHAPE	*Quantum jump three* *A x B x C x D*	SHAPE	*Quantum jump four* *A x B x C x D x E*	SHAPE
A	1.468084816								
B	1.312328929	1.926610173	40pts 63deg						
C	1.232948500	1.618033984	7pts ϕ 77.14285714deg	2.375411123	50deg 36pts 2.38095				
D	1.190710567	1.468084807	86deg	1.926610162	40pts 63deg	2.828427125	13pts 41.53846154deg		
E	1.144122806	1.362319114	71pts (95.0704 deg)	1.679669308	74deg	2.204278624	54deg 20pts 2.21296est	3.236067977	36deg pentagram
F	#VALUE!	#VALUE!		#VALUE!		#VALUE!			
G	#VALUE!	#VALUE!		#VALUE!		#VALUE!			
H	1.080363027	#VALUE!		#VALUE!		#VALUE!			
I	1.080363026	1.16718427	40pts 117deg	#VALUE!		#VALUE!			
J	1.049315779	1.133641971	13pts 124.75 deg	1.224744871	109deg 1.2299165	#VALUE!			
K	#VALUE!	#VALUE!		#VALUE!		#VALUE!			
L	#VALUE!	#VALUE!		#VALUE!		#VALUE!			
M	1.020156459	#VALUE!	157.5 deg 16 sided gon	#VALUE!		#VALUE!			

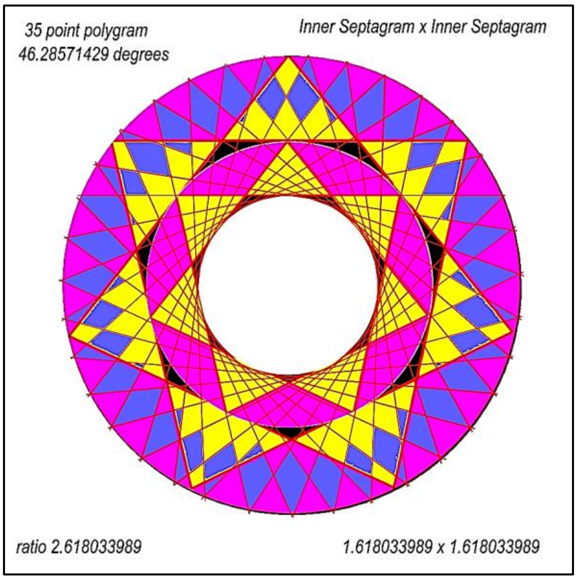
QUANTUM LEAP FROM ONE MATHEMATICAL HARMONIC TO THE NEXT

	MATHEMATICAL HARMONICS *MATHEMATICAL HARMONIC*	*Quantum jump one* *A / B*	SHAPE
A	1.468084816		
B	1.312328929	1.118686622	------------
C	1.232948500	1.064382599	------------
D	1.190710567	1.03547288	------------
E	1.144122806	1.040719196	45pts 148 deg
F	#VALUE!	#VALUE!	------------
G	#VALUE!	#VALUE!	------------
H	1.080363027	#VALUE!	------------
I	1.080363026	1	*Singularity*
J	1.049315779	1.029588087	------------
K	#VALUE!	#VALUE!	------------
L	#VALUE!	#VALUE!	------------
M	1.020156459	#VALUE!	------------

SQUARING INTERMEDIATE or SECONDARY SHAPES

INNER SEPTAGRAM X INNER SEPTAGRAM





BOTH IMAGES HAVE THE SAME OVERALL CIRCUMSCRIBING TO INSCRIBING CIRCLE RATIOS.

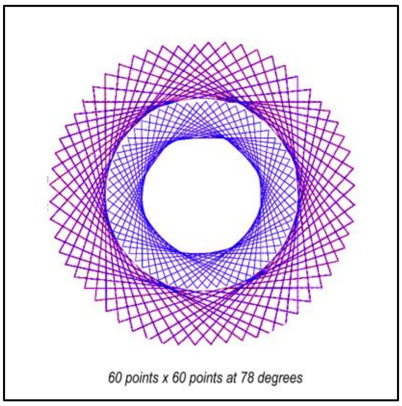
Inner Septagram x Inner Septagram = 35 Point Polygram
(46.28571429 ^{0} by calculation).

Ratio 1.618033989 (Φ) squared = 2.618033989.
NOT A PRIME NUMBERED SHAPE.
BUT, DERIVED FROM 5 X 7, TWO PRIME NUMBERS.

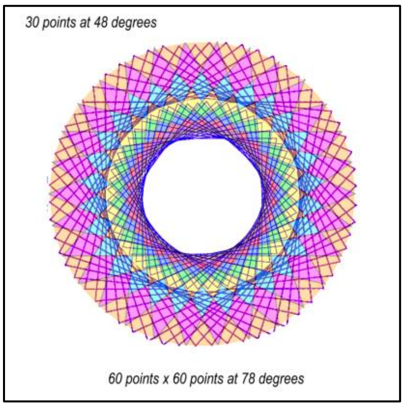
This is actually 5 Inner Septagrams in phase. (The internal Inner Septagram).
The internal Inner Septagram's outline follows the construction lines of the overall 35 point polygram.
*The **Internal** Inner Septagram is a **Construction Harmonic** for the eventual 35 point polygram.*
*The **External** Inner Septagram is the **Hidden Mathematical Harmonic** for the 35 point polygram.*

77	**7pts ɸ 77.14285714deg**	**1.618033989000000**
Initial Shape (Graphically) Squared		
81	**11pts 81.818181deg**	**1.527864046000000**

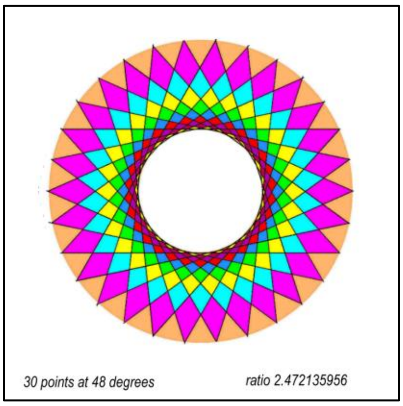
60 POINT POLYGRAM (78 degrees) SQUARED



x

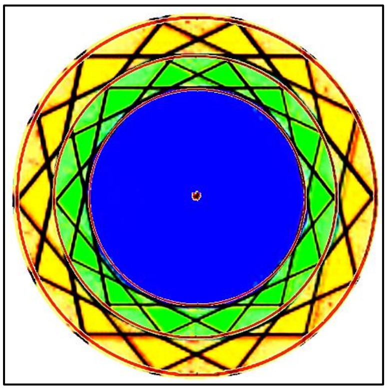


x

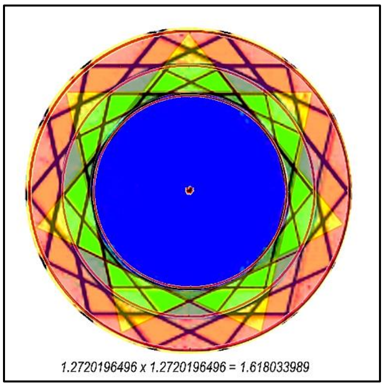


60 point polygram (78 degrees) x 60 point polygram (78 degrees) = 30 point polygram (48 degrees)
1.572302755 x 1.572302755 = 2.472135955

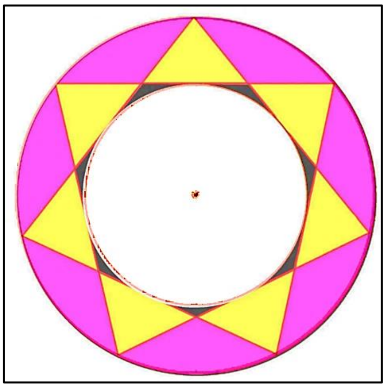
14 POINT POLYGRAM (103 degrees) X 14 POINT POLYGRAM (103 degrees)



x



x



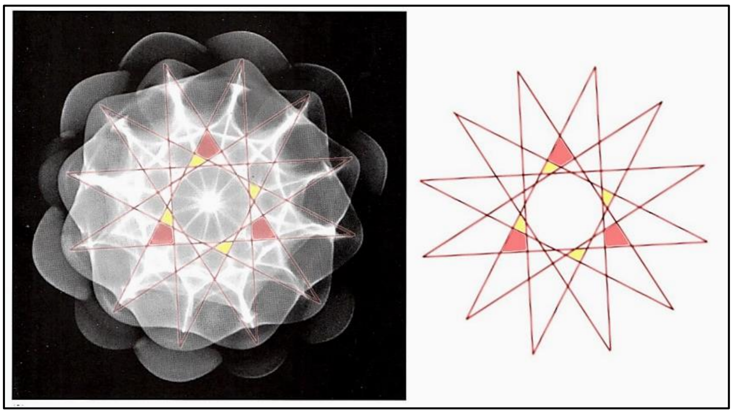
14 point polygram x 14 point polygram = Inner Septagram
1.2720196498 x 1.2720196498 = 1.618033989

14 point polygrams at 103 degrees

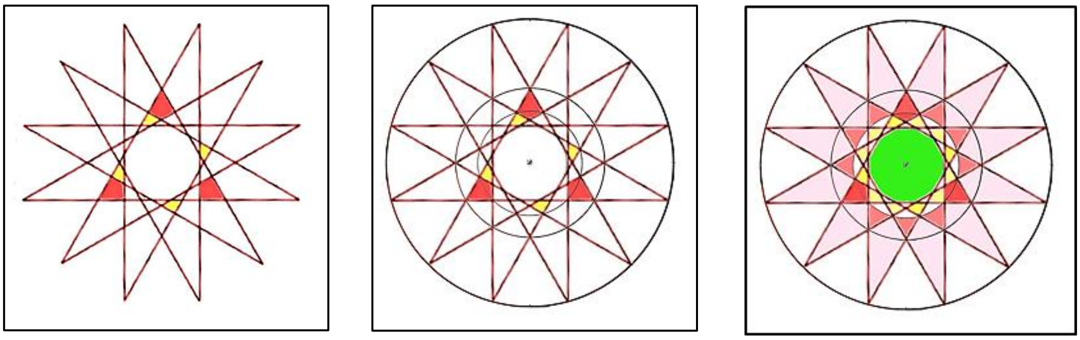
The images show how the construction lines for the Inner 14 point polygram when extended form the construction lines for the final Inner Septagram image

This final Inner Septagram image should in fact be ***two Inner Septagrams in phase*** but the mathematical ratio would remain the same; the same Inner and Outer Circles producing the two shapes in phase as well as the initial primary shape.

HARMONIC ANALYSIS OF HANS JENNY'S CLASSICAL IMAGE

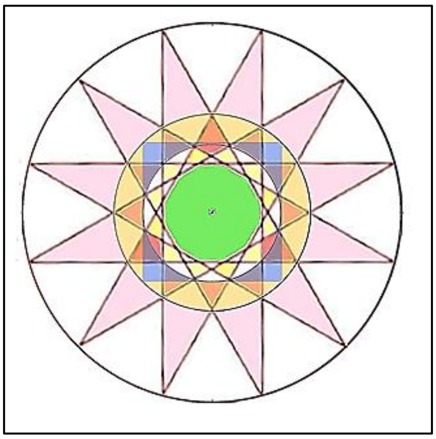


GRAPHICAL CONSTRUCTION HARMONICS:

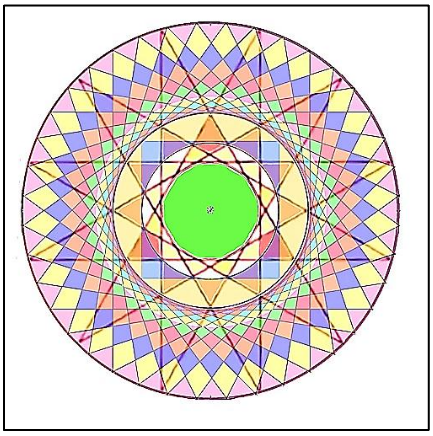


√2 x √2 = 2.000000000 x 1.926610162 = 3.853220324, the ratio for the 12 point polygram.
Square x Square = Equilateral Triangle x 1.926610162 = the ratio for the 12 point polygram
What is the Shape with a Ratio of 1.926610162? (Refer to Genome of Shape?)

"HIDDEN" MATHEMATICAL HARMONICS



***Construction Harmonics**: Square, Equilateral Triangle*

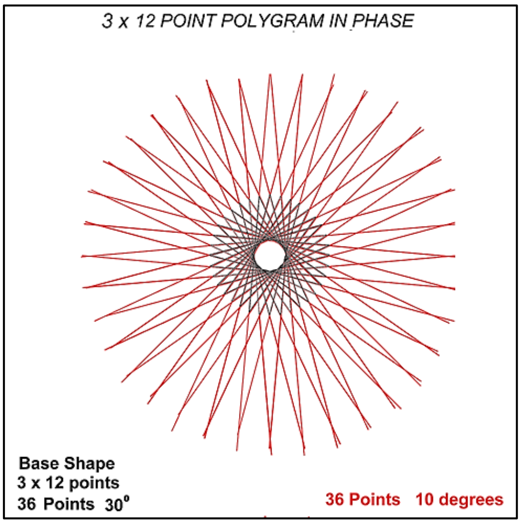


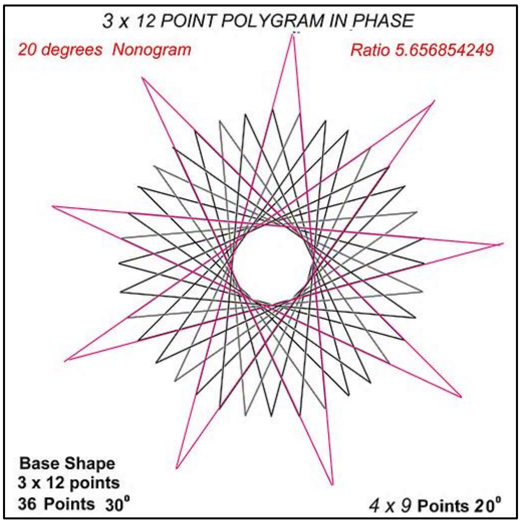
***Mathematical Harmonics**: Square, 40 point polygram.*

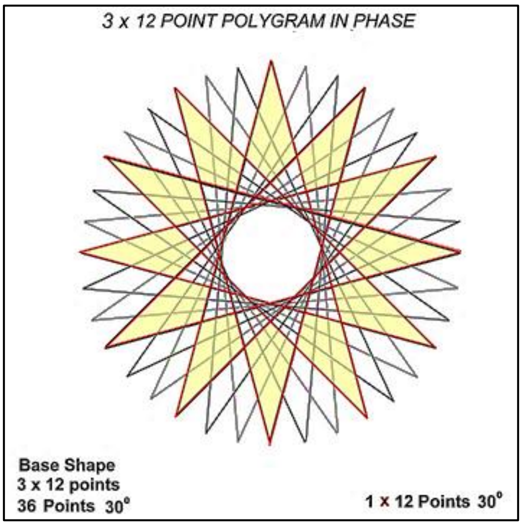
The final analysis is: Square x Square x 40 point Polygram (63 degrees with ratio 1.926610162)
(Square x Square = Equilateral Triangle) . . . OR . . . 1.414213562 x 1.414213562 = 2.000000000.
1.414213562 x 1.414213562 x 1.926610162 . . . OR . . . 2 x 1.926610162 giving 3.853220324
JENNY'S IMAGE HAS A SHAPE RATIO OF 3.853220324
Now what Frequency and Amplitude did he use?

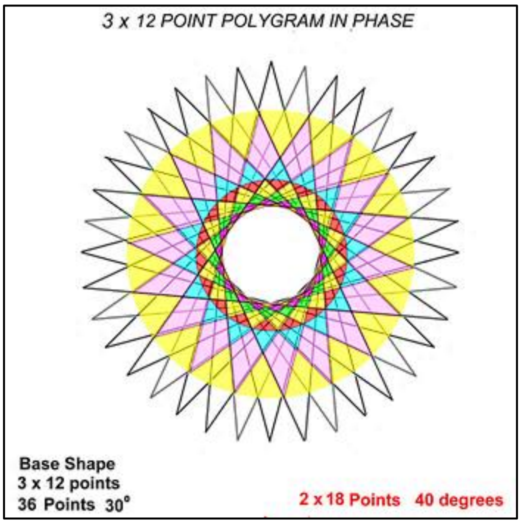
CONSTRUCTION HARMONIC MULTIPLIERS

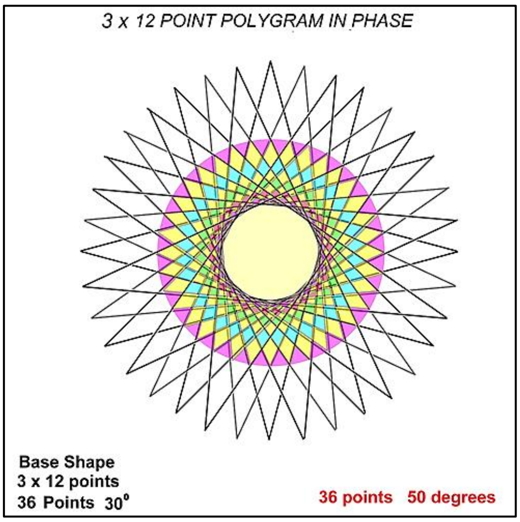
3 x 12 Point Polygrams in phase with sides extended:

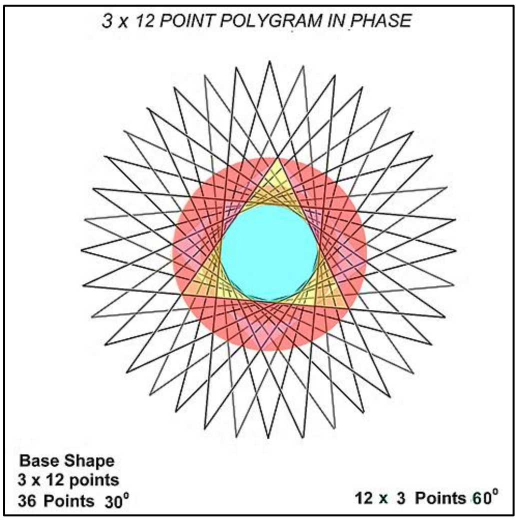






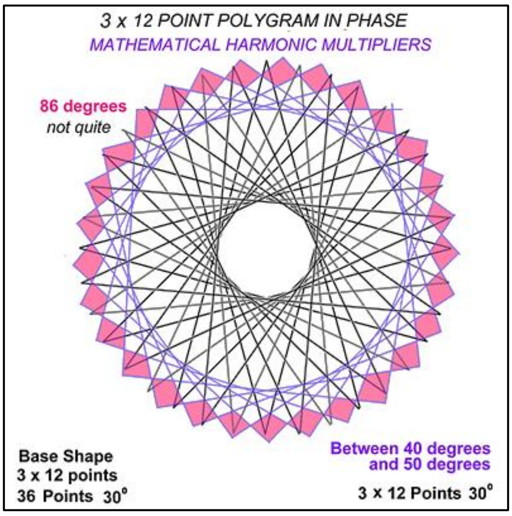


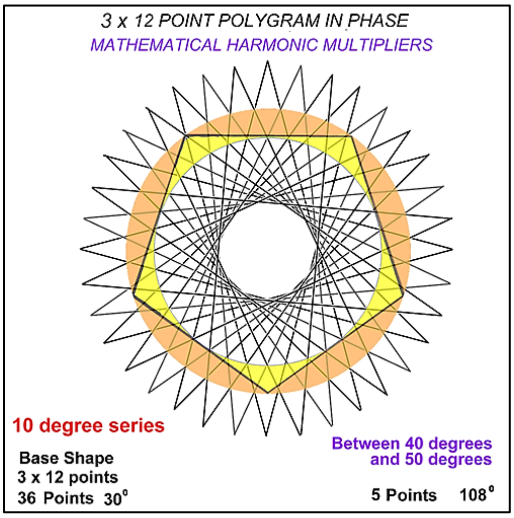


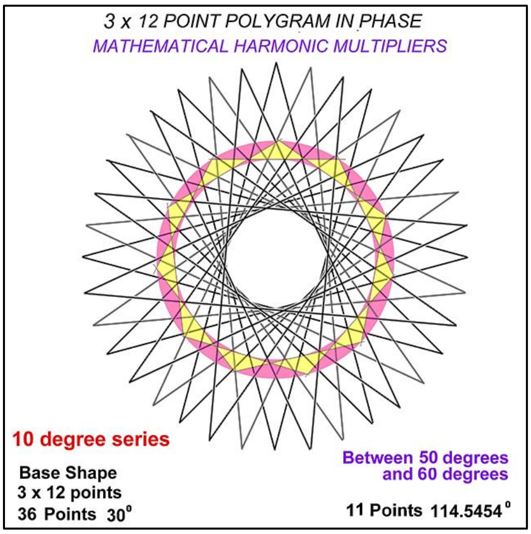


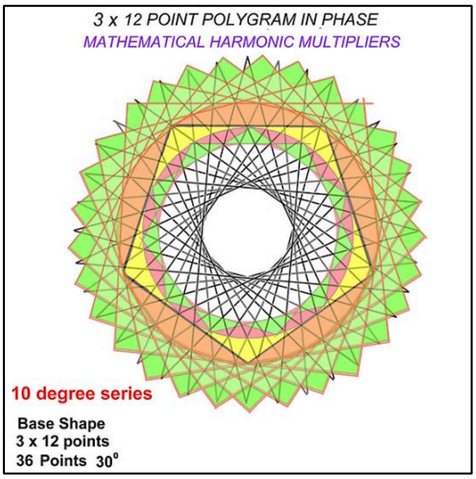
MATHEMATICAL HARMONIC MULTIPLIERS

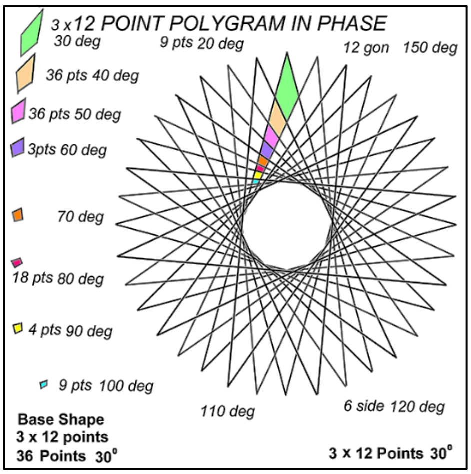
THE INVISIBLE SHAPES THAT MAY INFLUENCE THE RATIO



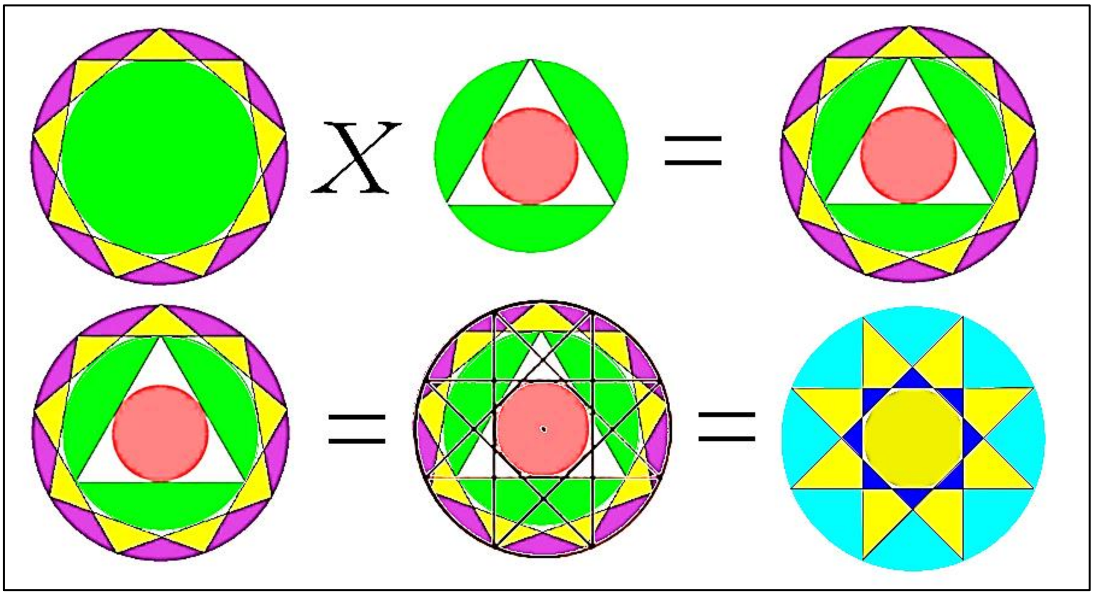








SHAPE X SHAPE = SHAPE (Graphically)



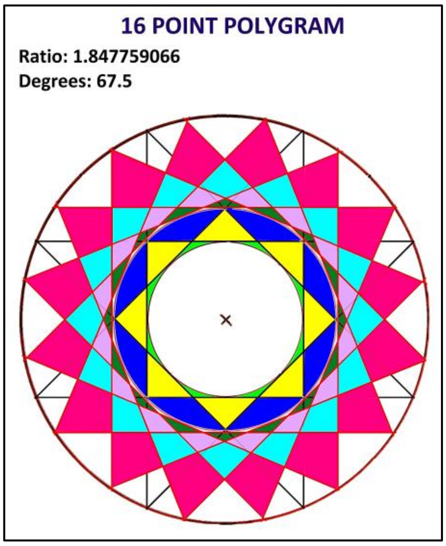
1.306562965 x 2.000000000 = 2.613125930
Inner Nonogram x Equilateral Triangle = Octagram (ratio 2.613125930)

<u>THE OCTAGRAM</u>

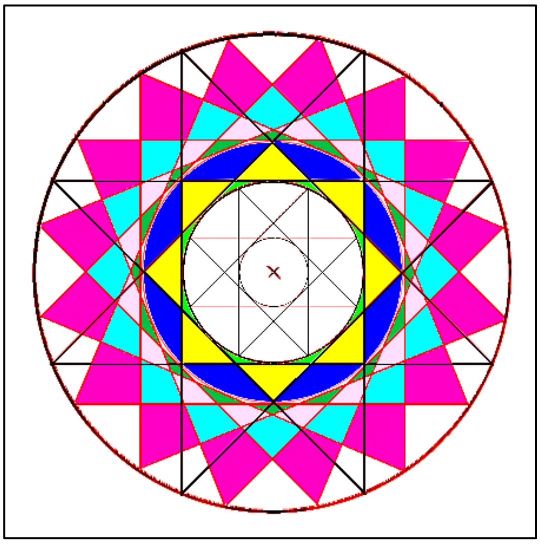
If we divide the ratio for the Octagram (2.61312592975) by its Inner ***Harmonic Construction*** shape the Square (1.414213562) (actually two squares in phase) we find the ***Mathematical Harmonic*** shape ratio of 1.847759065, which from our Genome of Shape we know to be the 16 point polygram with apex angles of 27.5^0.

This ***Mathematical Harmonic*** shape of the 16 point polygram does not show in the ***Harmonic Construction*** lines of the **Octagram** but should fit between the Outer Circle of the Squares and the Outer Circle of the Octagram.

As always: - *Shape x Shape = Shape.*

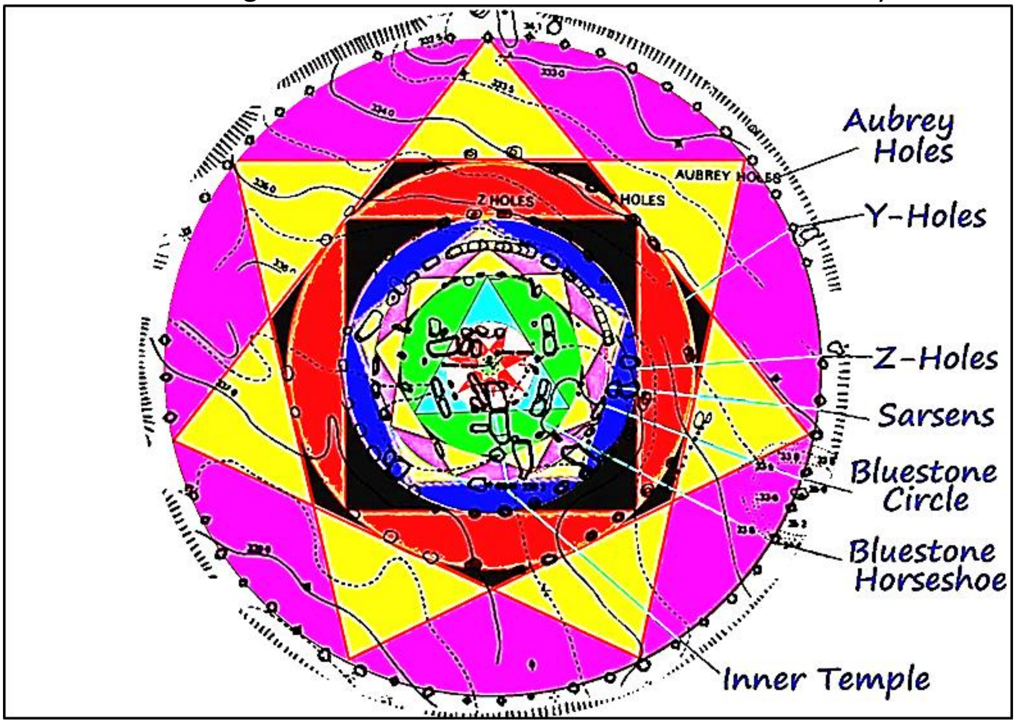


x

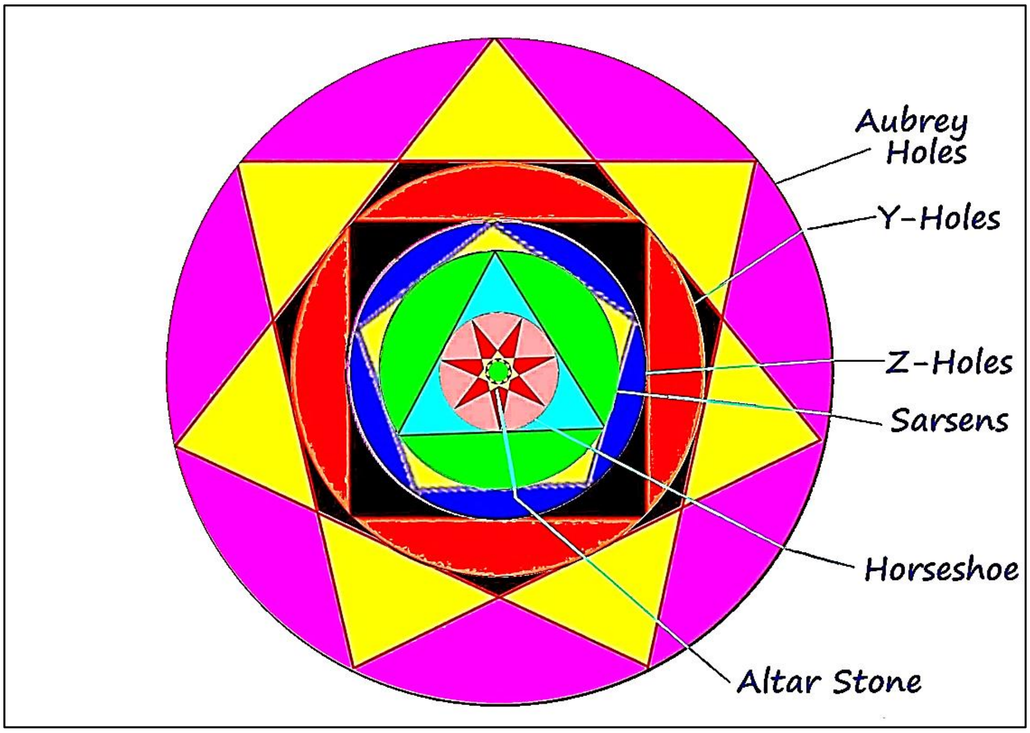


A GRAPHICAL and MATHEMATICAL INTERPRETATION OF STONEHENGE

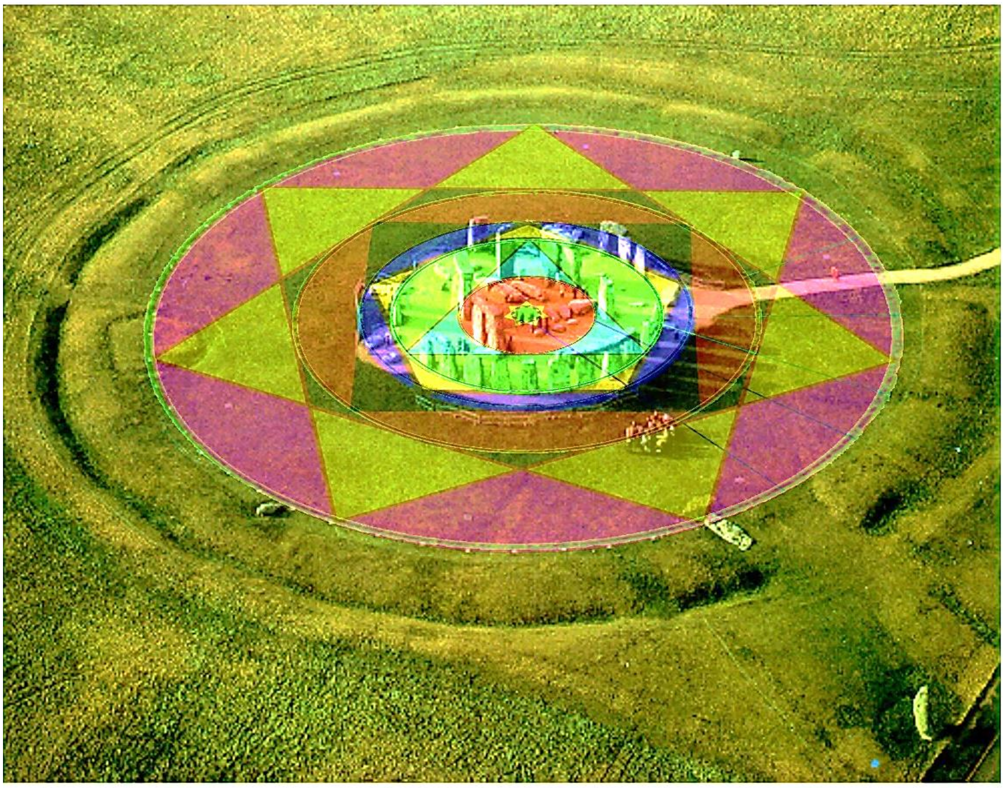
Base Image: - NASA Earth Sciences . . . Thom's 1974 Survey



SARSEN HENGE



Inner Septagram x Square x Pentagon = √8 **or** √2 x √2 x √2 **or** 2 x √2
or = Φ x √2 x (√5 – 1) = 1.618033989 x 1.414213562 x 1.236067978 = **2.828427125**
= The Harmonics of Plane Regular Shape



*And was **this** not the nature and purpose of Stonehenge - An Institute of Higher Learning?*

Learning about Harmonices Mundi before "Harmonices Mundi" *was written?*

Can you still hold onto theories that it was designed simply for death and burial rituals?

THE RATIO FROM AUBREY HOLE CIRCLE TO SARSEN CIRCLE:

Inner Septagram x Square x Pentagon = √8 **or** √2 x √2 x √2 **or** 2 x √2
= Φ x √2 x (√5 – 1) = 1.414213562 x 1.618033989 x 1.236067978 = 2.828427125

√8 **or** √2 x Φ x (√5 – 1)

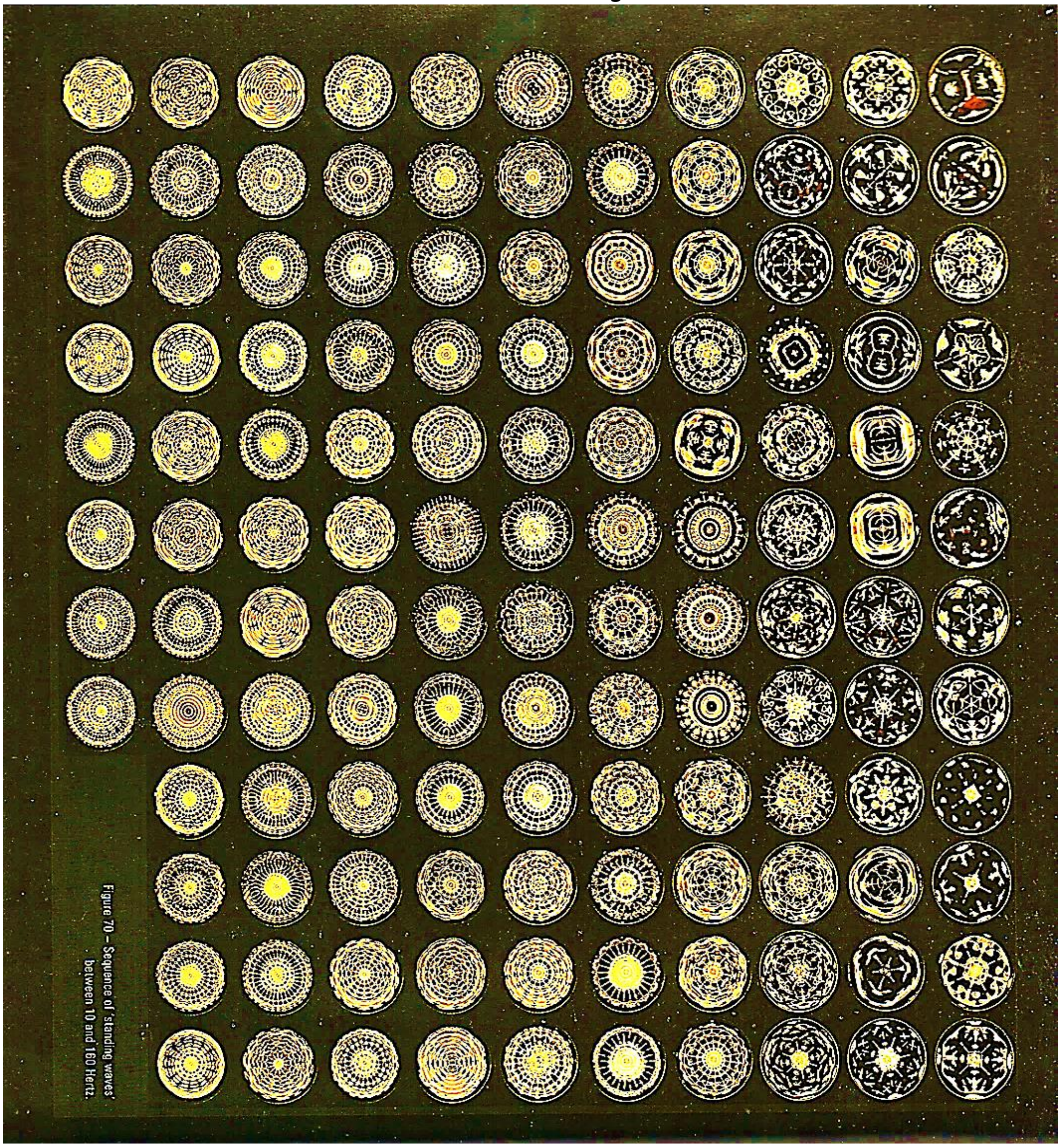
"THE SQUARE – THE OBLONG – THE SQUARE OF 5 LESS THE ONE"

PLATO'S MENO **or** PLATO'S GEOMETRICAL NUMBER
THE SAME RATIO . . . 2.828427125 **or** 2 x √2

UNDERSTANDING CYMATICS

ANALYSING ALEXANDER LAUTERWASSER'S IMAGES

These are the high resolution Cymatics Images Alexander Lauterwasser has placed in page 74 of his book: *"Water Sound Images".*



NOTE THE MULTITUDE OF CIRCLES THAT NATURE HAS PROVIDED: it is these circles that I claim may assist greatly in interpreting the Plane Regular Shape being produced in the medium by excitation using Frequency.

- HOW SIGNIFICANT ARE THESE CIRCLES?
- WHY DOES HE HAVE SO MANY CIRCLES PRESENT IN HIS IMAGES?
- DO SPECIFIC IMAGES HAVE SPECIFIC CIRCLES?
- V.I.P. – DO SHAPE RATIOS EXIST BETWEEN THESE SPECIFIC CIRCLES?

Alexander Lauterwasser has not published Frequencies for each of his images above. All that is given is that there are **128** images produced between **10Hz** and **160Hz**; or alternatively, 128 images over a range of 150Hz. There are, however, between these two frequencies, only 48 Music Note Frequencies that occur within this range. In round terms it could be stated that Lauterwasser produced 2.6666666667 images per music note.

Even in my feeble attempts at producing a 'Gnome of Shape', I noticed that I had several shape ratios that did not align harmonically with any Music Note Frequencies. These shapes possibly exist between those that resonate with the Music Note Frequencies.

I have looked closely at his images (enlarged from their published sizes) to ascertain their symmetry rankings in terms of 'folds'. These 'folds' I prefer to call plane regular shapes for it is obvious to me that they are. This rash statement can be supported by the presence of numerous applicable Inner and Intermediate Circles in his images that, together with Circumscribing Circles, assist in identifying the relevant shape. Initially, from counting these image 'folds', I attributed a prime base number that may or may not be an indication of the image's actual primary shape.

4/8	4/8	5	5	10	3	3/6	3/6	4/8	4/8	4/8	4	FOLDS
4		5			3			4				PRIME BASE
E_0	F_0	$F^{\#}_0/G^{b}_0$	G_0	$G^{\#}_0/A^{b}_0$	A_0	$A^{\#}_0/B^{b}_0$	B_0	C_1	$C^{\#}_1/D^{b}_1$	D_1	$D^{\#}_1/E^{b}_1$	MUSIC NOTE
10.300861	10.913382	11.56232571	12.249857	12.9782718	13.750000	14.567618	15.433853	16.351598	17.323914	18.354048	19.445436	NOTE FREQUENCY
126deg 20pts	117deg 40pts		115deg Pentagon			92deg 45pts	84 deg 15pts	79.2deg 25pts	75deg 24pts			SHAPE
4/8	4/8	5	5	5, 10	3	3/6	3/6	4/8	4/8	4/8	4	
UNDER RANGE OF PIANO								IN PIANO RANGE				

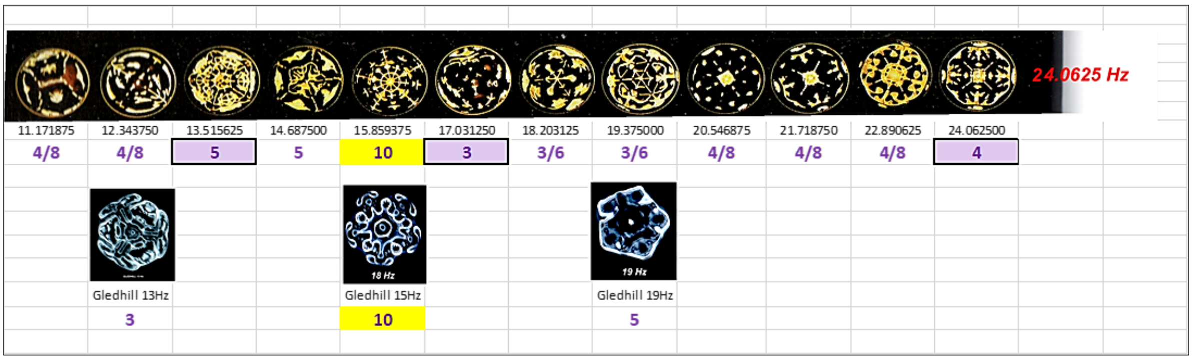
4/8	4/8	4/8	4 plus	4 plus	4 plus	5/10	5/10	5/10	3/6	3/6	3/12	FOLDS
cont 4			4			5			3			PRIME BASE
E_1	F_1	$F^{\#}_1/G^{b}_1$	G_1	$G^{\#}_1/A^{b}_1$	A_1	$A^{\#}_1/B^{b}_1$		B_1	C_2		$C^{\#}_2/D^{b}_2$	MUSIC NOTE
20.601722	21.826764	23.124651	24.499715	25.956544	27.500000	29.135235	29.921875	30.867706	32.703196	33.437500	34.647829	NOTE FREQUENCY
	75deg 24pts			16pts 67.5deg		66 deg 60pts			55deg 72pts			SHAPE
4, 8, 16							Lauterwasser			Lauterwasser		

3/6/12	4	4/8	4 /20	3, 6, 12	7/14	5/10	16, 32	24	12	12	3, 6, 12	FOLDS
3	4				7	5	4	3	4		3	PRIME BASE
	D_2		$D^{\#}_2/E^{b}_2$		E_2		F_2		$F^{\#}_2/G^{b}_2$		G_2	MUSIC NOTE
35.781250	36.708096	38.125000	38.890873	40.468750	41.203445	42.812500	43.653529	45.156250	46.249303	47.500000	48.999429	NOTE FREQUENCY
	54deg 20pts				51.428 deg 14pts	48deg 30pts	45deg octogram	44deg 90pts				SHAPE
Lauterwasser		Lauterwasser		Lauterwasser		Lauterwasser		Lauterwasser		Lauterwasser		

As Lauterwasser has commenced producing images at frequencies below the first note on an 88 key piano, then I should be able to approximate the images relevant to the known first piano note, **C_0** at 16.35 Hz. (or **C_1**), given that **A_1** is known to be 27.5Hz.

LAUTERWASSER'S IMAGES AND THE IMAGES OF OTHERS

Suggested Lauterwasser frequencies for images compared with Gledhill and Reid images
(Lyndon Gledhill and John Stuart Reid have also produced 'Cymatic images of Music Notes').



11.171875	12.343750	13.515625	14.687500	15.859375	17.031250	18.203125	19.375000	20.546875	21.718750	22.890625	24.062500
4/8	4/8	5	5	10	3	3/6	3/6	4/8	4/8	4/8	4
	Gledhill 13Hz			Gledhill 15Hz			Gledhill 19Hz				
	3			10			5				

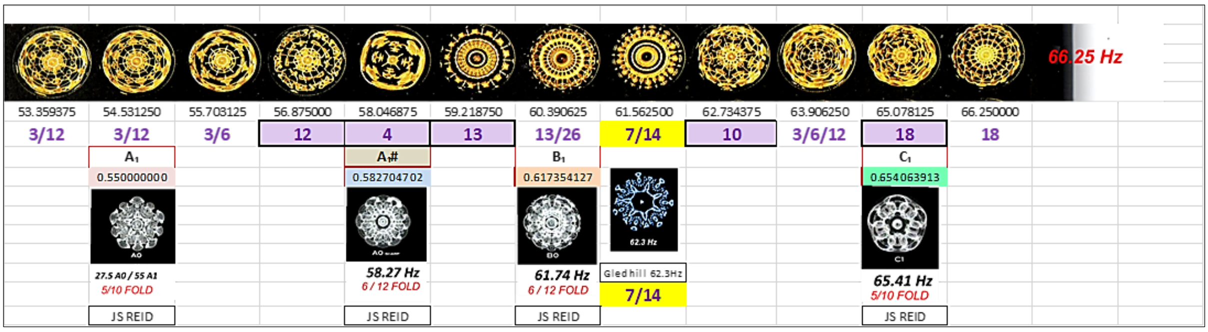
24.0625 Hz

25.234375	26.406250	27.578125	28.750000	29.921875	31.093750	32.265625	33.437500	34.609375	35.781250	36.953125	38.125000
4/8	4/8	4/8	4 plus	4 plus	4 plus	5/10	5/10	5/10	3/6	3/6	3/12
					Gledhill 31Hz			Gledhill 34Hz			
					4			3/6			

38.125 Hz

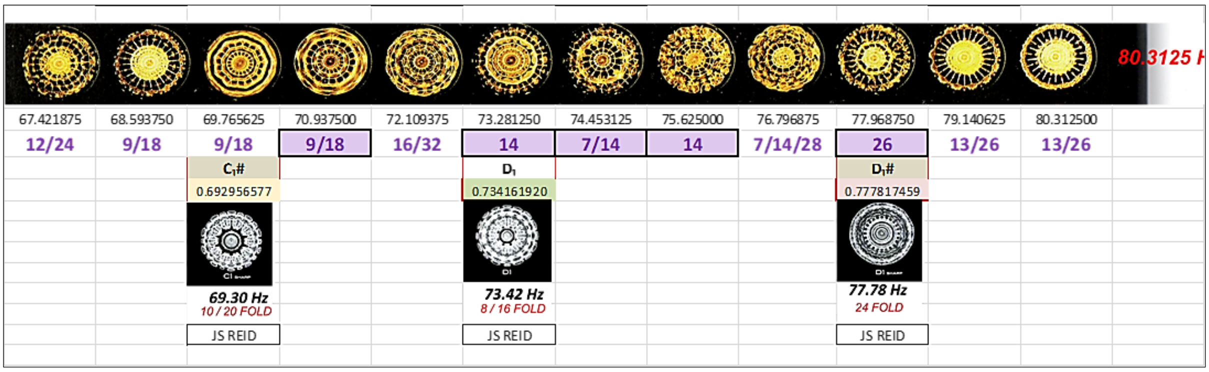
Bear in mind that the frequencies associated with each image have not been supplied by Alexander Lauterwasser but are merely **estimations** I have made based on his statement "*between 10Hz and 160Hz".*

A count of the images shows that there are 128 in total. My estimate of his frequencies can be ***rough*** only.



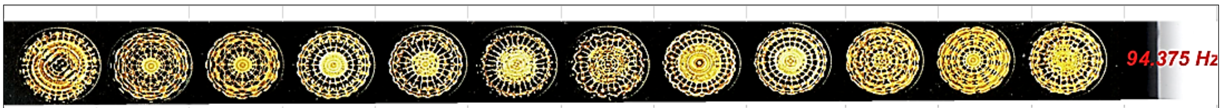
53.359375	54.531250	55.703125	56.875000	58.046875	59.218750	60.390625	61.562500	62.734375	63.906250	65.078125	66.250000
3/12	3/12	3/6	12	4	13	13/26	7/14	10	3/6/12	18	18
	A_1			A_1#		B_1				C_1	
	0.550000000			0.582704702		0.617354127				0.654063913	
	27.5 A0 / 55 A1 5/10 FOLD			58.27 Hz 6 / 12 FOLD		61.74 Hz 6 / 12 FOLD	Gledhill 62.3Hz			65.41 Hz 5/10 FOLD	
							7/14				
	JS REID			JS REID		JS REID				JS REID	

66.25 Hz



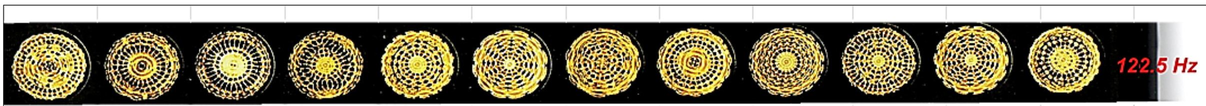
67.421875	68.593750	69.765625	70.937500	72.109375	73.281250	74.453125	75.625000	76.796875	77.968750	79.140625	80.312500
12/24	9/18	9/18	9/18	16/32	14	7/14	14	7/14/28	26	13/26	13/26
		C_1#			D_1				D_1#		
		0.692956577			0.734161920				0.777817459		
		69.30 Hz 10 / 20 FOLD			73.42 Hz 8 / 16 FOLD				77.78 Hz 24 FOLD		
		JS REID			JS REID				JS REID		

80.3125 H

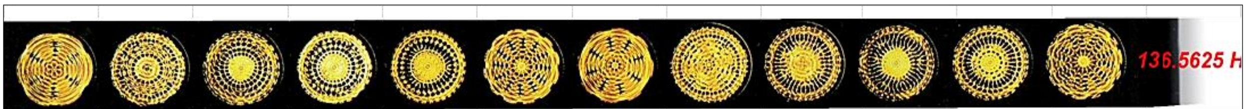


81.484375	82.656250	83.828125	85.000000	86.171875	87.343750	88.515625	89.687500	90.859375	92.031250	93.203125	94.375000
18/36	8/16	16	11/22	22	30	15/30	2x15/30	24	14	7/14	26
	E_1				F_1				F_1#		
	0.824068892				0.873070579				0.924986057		
											
	82.41 Hz 8 FOLD				87.31 Hz 8 / 16 FOLD				92.50 Hz 8 / 16 FOLD		
	JS REID				JS REID				JS REID		

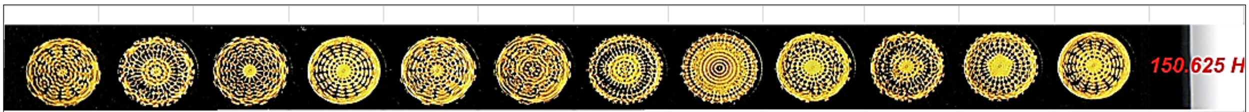
95.546875	96.718750	97.890625	99.062500	100.234375	101.406250	102.578125	103.750000	104.921875	106.093750	107.265625	108.437500
16	16/32	34	22	28	4/36	11/22	24	24	14 plus	10/20	6/8/10?
		G_1					G_1#				
		0.979988590					1.038261744				
											
		98 Hz 8 FOLD					103.83 Hz 8 / 16 FOLD				
		JS REID					JS REID				



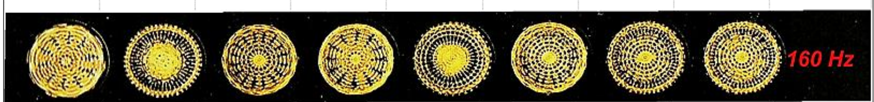
109.609375	110.781250	111.953125	113.125000	114.296875	115.468750	116.640625	117.812500	118.984375	120.156250	121.328125	122.500000
38	26	20 / 32	16 / 27	16	12	8 / 22	4 / 28	18	14 / 15 / 42	14	10 / 24
	A_2					A_2#					
	1.100000000					1.165409404					



123.671875	124.843750	126.015625	127.187500	128.359375	129.531250	130.703125	131.875000	133.046875	134.218750	135.390625	136.562500
3 / 6	20	26	26	32	12	8	46	40	40	14/34	13
B_2						C_2					
1.234708253						1.308127827					



137.734375	138.906250	140.078125	141.250000	142.421875	143.593750	144.765625	145.937500	147.109375	148.281250	149.453125	150.625000
10	10/30	16	16	12	8	4/8/12/38	26/52	18	14	28	14
	C_2#							D_2			
	1.385913155							1.468323840			



151.796875	152.968750	154.140625	155.312500	156.484375	157.656250	158.828125	160.000000
10	10/48	16	12	38	18	18/19	14/52
			D_2#				
			1.555634919				

TESTING CIRCLES in LAUTERWASSER'S IMAGES:

Some of these 128 images are so specific in their details that it is not difficult to identify the shape being recorded by the excitation of the specific frequency. Where there is doubt about which possibility between two applicable images is the correct choice, then the the ratios of the circles may guide you in your choice of selection.

It is a little more difficult to identify images for *shapes in phase in parallel*. It is not impossible but I suspect these to be mostly primary shapes that cannot be extended further without having related self-images in phase to provide the necessary extendable sides. What is extremely mystifying is the manner in which the activating frequency knew to duplicate the primary shape to provide extendable sides even though the shape ratio for both the *single shape* and the *multiple phase shape* is the same. It is always possible that these *multi-phase parallel* shapes only occur as intermediate shapes in related outer shapes. There is one thing in abundance in these Lauterwasser images and that is the Circle. But if we assume that all images were made under the same conditions, e.g. in the same *circular* container, it is important that we do not also assume that the container is the Circumscribing Circle for any particular image.

In many of his images there seems to be no circumscribing circle; this is almost as if the image was too large for the container; this can be seen in the outer limits where the features have 'bunched up'. On the other hand the Inner Circle is always present. In my own simple experiments with "Radio Shack" kits it was noted that all the images seemed to form from the inside to the outside; the first image to appear was the polygon which bloomed into the eventual outer shape. When viewing completed shapes the polygon is always the inner shape and is usually the source of the harmonics for the other intermediate or outer shapes. Later, in chapters relating to my Inner Circle of Harmony, it will be seen that the polygons and their ratios are the closest shapes to my Singularity, the ratio 1.000000000, which is but a molecule away from the reciprocal values of the dark-matter (or Black Hole) area.

Deg	Shape	Ratio	Pts
19-	18.947 deg 38pts	6.111456184000000	38
37.8947	38pts	3.129602235303950	38
23	39pts 23.07692308deg	4.944271909999160	39
27	40pts	4.236067978000000	40
63	40pts	1.926610162000000	40
99	40pts	1.315789474000000	40
117	117deg 40pts	1.167184270000000	40
57	57deg 41pts	2.118033990000000	41
21	20.93023256deg 43pts	5.545084971874640	43
28	45pts	4.176904000000000	45
52	52 degrees 45pts	2.288245610000000	45
68	45pts	1.814652616077490	45
76	76 degrees 45pts	1.632993161855450	45
87	22.5deg series 45pt	1.448274121000000	45
88	45pts . . . 11 index no.		45
92	45pts est ratio	1.386271242968660	45
124	45pts est ratio	1.131319763600000	45
148	45pts	1.040719200441880	45
164	45 pts		45
172	45 sided gon		45

But, counting *"Radials"* is not a simple indicator to the shape in the image. Many species of shapes have multiple examples of the same numbered points. Each of these examples has a different ratio and even if they all appear together, harmonically, in a multipoint image they can each be the result separately in a cymatics test.

In these instances only the circles will assist.

If one is seeking a simple theory of shape then this is certainly not it.

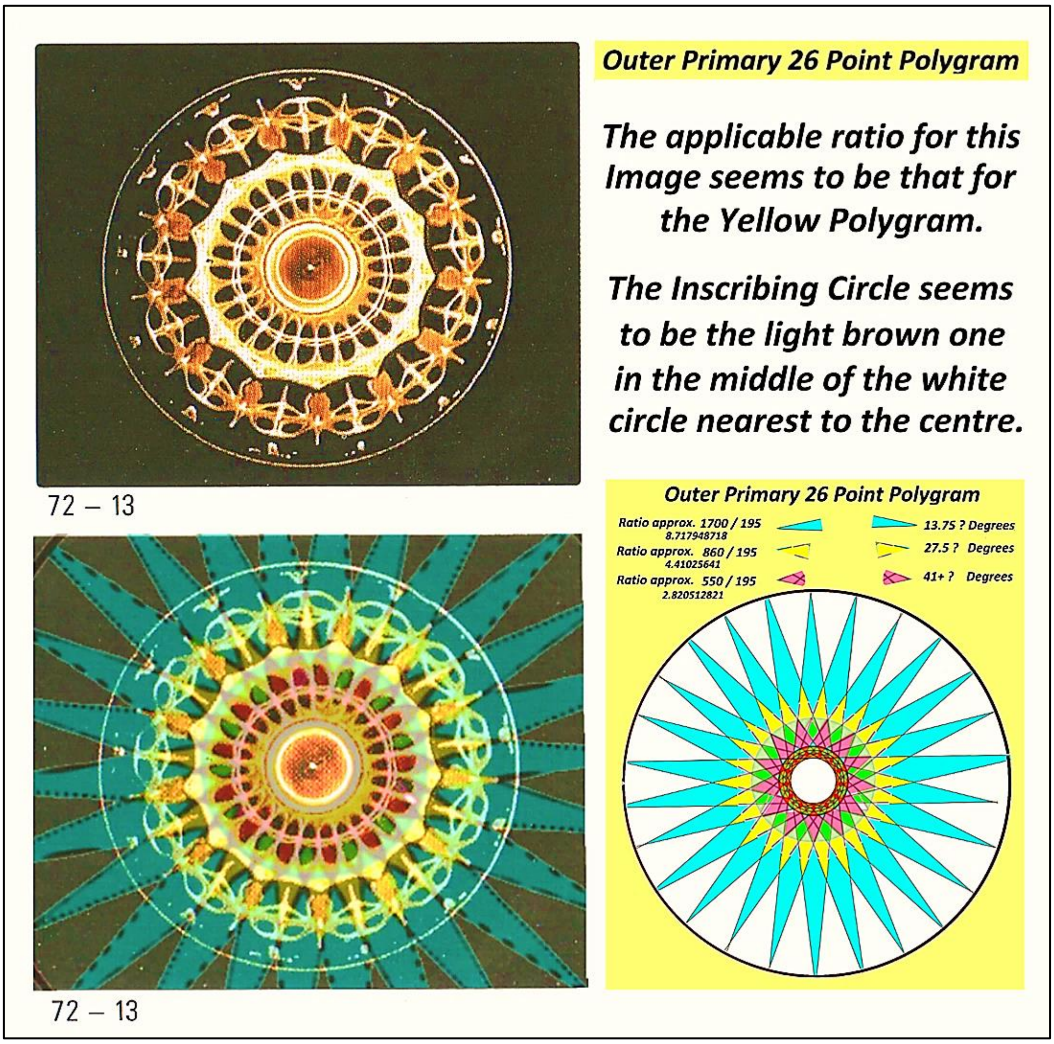
At this point please consider some of my ***Theory of Shape Theorems***:

- *Every Plane Regular Shape has a **Circumscribing Circle** and an **Inscribing Circle** that exist in a Ratio to each other that is unique for each and every Plane Regular Shape. Put simply: each shape has a unique pair of Inner & Outer Circles.*
- *Two Shape Ratios multiplied or Divided will produce a Ratio for another Shape. - (Basis for Harmonics)*
- *An ordered list of Polygons (Numerical by number of sides) in conjunction with the 2, 1, 2, 0.5 code will produce an "ordered" list of **Primary** Polygrams.*
- ***Primary** Polygrams are those with the smallest angle at the apex for that denomination and which contain within them all other shapes of that denomination along with other **Harmonic Shapes**.*
- *Copies of the same shape, regardless of **physical size,** will have the same constant ratio.*
- *The concept of the "Dough in the Doughnut".*

ALEXANDER LAUTERWASSER IMAGES

CYMATICS EXPERIMENTS PRODUCE PLANE REGULAR SHAPES!

THIS LAUTERWASSER IMAGE SHOWS THAT THE OUTER LIMIT OF THE IMAGE IS NOT ALWAYS THE OUTER LIMIT OF THE POLYGRAM BEING PORTRAYED.
IT IS POSSIBLE THAT FREQUENCY, AMPLITUDE or DISH SIZE COULD BE RESPONSIBLE FOR THIS – ONLY PROPER EXPERIMENTATION CAN RESOLVE THIS ASPECT OF CYMATICS.



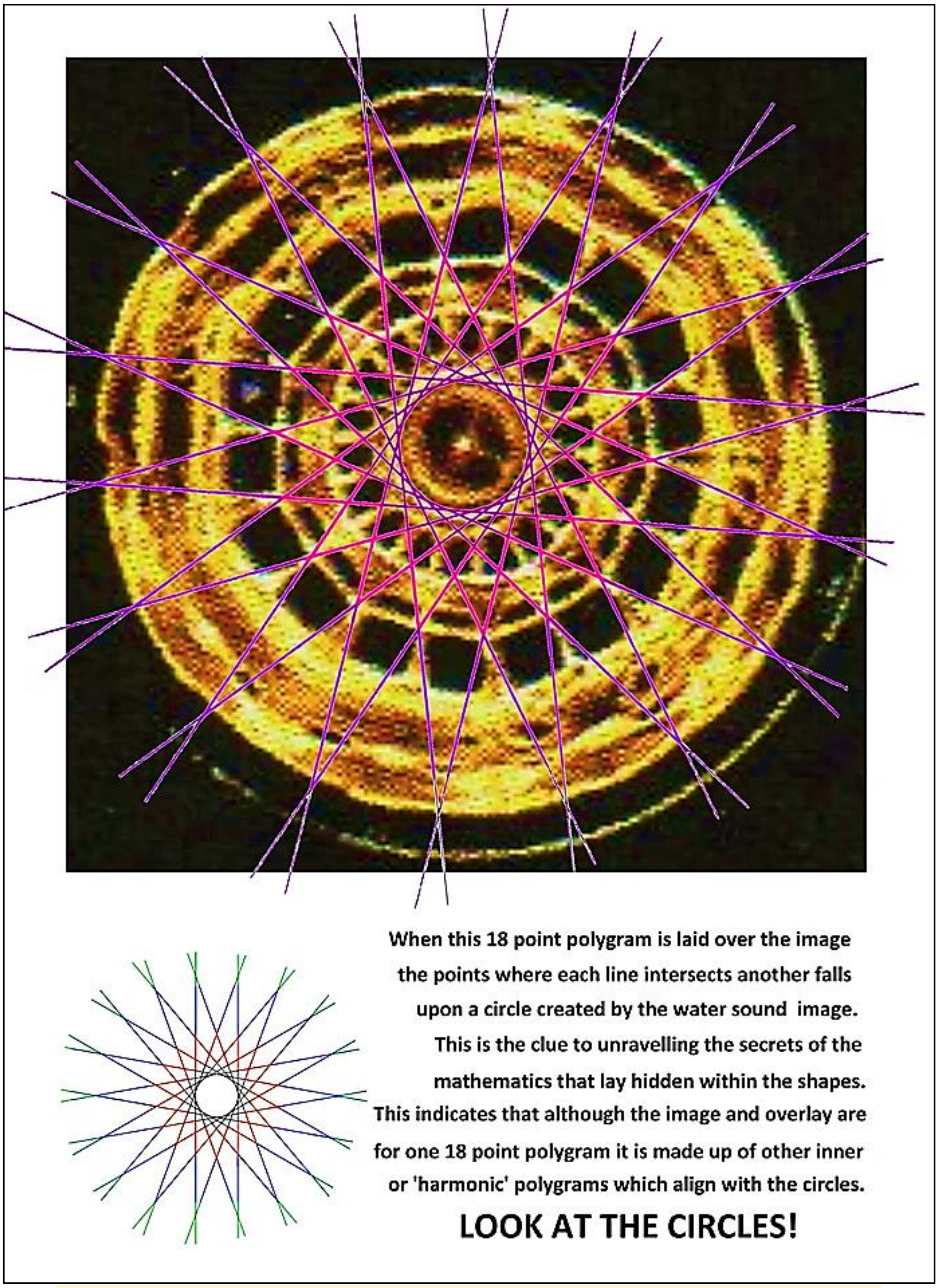
THE YELLOW POLYGRAM IS AN INNER HARMONIC TO THE 26 POINT OUTER PRIMARY POLYGRAM.

IS THIS FREQUENCY PRODUCING AN OUTER PRIMARY SHAPE OR ITS HARMONIC INNER SHAPE?

- EACH INNER HARMONIC SHAPE HAS ITS OWN SHAPE RATIO AND FREQUENCY.
- EACH FREQUENCY PRODUCES ITS OWN INDIVIDUAL SHAPE RATIO;
  - ONE FREQUENCY PRODUCES THE OUTER PRIMARY SHAPE WHILST OTHERS PRODUCE THE INTERMEDIATE SHAPES THAT EVENTUALLY CONSTRUCT THE OUTER PRIMARY SHAPE.
- A PRIMARY POLYGRAM CAN CONTAIN MANY SECONDARY POLYGRAMS WITHIN ITS BOUNDARIES.
- A PRIMARY POLYGRAM IS ONE WHICH WHEN ITS CONSTRUCTION LINES ARE EXTENDED IT EITHER REVERTS TO PARALLEL LINES OR NON-PARALLEL LINES BOTH OF WHICH RADIATE OUT INTO SPACE WITHOUT AGAIN CROSSING TO FORM SHAPES.
- POLYGRAMS WITH **<u>EVEN</u>** NUMBERS OF POINTS BECOME PARALLEL LINES WHEN EXTENDED.

QUESTION:

IS THIS AN IMAGE OF AN 18 POINT POLYGRAM OR OF TWO 9 POINT ONES IN PHASE IN PARALLEL?

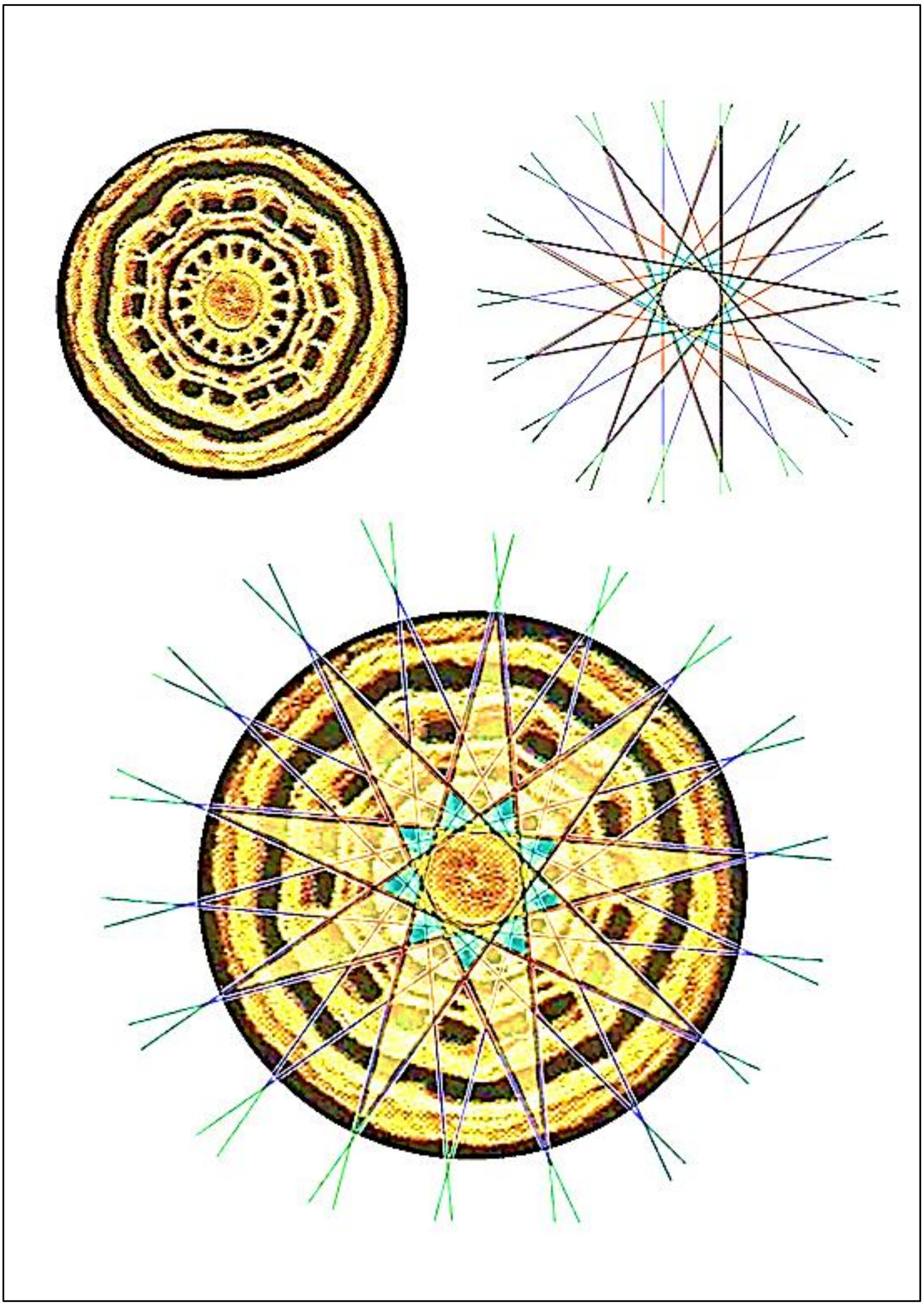


THE APEXES OF INTERMEDIATE SHAPES ALIGN WITH THE IMAGE'S CIRCLES.

SO, THE CIRCLES EXIST IN A SPECIFIC RATIO TO EACH OTHER.

EACH AND EVERY FEATURE IN THIS IMAGE IS RELEVANT TO ITS OVERALL OUTER SHAPE.

IN TRUTH, IT WAS NOT AN 18 POINT POLYGRAM BUT WAS TWO NONOGRAMS **IN PHASE**.



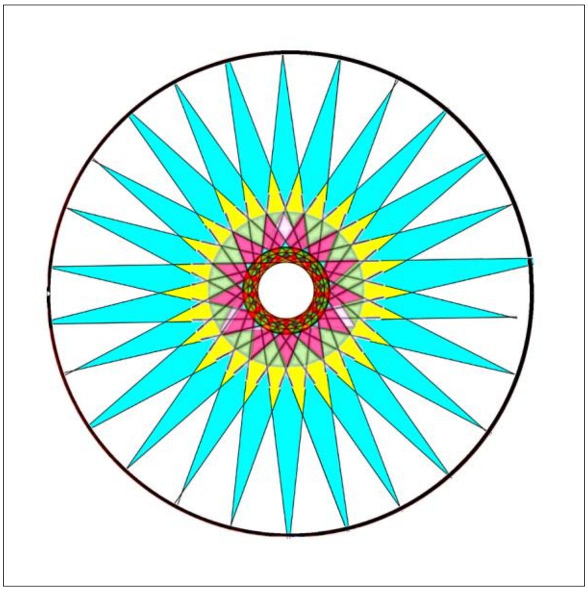
TRACE OUT THE CONSTRUCTION LINES.

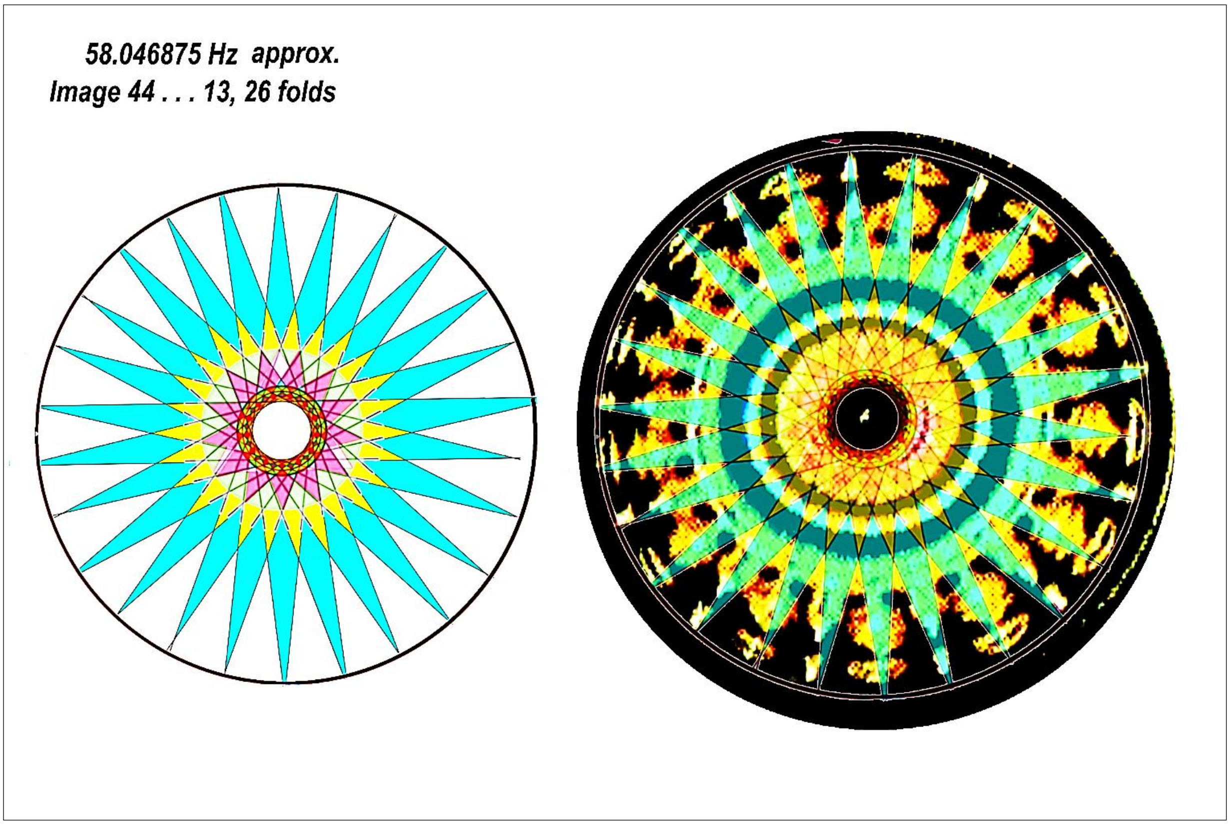
THE SQUARENESS OF SOME OF THE LINES IN THE IMAGE INDICATES THE PRESENCE OF THE EFFECTS OF POLYGONS. AS POLYGONS ARE THE FIRST PART OF AN IMAGE TO BE SEEN AS IT DEVELOPS FROM THE CENTRE OUT, THIS SHAPE IS EITHER AN EARLY RENDITION OF A MORE COMPLETE IMAGE OR IT IS ACTUALLY A POLYGON RESPONDING TO A "POLYGON" FREQUENCY

LAUTERWASSER'S IMAGE 44 OF 128

13 OR 26 FOLDS (OR RADIALS)

x



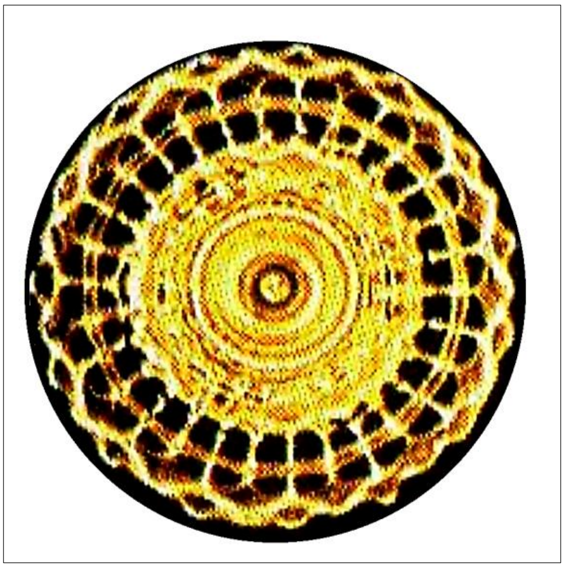


AS ALWAYS, THE APEXES FOR THE INTERMEDIATE SHAPES ALIGN WITH THE IMAGES CIRCLES.

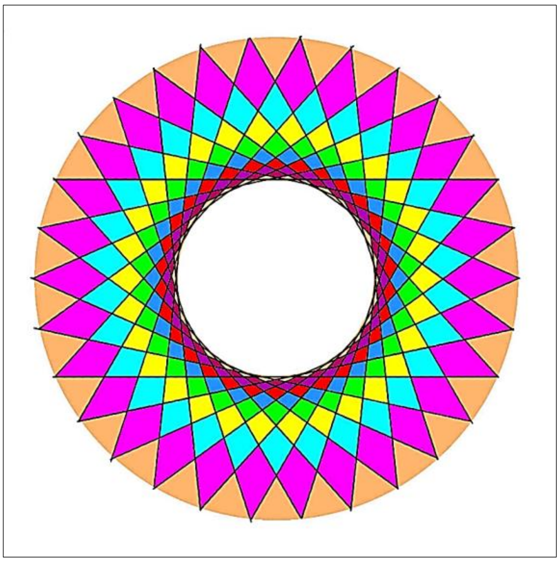
LAUTERWASSER'S IMAGE 68 OF 128

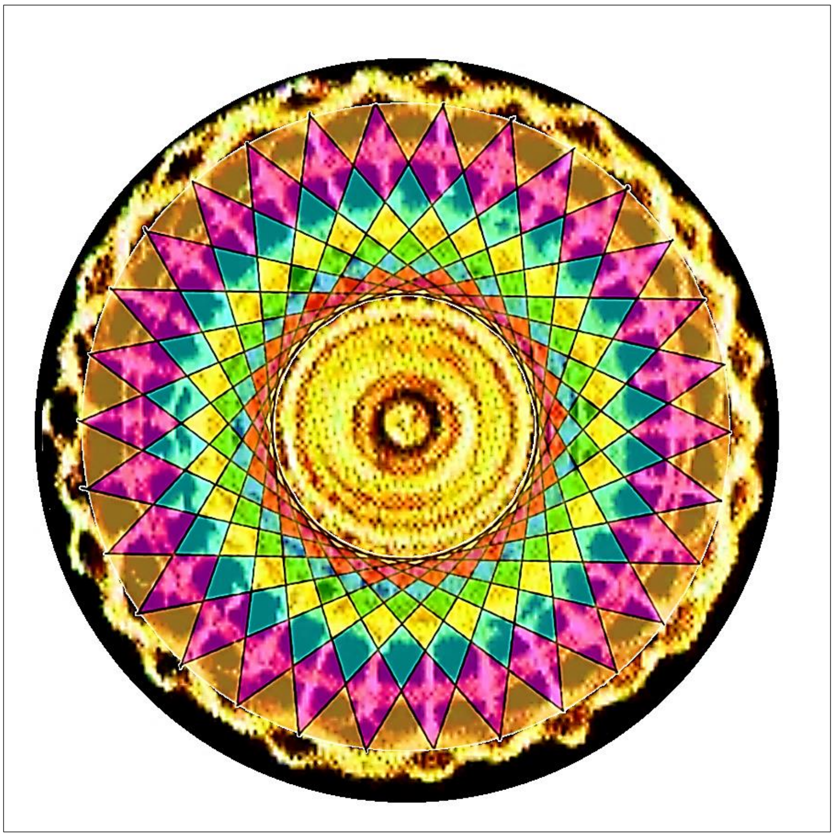
15 OR 30 FOLDS (OR RADIALS)

THIS IMAGE HAS AN OUTER AND INNER CIRCLE AND SEVEN INTERMEDIATE CIRCLES.
30 FOLDS



X





IS THIS 2 X 15 POINT POLYGRAMS IN PHASE IN PARALLEL?
ONE CAN VIEW THE UNDER AND OVER EFFECT OF THE RADIALS AT THE SCALLOPED OUTER RINGS.

PTOLEMYS CHORDS AND PLANE REGULAR SHAPES

Ptolemy Claudius, Almagest 1- *9, 10.*

9. 'On the Particular Notions': p.14

"A summary and general preliminary explanation would explain some such exposition as the foregoing of the things to be presupposed. But now we are going to begin the detailed proofs.

And we think the first of these is that by means of which is calculated the length of the arc between the poles of the equator and the ecliptic, lying on the great circle drawn through these poles. To this end we must first see expounded the method of computing the size of chords inscribed in a circle, and we are now going to demonstrate this geometrically for each case, once for all."

10. 'On the size of Chords in a Circle:' p.14

"With an eye to immediate use, we shall now make a tabular exposition of the size of these chords

- *by dividing the circumference into **360** parts and setting side by side the chords as the arcs subtended by them increase by a half part.*
- *That is, the diameter of the circle will be cut into **120** parts **for ease in calculation**;*
- *(and we shall take the arcs, considering them with respect to the number they contain of the **circumference's** 360 parts,*
- *and compare them with the subtending chords by finding out the number the chords contain of the **diameter's** 120 parts.)"*

*". . . aiming always at such an **approximation** as will leave no error worth considering as far as **the accuracy of the senses** is concerned."*

Although the shape ratios for the square (90^0) the equilateral triangle (60^0) and the pentagram (36^0) bear a good correlation with Ptolemy's chords most of the others seem to vary with differing levels of inaccuracy without indicating any pattern.

Ptolemy's Chords

Ptolemy's Chords ??? / Reverse Engineered Chords

Arcs Degrees	Chords Sexagesimal			Sixtieths						
120	103	55	23	0	0	31	18			
	103	53	1	50	42	0	31	6	14	24
108	97	4	56	0	0	36	50			
	97	4	55	20	29	38	20	32	38	24
90	84	51	10	0	0	44	20			
	84	51	9	59	59	59	23	42	43	12
72	70	32	4	0	0	50	45			
	70	1	51	48	7	35	14	29	45	36
60	60	0	0	0	0	0	0			
	60	0	0	0	0	0	0			
40	41	2	33	0	0	59	0			
	41	2	33	0	58	59	38	6	43	12
36	37	4	55	0	0	59	43			
	37	4	55	20	29	57	46	56	38	24

In this Chart the chords in black are those taken from *Ptolemy's Almagest 1, Encyclopaedia Britannica, Great Books of the Western World, Volume 16*, p. 21. The chords in red have been derived from **dividing Ptolemy's diameter of 120 by my shape ratios** for the corresponding degrees. Even in Sexagesimal notation the correlation between these chords is obvious for 108^0, 90^0, 60^0, 40^0, and 36^0.

But, these are the degrees that most writers on this subject claim are the ones that Ptolemy started with when producing his table of chords. There are those '*adapted from Euclid'* and those that *'Ptolemy was familiar with'* when he commenced. If these are the only shapes that bear a good correlation with the chords then the main inference I could make would be that Ptolemy was sufficiently familiar with the square, equilateral triangle, pentagram, and the pentagon to accurately deal with them.

He does not go the extra step of dividing his diameter of 120 by his chords to obtain a *ratio* for each shape and its degrees. He does not specifically deal with plane regular shape except by reference to *'inscribed hexagon'* or *'inscribed decagon'* as he views the sides of the polygons as the subtending chords. He does not deal in any depth with polygrams at all.

So, apart from any inaccuracies contained in his chords, Ptolemy also had, in this regard, the disadvantage of conceptual myopathy. But then, he was not specifically seeking a harmonic system of shapes related to degrees but a system of lengths related to degrees.

He achieved his desired goal of *relating degrees to linear dimensions* for astronomical, navigational and mapping purposes. Even the societies of surveyors sing his praises for giving them the tools to create a profession. For over 1500 years Ptolemy's Chords ruled supreme and filled the void of knowledge. In this 21st Century we seek more and one of the things we seek is the Mathematics of Harmonics. The sequences of harmonies I have found in the natural system that is the system of Plane Regular Shapes are more extensive, more complete, more accurate, and more universally applicable than any system previously concocted. Even so, Ptolemy was closer than any other person before or since to discovering these harmonics and he was possibly not even aware of their existence. If my shape ratios prove to be accurate then Ptolemy's Chords can be reverse engineered by dividing Ptolemy's *Circumscribing* Circle's diameter (120) by the shape ratio to obtain the chord for that shape; for is not the chord the diameter of the *Inscribing* Circle for that shape; and is not my shape ratio obtained by dividing the Circumscribing Circle by the Inscribing one?

I wondered why, given all the ancient knowledge of shapes, Euclidean geometry, Plato's geometrical number and five regular solids, the Pyramids, Stonehenge, The Sanctuary, and Durrington Walls, the harmonics of the plane regular shapes have remained hidden.

If they were known before now then surely they would have been used to rectify Ptolemy's Chords. Kepler, in quoting from Ptolemy even in musical harmonies, would have had more accurate ratios to deal with even though they were the dreaded incommensurables.

They would have appeared more blatantly at places such as the gardens of the Palace of Versailles where any person worthy of the title of *'Sun King'* would have insisted upon their 'sacred' use.

Since Plato introduced his 5 Regular **Solids** all interest in **Plane** Regular Shapes seems to have disappeared.

There is evidence of the use of certain of the shape ratios at Stonehenge but once again these are only certain ratios but nevertheless are the same as those claimed to have been Ptolemy's starting point. The use of these same ratios at Stonehenge *had* led me to believe that there was a distinct possibility that the whole system of shape ratios were known 5000 years ago but Ptolemy and others, based at the Library of Alexandria, would have had access to any information bearing a hint of the existence of these harmonics. The inaccuracies contained in his table of chords confirms that although he could associate certain degrees with certain shapes he had no knowledge of the system of shape ratios. His mathematics hid the harmonics from him. Was it also a complete accident that Eratosthenes' fame spread from his use of 07^0 12' in measuring the circumference of the earth when **<u>all</u>** my decimal shape ratios, when converted to sexagesimal notation, reflect the 07 12 multiplication tables indicating some underlying harmonic link to this table? Why do writers on Eratosthenes refer to his use of the '*<u>sacred</u>*' 07 12 both in this calculation and in the laying out of the sites for Heliopolis and Persepolis (3 x 07 12) without expanding their reason for the '*sacredness*'? Did the very existence of these 07 12 multiplication tables prompt us to query why they should be included in sets of clay tablets along with 3x, 4x 5x, 10x, 15x, 20x, multiplication tables? The presence of 07 12 among these other simple multiplicands should have aroused some inquisitiveness in us as to why it was included.

I include now a table that **compares** my approach to Shape Theory **to** Ptolemy's approach to his Chord Table:

Ptolemy's Chords vs Shape Theory

PTOLEMY	*SHAPE THEORY*
Astronomical measurements	Search for *Harmonices Mundi*
Circumscribing Circle	Circumscribing Circle
- Fixed Diameter (120)	Fixed Diameter for comparison
- Arcs and Sides of Polygons	Degrees & tangents forming shapes
Inscribed Polygons	Inscribed Polygons & Inscribed Polygrams
Subtending Chords (bases of arcs)	Diameter of Inscribing Circle
-no inscribing circle (but chord is its diameter)	Inscribing Circle
-Boundaries of Angles	Continuous Tangents forming shapes
Ptolemy's Chord Ratio:	Plane Regular Shape Ratio:
- 120 / Chord	Circumscribing Circle / Inscribing Circle
Commencing Degrees used for Table:	Commencing Degrees used for Theory:
90^0, 60^0, 36^0, 72^0,	90^0, 60^0, 36^0, 72^0,
In Order of *Degrees and Halves*	In Order of *Degrees that form Shapes*

All things being equal, Ratios derived from '*120 divided by Ptolemy's Chords'* should equal *Shape Ratios* for shapes based on the same degrees (arc degrees).

Had this concept been visible to Ptolemy in 150 AD we would no longer be searching for it. All he needed it seems was a little more accuracy and an idea of the concept. The Harmonics have always been there; it was the Concept that was missing.

It is strange that, 1864 years after Ptolemy, I approached my theory without knowing anything about the *Almagest* but actually started with the same degrees that Ptolemy started with. I was not seeking a theory of trigonometry and, in fact I was purposely avoiding the use of any Trigonometry at all. Apart from my total distaste for Trigonometry I had tried to approach these matters with a totally open mind void of any modern mathematical influences which could distract me or lead me in directions already travelled by others. I wanted to have a new approach to finding the *Harmonices Mundi* written about by so many but not exactly clarified or specifically demonstrated by them. The first ratio that revealed itself to me was √2 which was the ratio for the pair of concentric circles that give us the square.

The square has sides that form the angle for **90^0**. I then looked at the square inside a square and the associated circles which were in the ratio √2 x √2 or 2. This produced the equilateral triangle with sides that form **60^0**. Others have come up with this ratio for this triangle in Euclidean ways. So I learned that a square multiplied by a square gives an equilateral triangle. This is not something you learn every day. But this was just a simple fact which eventually became the basis for an earthshattering theorem that *'shape multiplied by shape equals another shape'*. Following this the Quadrature seemed like a likely contender. It gives √2, √2 x √2, √2 x √2 x √2 (√8) (Stonehenge), √2 x √2 x √2 x √2 (4), and then √2 x √2 x √2 x √2 x √2, (√32), the ratio for the Nonogram.

I then sought out the ultimate; **the seven concentric circles**! I was after all dealing with concentric circles that had the power to influence the formation of shapes; plane regular shapes. Observation shows that all plane regular shapes have both circumscribing and inscribing circles but no one had used both together in a system for we have venerated Euclidean Geometry for millennia and he did not use both circles together. Plato hinted at this system in his Timaeus along with the *means and extremes* but then goes on to *'spin the second circle in the opposite direction'* and thus invent his regular solids, in three dimensions. How many are the articles about Plato's Regular Solids? The quest continues, and probably will for another millennium. How few are the articles about the system of Plane Regular Shapes? Are there in fact any?

Try therefore to find just one article on Plane Regular Shapes and the harmonic world in which they exist!

How strange is it that I have avoided the use of trigonometry at all costs and yet the only place I have found any iota of any ancient use of my GRAPHICAL harmonic ratios is in the 150 AD Chord Table of Ptolemy Claudius, the Sub-Inventor of Trigonometry! The title of 'inventor' it seems is usually reserved for Hipparchus. True, he was seeking Mathematical Geometry to explain Graphical Geometry. But was Ptolemy using Graphical Geometry to ennumerate a Mathematical Geometry scale now called trigonometry?

But Trigonometry alone does not and cannot reveal the mysteries found in Graphical Geometry.
And, the use of Graphical Geometry does not automatically infer the use of Trigonometry.

Trigonometry and other modern mathematical methods seem to blind 21st. century mathematicians to the simplicity and beauty of the world of harmonics. They are too busy perfecting and refining the numbers in existing theories to the nth degree or speaking in '*tongues*' in languages totally uninterpretable to the uninitiated to take a new approach with a totally open (even empty) mind, and so requiring one to ignore all mathematical achievements over the past 1800 years. Most mathematical debate today seems to have stagnated into semantics around whether numbers are real, finite, infinite, integers commensurable, incommensurable, digits, transcendental, transfinite, rational, and irrational and Greek *Logos* or *Arithmos*.

- Can we thusly determine if they could belong to a sequence that is the epitome of Harmony?
- Will classifying the numerals in the ratios decide whether they belong in a harmonic set?
- Will pursuing Infinite Values to 50,000,000 decimal places prove anything real or of value?

I think you will find, contained in all the various harmonic sequences surrounding the ratios of plane regular shape, sufficient categories of numerical classification.

You will, however, find infinite or incommensurable numbers or values coordinating with each other to produce yet other meaningful infinite or incommensurable values without your being able to physically *see* the invisible numbers at work.

- Does the invisibility of the total or full extent of the infinite workings preclude or prohibit proofs of the theorems of finite shapes even though the variances shown in the calculations can be seen as giving order to the universe?
- Does this invisibility cease to allow incommensurables to act in a commensurable manner within a system?
- Can incommensurables be classified as odd or even numbers?
- Can two odd numbers multiplied make an even number?
- Is the √2 therefore an <u>even</u> infinite number as √2 x √2 = 2?
- What about √5 – 1? Is the result odd or even?
- What is the repetitive sequence 0.5, 2, 1, 2, found in ***shape index number*** harmonics all about?
- Why is it so?
- Is the resolution to Cantor's Continuum Hypothesis hidden somewhere within Harmonic Shape Theory?

Infinite Plane Regular Shape Ratios can <u>sort</u> **Infinite** Square Roots of Integers into a "2n" series (Fowler's & Knorr's Anthyphairesis?) indicating correlation.
Infinite Plane Regular Shape Ratios can <u>sort</u> **Infinite** Musical Note Frequencies into "Half Octave" groups (√2) indicating correlation.
Can the **Infinite** Plane Regular Shape Ratios <u>sort</u> and rectify **Infinite** Ptolemy Chords and thus correlate?

Who would want to live in a world without Infinity?

Can the use of a system of **Infinite** shape ratios enable us to deal effectively with infinity?
To effectively deal with Infinity we need faith; faith that the unseen numbers are correct.

Correlation using only Ptolemy's Initial Chords

It seems to be a universally accepted perception that Ptolemy started his construction of his Table of Chords with certain chords that were already known at his time and seemed to be derived from Euclid. Analysis of his Chords in the light of my Plane Regular Shape Ratios gives the result that these are the only chords that have a 100% correlation with the ratios for the plane regular shapes derived from those particular "Arc Degrees".

Certain Shapes with Whole Degrees (without fractions). . . . . Chords reverse engineered from Shape Ratios

*Ptolemy's **Initial** Chords* Arcs Degrees	Chords Sexagesimal Ptolemy's Chords ??? Reverse Engineered Chords				Sixtieths						*Diameter of Inscribing Circle* Ptolemy"s Chord in Decimals Reverse Engineered Chords (120/shape ratio)	*Ptolemy's Chord Ratio* If outer Radius is (1) 60 Circumscribing Diameter (2) 120 *(120/chord)*	*Correlation* *Plane Regular Shape Ratios To Ptolemy's Chord Ratio*	*Concentric Circle Analysis* Plane Regular Shape Ratios Plane Regular Shape for these Degrees	Plane Shape Ratios
120	103	55	23	0	0	31	18				103.923055556	1.154700459		hexagon	1.144122806
	103	53	1	50	42	0	31	6	14	24	104.883845834	1.144122806	1.009245208		
108	97	4	56	0	0	36	50				97.082222222	1.236065649		pentagon	1.236067977
	97	4	55	20	29	38	20	32	38	24	97.082039325	1.236067977	0.999998116		
90	84	51	10	0	0	44	20				84.852777778	1.414214162		Square	1.414213562
	84	51	9	59	59	59	23	42	43	12	84.852813742	1.414213562	1.000000424		
72	70	32	4	0	0	50	45				70.534444444	1.701296451		10pts decagram	1.713525493
	70	1	51	48	7	35	14	29	45	36	70.031056141	1.713525493	0.992863227		
60	60	0	0	0	0	0	0				60.000000000	2.000000000		equilateral triangle	2.000000000
	60	0	0	0	0	0	0				60.000000000	2.000000000	1.000000000		
40	41	2	33	0	0	59	0				41.042500000	2.923798502		18 point polygram	2.923798177
	41	2	33	0	58	59	38	6	43	12	41.042504552	2.923798177	1.000000111		
36	37	4	55	0	0	59	43				37.081944444	3.236076258		pentagram	3.236067977
	37	4	55	20	29	57	46	56	38	24	37.082039325	3.236067977	1.000002559		

∑x	5.000001209
n	5
∑x/n	1.000000242

100.0000242 %

If we look only at the 5 "Arc Degrees" from Ptolemy's Chords that produce a correlation of at least 1.00000 with the ratio of my plane regular shape for the same degrees, (and having noticed that these were also his commencing chords), and then subject them to a simple ∑x/n calculation of the average of these five, we obtain an average of 1.000000242 which is close enough to claim correlation between these chords and the corresponding shape ratios.

So, If Ptolemy started off with good correlation what happened after that? Did he treat his system of chords as a linear system or did he try to introduce harmonics into the mix? If we take a simple look at the spread of his commencing chords what do we find?

Arc Degrees	Chord	Chord to Degree	Shape Ratio	Shape	Code
36	37+	plus 1	3.236067978	Pentagram	√5 + 1
40	41+	plus 1	2.923798177	18 point polygram	
60	60	even	2.000000000	Equilateral Triangle	√2 x √2
90	84+	minus 6	1.414213562	Square	√2
108	97+	minus 11	1.236067977	Pentagon	√5 – 1
180	120	minus 60	1.000000000	straight line	singularity

Once again we have a confirmation that the only ratios that were known to ancients were Φ and √2. We know that the ratio for Φ was (√5 + 1) / 2. It seems that even Euclid knew this. My major problem is that Ptolemy was dealing specifically with ***Inscribed Polygons*** whilst I am dealing with both Inscribed Polygons and Inscribed Polygrams.

PTOLEMY'S CHORDS

Differentials . . . (without converting to Reciprocals)

	x	
	1.007606912	
	0.992395538	
	1.011238361	
	1.002719029	
	0.979879966	
	1.007092897	
	0.998027798	
	1.000002559	
	1.000000111	
	0.998126754	
	1.000000000000000	
∑x	10.99708993	
average differential	0.999735448	∑x / n
reciprocal of above	1.000264622	

99.97%

Even after wavering above and below the unit value 1 the average difference between ratios derived from 1st and 2nd sources namely:

1st. - dividing 120 by Ptolemy's Chords and
2nd. - my shape ratios
is about 0.03%; that is 3/100ths of a degree.
108 seconds or 1 minute 48 seconds

This figure is reached by playing *"Unders & Overs"* with the differentials. The average of those "***Over***" balances out some of those "***Under***".

If we convert all differentials to *"Unders"* we would be wrongly influencing the result.

	average without	
	1.000002559	
	1.000000111	
	1.000000000000000	
	1.007606912	
	0.992395538	
	1.011238361	
	1.002719029	
	0.979879966	
	1.007092897	
	0.998027798	
	0.998126754	
∑x	7.997087256	
average differential	0.999635907	∑x / n
reciprocal of above	1.000364226	

99.96%

Even after wavering above and below the singularity 1 and excluding the results that were virtually equal to 1.000000000 the average difference between ratios derived from:

1st. - dividing 120 by Ptolemy's Chords and
2nd. - my shape ratios
is still about 0.04%; that is 4/100ths. of a degree.

												MY SHAPE RATIOS	
												Estimated Diameter of Inscribing Circle if Circumscribing Circle is 120	*Ptolemy's Chord Ratio*
Ptolemy's Chords												Chord derived from shapes in Decimals	If outer Radius is (1) 60
Arcs Degrees	Chords Sexagesimal				Sixtieths							120 / shape ratio	Circumscribing Diameter (2) 120
	Ptolemy's Chords and Chords Reverse Engineered from Shape Ratios											Ptolemy's Chords and Chords Reverse Engineered from Shape Ratios	
	SEXAGESIMALS											DECIMALS	
120	103	55	23	0	0	31	18					103.923055555556000	1.154700459474560
												104.883845834291000	1.144122806000000
117	102	19	1	0	0	32	43					102.316944444444000	1.172826266964580
												102.811529493968000	1.167184270000000
108	97	4	56	0	0	36	50					97.082222222222200	1.236065648820020
												97.082039324993700	1.236067977499790
100	91	55	32	0	0	40	17					91.925555555555600	1.305404131362330
												91.671842726283200	1.309016994000000
90	84	51	10	0	0	44	20					84.852777777777800	1.414214161783480
												84.852813742385700	1.414213562373100
88	83	21	33	0	0	45	6					83.359166666666700	1.439553738341110
												83.176274635288500	1.442719099000000
84	80	17	45	0	0	46	36					80.295833333333300	1.494473561309740
												80.124128460058600	1.497676197000000
80	77	8	5	0	0	48	3					77.134722222222200	1.555719610349860
												76.989190297430500	1.558660372143240
78	75	31	7	0	0	48	45					75.518611111111100	1.589012274384170
												75.658963834757900	1.586064544342490
76	73	52	46	0	0	49	26					73.879444444444400	1.624267763548720
												#DIV/0!	#DIV/0!
75	73	3	5	0	0	49	46					73.051388888888900	1.642679240260850
												72.698729707955000	1.650647824000000
72	70	32	4	0	0	50	45					70.534444444444400	1.701296450906570
												70.031056141398200	1.713525493000000
70	68	49	45	0	0	51	23					68.829166666666700	1.743446939887400
												#DIV/0!	#DIV/0!
66	65	21	24	0	0	52	37					65.356666666666700	1.836078951394910
												64.821781645834200	1.851229586000000
63	62	42	0	0	0	53	30					62.700000000000000	1.913875598086120
												62.285563715406200	1.926610162000000
60	60	0	0	0	0	0	0					60.000000000000000	2.000000000000000
	60	0	0	0	0	0	0					60.000000000000000	2.000000000000000
55	55	24	36	0	0	55	40					55.410000000000000	2.165674066053060
												55.040000003522600	2.180232558000000
54	54	28	44	0	0	55	55					54.478888888888900	2.202688095286660
												53.498966399219100	2.243033988816490
52	52	36	16	0	0	56	25					52.604444444444400	2.281176072997630
												52.441922962981200	2.288245610000000
50	50	42	51	0	0	56	53					50.714166666666700	2.366202737565110
												50.399999998992000	2.380952381000000
48	48	48	30	0	0	57	21					48.808333333333300	2.458596551135390
												48.541019662496800	2.472135954999580
45	45	55	19	0	0	58	0					45.921944444444400	2.613129767298370
	45	50	9	19	0	37	52	19	12			45.835921345633800	2.618033989000000
40	41	2	33	0	0	59	0					41.042500000000000	2.923798501553270
	41	2	33	0	58	59	38	6	43	12		41.042504552469100	2.923798177243080
36	37	4	55	0	0	59	43					37.081944444444400	3.236076257537740
	37	4	55	20	29	57	46	56	38	24		37.082039324993700	3.236067977499790
33	34	4	55	0	1	0	12					34.081944444444400	3.520925873099960
	34	19	25	15	46	38	55	40	48			34.323684155223800	3.496128197000000
30	31	3	30	0	1	0	40					31.058333333333300	3.863697343708080
	31	8	34	0	52	52	0	0	11	31	12	31.142781857703100	3.853220324000000
27	28	0	48	0	1	1	4					28.013333333333300	4.283674440742500
	28	19	41	21	58	33	22	10	33	36		28.328157296629700	4.236067978000000
24	24	56	58	0	1	1	26					24.949444444444400	4.809726335478410
	24	45	34	58	56	49	1	37	55	12		24.759717347383200	4.846581983000000
20	20	50	16	0	1	2	51					20.837777777777800	5.758771462088090
	20	12	47	31	56	31	3	21	36			21.213203435596400	5.656854249492380
18	18	46	19	0	1	2	2					18.771944444444400	6.392518385889110
	18	54	53	4	3	4	29	34	4	48		18.914740978649700	6.344258170675030
0													

points	Plane Regular Shape for these Degrees	Plane Shape Ratios	Plane Shapes Harmonic Multipliers	Chord / Shape Ratio Differential
	Concentric Circle Analysis Plane Regular Shape Ratios		Plane Shapes Harmonic Multipliers	*Differential* DECIMALS
	hexagon	1.144122806000000		1.009245208135950
	40pts	1.167184270000000	1.020156459	1.004833852811070
	pentagon	1.236067977499790	1.059016994	0.999998116058488
	inner nonogram	1.309016994000000	1.059016994	0.997240018537402
	Square	1.414213562373100	1.080363027	1.000000423847150
	90pts	1.442719099000000	1.020156458	0.997805975770973
	15pts	1.497676197000000	1.038092722	0.997861596721190
	18pts	1.558660372143240	1.040719199	0.998113276088912
	60pts	1.586064544342490	1.017581875	1.001858518338480
	45pts		0	#DIV/0!
	24pts	1.650647824000000	#DIV/0!	0.995172450704937
	10pts decagram	1.713525493000000	1.038092722	0.992863227221663
	36pts		0	#DIV/0!
	60pts	1.851229586000000	#DIV/0!	0.991815907265275
	40pts	1.926610162000000	1.040719194	0.993390170899620
3	equilateral triangle	2.000000000000000	1.038092729	1.000000000000000
	72pts	2.180232558000000	1.090116279	0.993322505026576
	20pts	2.243033988816490	1.028804923	0.982012803314172
	45pts	2.288245610000000	1.020156458	0.996910499042816
	36pts	2.380952381000000	1.040514345	0.993805149757471
	30pts	2.472135954999580	1.038297101	0.994523196090084
8	octogram	2.618033989000000	1.059016994	0.998126753998523
18	18 point polygram	2.923798177	1.116791527	1.000000110920850
5	pentagram	3.236067977499790	1.106802789	1.000002558672440
120	120 point polygram	3.496128197000000	1.080363027	1.007092896685320
12	12 point polygram	3.853220324000000	1.102139312	1.002719029494060
40	40 point polygram	4.236067978000000	1.099357841	1.011238361374210
30	30 point polygram	4.846581983000000	1.144122806	0.992395538205922
9	nonogram	5.656854249492380	1.167184269	1.018016588036510
20	20pts	6.344258170675030	1.121516994	1.007606912252900

Polygons with whole Number Degrees

If we accept the equation that the **Index Number for a Polygon** is equal to "*Number of sides less 2 divided by 2"* then we can produce lists of index numbers relating to the numbers of Polygon sides. The results are therefore whole numbers or whole number plus one-half.

If we accept the equation that the **Index Number for a Polygram** is equal to *"Number of Points (or sides) multiplied by the degrees in each point all divided by 360"* and then apply it to **Polygons** with the same number of sides we can derive the number of degrees simply from the Index Number and Number of Sides. What we have to work with is then the equation *"Degrees equal Index Number multiplied by 360 divided by number of sides."*

As this seems to work quite well it indicates that both the equations for Index Numbers for both the Polygrams and Polygons will apply to the Polygons. It is only through this idiosyncrasy that we are able to equate degrees to polygons sides.

Index	*Degrees*	*Polygon Sides*
11	165	24
14	168	30
17	170	36
19	171	40
21.5	172	45
29	174	60
35	175	72
44	176	90
59	177	120
89	178	180
179	179	360

Did Ptolemy equate 180^0 with a 360 sided Polygon? Calculations using Index Numbers indicate that 179^0 equates to a 360 sided Polygon. Within the last degree from 179^0 to 180^0 the number of polygons found in that 1^0 move towards infinity.

Using these equations I have produced a list of Polygons with their number of sides and degrees.

PTOLEMY AND WHOLE DEGREES

It is intriguing that the polygons that showed that they were formed from ***whole degrees*** (without fractional degrees) included those with 36, 40, 60, 72, 90, 120 sides.

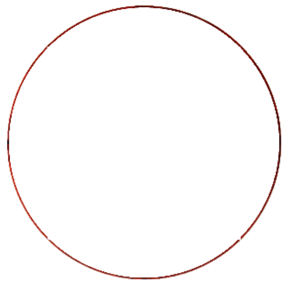
If we look upon these numbers of sides as degrees instead we have the starting point that is suggested was used by Ptolemy in deriving his chords.

It is not suggested that Ptolemy was aware of this but the coincidence is intriguing.

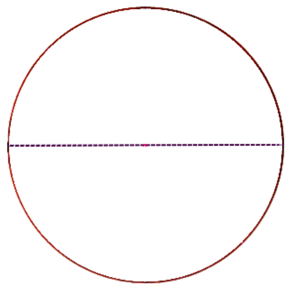
These are also the degrees where Ptolemy shows the best accuracy and correlation with my Shape Ratios.

From Ptolemy's Chords to Shape Ratios

From Ptolemy's 72^0 to a Concentric Circle formed Decagram

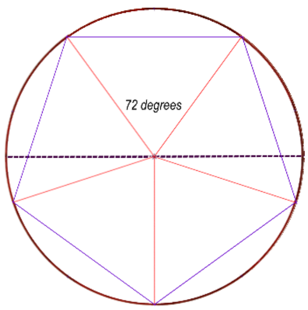


Ptolemy started with a circle containing 360 degrees.
The circumference of this circle represented 360 portions.

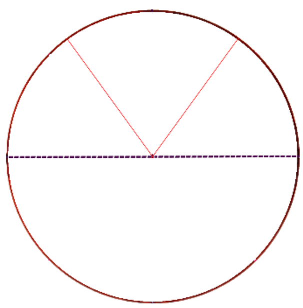


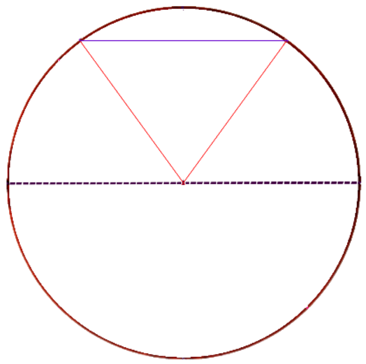
He then added a diameter of 120 units.

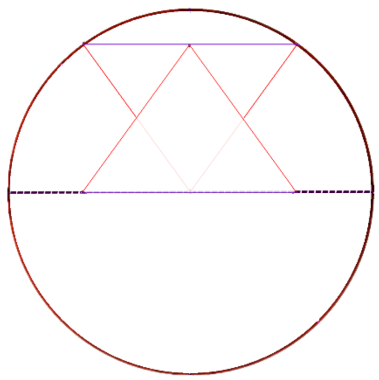
He has not needed Pi for these *'Dimensions".*

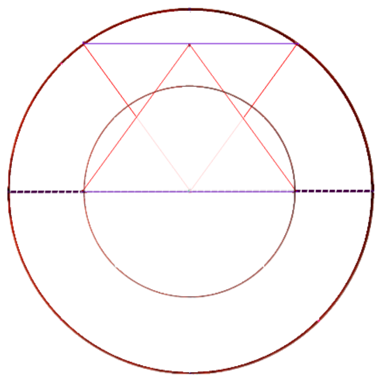


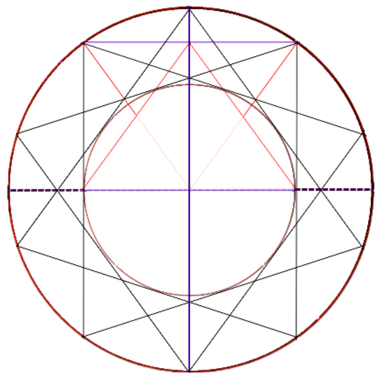
He then produces a Pentagon whose sides produce a chord for 72^0.
72 is of course one-fifth of 360.

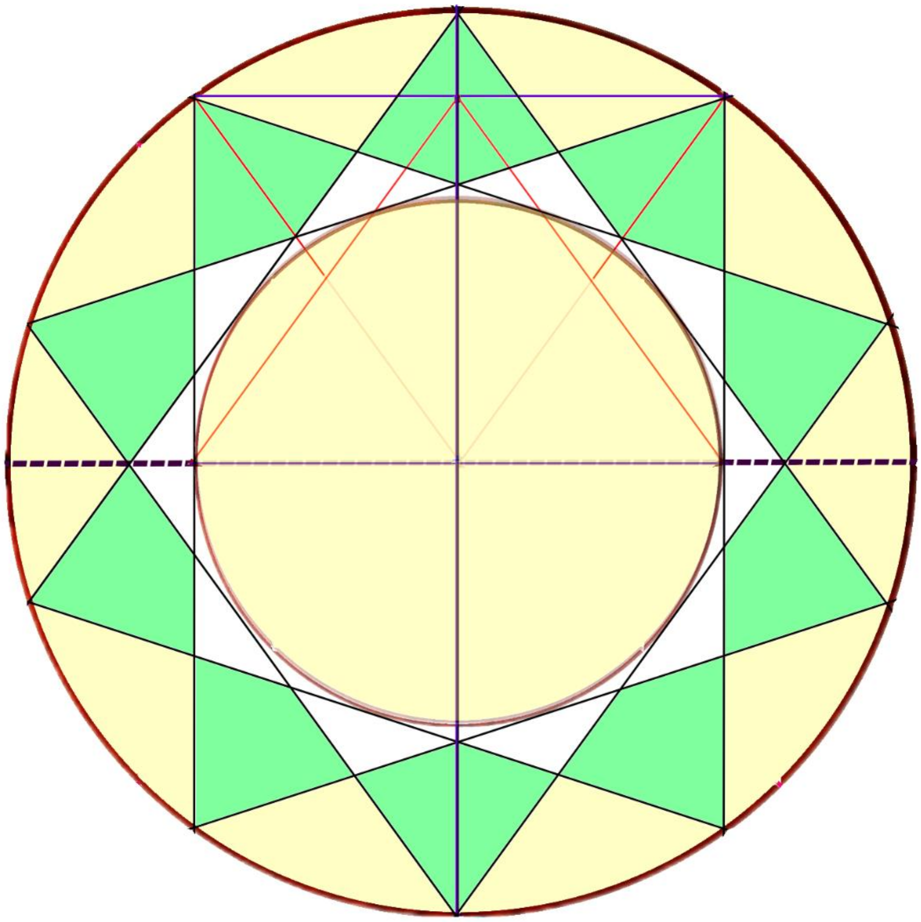




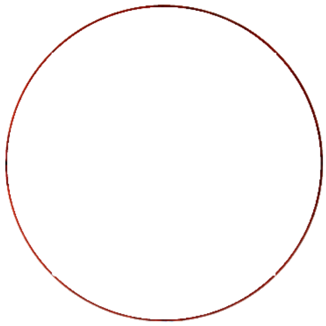




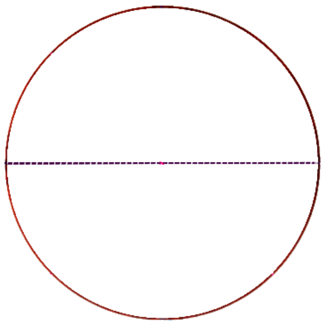




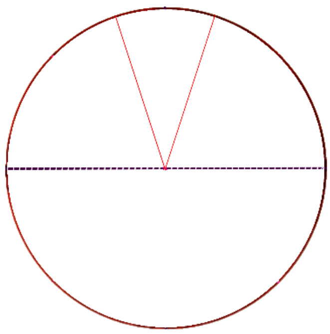
Ptolemy's Decagon Chord to Shape Ratio's Pentagram



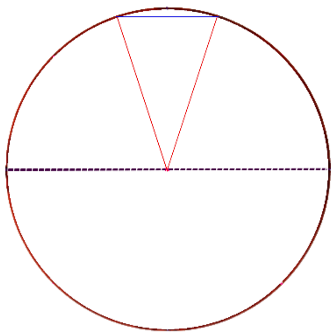
Ptolemy's Circle with 360^0 Circumference.



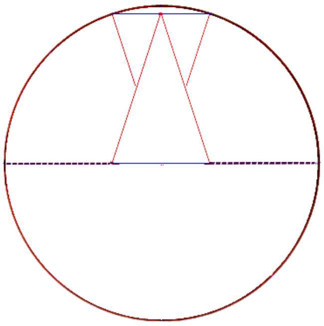
Ptolemy's Diameter of 120 units.



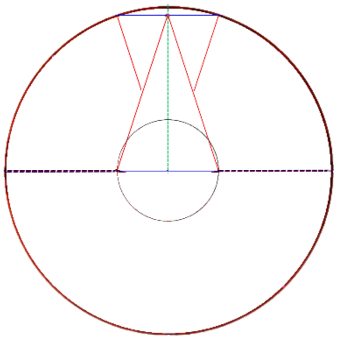
Ptolemy's Angle of 36^0 from the Decagon.



Ptolemy's Chord produced from this Angle of 36^0.

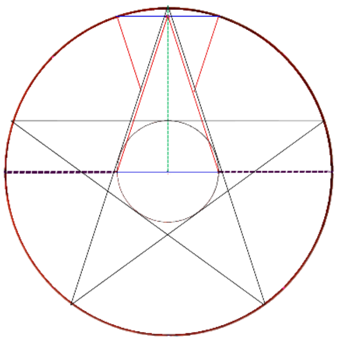


The triangle containing the 36^0 Angle and the Chord is inverted.
The apex of this triangle drops from the original chord.
The height of this triangle is the line from the chord to the diameter.

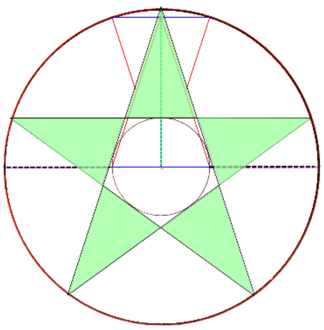


A Circle is inserted using Ptolemy's Chord as a diameter.

It should be noted that the sides of the 36^0 angle are not tangents to this circle.

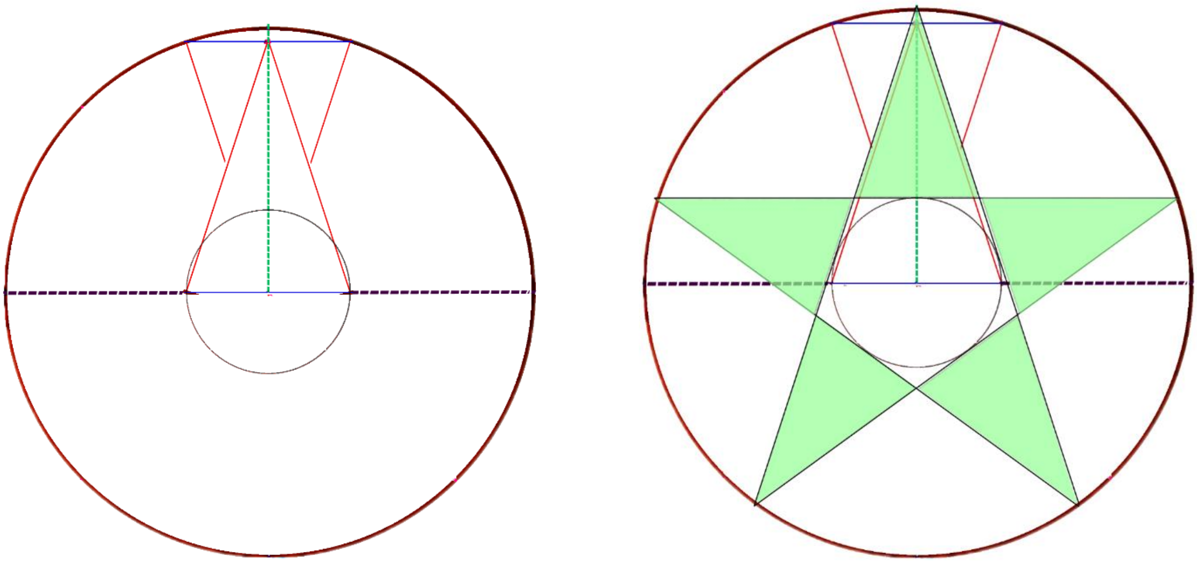


Using Ptolemy's original circle as circumscribing circle and this new circle as the inscribing circle we now use tangents to the inscribing circle to produce a regular pentagram.

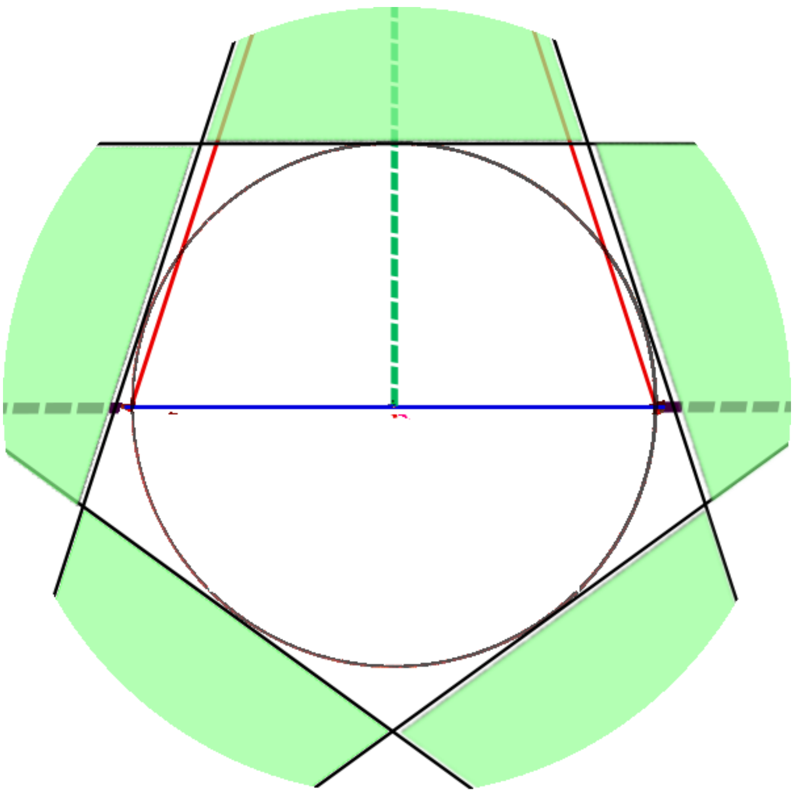


FROM A DECAGON TO A PENTAGRAM

USING PTOLEMY;S CHORDS



X



This enlargement of previous illustrations will show that the angle of 36^0 from the chord to the diameter of the original circle provides a new circle with a diameter equal to the chord. The sides of the original angle dropped from the chord are not tangents to this inscribing circle.

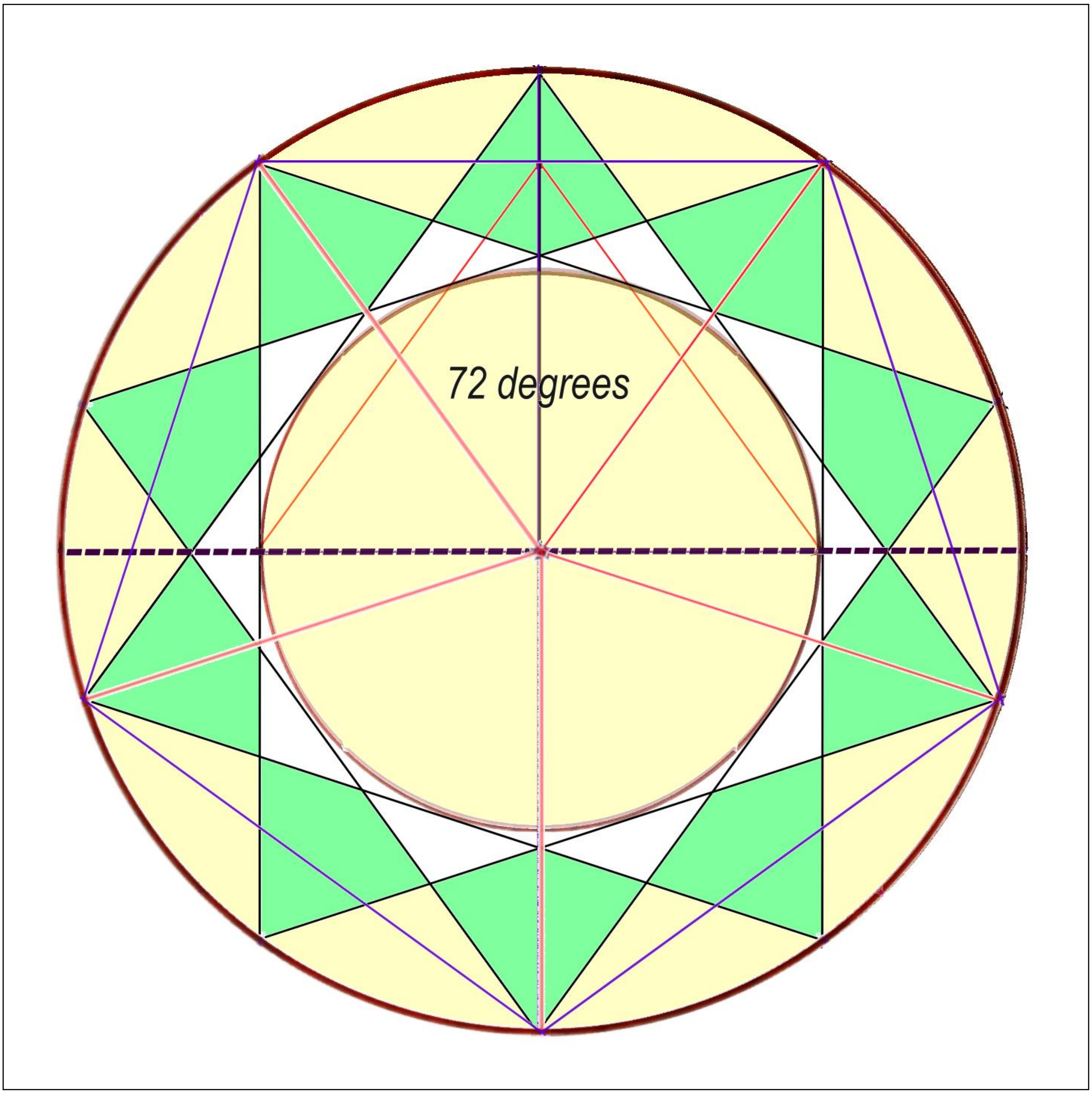
But, if we drop an angle from the original circumference of the circumscribing circle we find that its sides are in fact tangents to this circle with the chord as its diameter.

There is definitely a relationship between the concept that is Ptolemy's Chords and that new concept which is my Plane Regular Shape Ratios.

FROM A PENTAGON TO A DECAGRAM

USING PTOLEMY;S CHORDS

Putting the Whole Concept on One Diagram



Graphical Mathematics for the Beginner

GRAPHICALLY AND MATHEMATICALLY PORTRAYING *THE SHAPE THEOREM*

THE SHAPE THEOREM:

"A SHAPE RATIO MULTIPLIED BY ANOTHER SHAPE RATIO PRODUCES THE RATIO FOR A THIRD SHAPE."

This theorem is the basis for the existence of the ***Harmonics of Plane Regular Shape***.
This theorem is the basis for the applicability of ***The Matrix*** in deriving shape ratios.

If a unique mathematical value can be found for EACH Plane Regular Shape
&
If this theorem can be applied universally to ALL Plane Regular Shapes
&
If we can accept that the results of all Cymatics experiments (shapes produced by vibration) using Circular containers are in fact Plane Regular Shapes
Then
WE WILL HAVE A SYSTEM OF MATHEMATICS THAT WILL ACCOUNT FOR THE RESULTS OF ALL CYMATICS EXPERIMENTS.
&
POSSIBLY OF SOME OTHER EXPERIMENTS WHICH USE FREQUENCIES TO EXCITE LIQUIDS.

SOME GRAPHICAL MATHEMATICIANS

HANS JENNY, P273 (8):

*JENNY: "If two frequencies are made to impinge on one and the same liquid system, a figure appears which **is the resultant of these actions**. Each frequency produces a definite figure of its own. The resultant is a 'third' figure (Figs. 156 – 164)."*

My Theory: What Jenny is observing and stating here is my Shape Theorem: -

Shape Ratio x Shape Ratio = A Third Shape Ratio.

Or to put it simply:-

Shape x Shape = Shape

*It is this feature of the Shape Ratios that give them their Harmonic flavour. From this Theorem I proceeded to what I called my **Stonehenge Theorem** because it is where I first found this phenomena:*

> ***In any set of 3 or more Concentric Circles where each adjacent pair of circles produces a shape (and because Shape X Shape = Shape) then any pair of circles in this set, adjacent or otherwise, will produce a shape.***

Dr. Hans Jenny has seen what Kim Veltman called 'Visual Mathematics' at work.

PLATO: *According to Kim Veltman:*

428-348 bc : "Plato was more successful. He built on the *Pythagorean* associations in his *Timaeus"*

Plato in his *Timaeus* described the composition of all five regular solids, but believed that only three could be changed into one another.[48] **Pacioli** believes that all five are interchangeable. So too does **Leonardo da Vinci**[49] **Plato's *Timaeus* as it has come down to us, had no illustrations**. **Euclid**'s text, as we have already noted, had diagrams which were spatially unconvincing (fig. 2.1-5). **Pacioli**, by contrast, **commissioned a magnificent set of illustrations by Leonardo da Vinci** (fig. 8-11, pl.1,3,5). **The opening lines of his preface confirm that this was not merely a decorative flourish. Pacioli cites Aristotle to claim that sight is the beginning of wisdom**[50] and to strengthen his case he uses another of Aristotle's phrases which the mediaeval philosophers had used quite differently: that ***"there is nothing in the intellect which was not previously in the sense".***[51]

KEPLER: *According to Kim Veltman:*

Johannes Kepler

Meanwhile, the terrestrial role of the regular solids had gained in significance through **Kepler**'s booklet on the *Snowflake* [38] (1611). In this work he drew attention to the **hexagonal** pattern of snowflakes, noting how this form recurred in beehives and in the pips of pomegranates.[37] He also noted how *pentagonal shapes occurred in many botanical forms*. In this context he posited **the existence of a shape forming power** [40] and **related these basic shapes in nature to the regular solids**, particularly the dodecahedron and icosahedron, [41] ***both of which involved the golden section,*** i.e. precisely that divine proportion which **Pacioli** had made the title of his book.

PTOLEMY CLAUDIUS

FOR AN ENGLISH VERSION OF PTOLEMY'S CHORDS:

***Refer:* Volume 16,** of the *Great Books of the Western World*

- Ptolemy
  - *Almagest, part 1* (translated by R. Catesby Taliaferro)
- Nicolaus Copernicus
  - *On the Revolutions of Heavenly Spheres* (translated by Charles Glenn Wallis)
- Johannes Kepler (translated by Charles Glenn Wallis)
  - *Epitome of Copernican Astronomy* (Books IV–V)
  - *The Harmonies of the World* (Book V)

PTOLEMY'S METHODOLOGY:

10. 'On the size of Chords in a Circle:' p.14

"With an eye to immediate use, we shall now make a tabular exposition of the size of these chords

- *by dividing the circumference into **360** parts and setting side by side the chords as the arcs subtended by them increase by a half part.*
- *That is, the diameter of the circle will be cut into **120** parts **for ease in calculation**;*
- *(and we shall take the arcs, considering them with respect to the number they contain of the **circumference's** 360 parts,*
- *And compare them with the subtending chords by finding out the number the chords contain of the **diameter's** 120 parts.)"*

*". . . aiming always at such an **approximation** as will leave no error worth considering as far as **the accuracy of the senses** is concerned."*

PAUL ADRIEN MAURICE DIRAC

"God is a mathematician of a very high order, and He used very advanced mathematics in constructing the universe."

Paul Adrien Maurice Dirac (8 August 1902 – 20 October 1984) was a British theoretical physicist and a **founder of the field of quantum physics**.

HIS QUOTES:

- *In science one tries to tell people, in such a way as to be understood by everyone, **something that no one ever knew before.** But in the case of poetry, it's the exact opposite!*
- *It seems clear that the present quantum mechanics is not in its final form.*
- *The measure of greatness in a scientific idea is **the extent to which it stimulates thought and opens up new lines of research**.*
- *I think it's a peculiarity of myself that I like to play about with equations, **just looking for beautiful mathematical relations** which maybe don't have any physical meaning at all. Sometimes they do.*
- *One could perhaps describe the situation by saying that God is a mathematician of a very high order, and He used very advanced mathematics in constructing the universe*
- *It seems to be one of the fundamental features of nature that fundamental physical laws are described in terms of **a mathematical theory of great beauty and power**, needing quite a high standard of mathematics for one to understand it. You may wonder: Why is nature constructed along these lines? One can only answer that our present knowledge seems to show that nature is so constructed. We simply have to accept it. One could perhaps describe the situation by saying that **God is a mathematician of a very high order, and He used very advanced mathematics in constructing the universe**. Our feeble attempts at mathematics enable us to understand a bit of the universe, and as we proceed to develop higher and higher mathematics we can hope to understand the universe better.*
- *Just by studying mathematics **we can hope to make a guess at the kind of mathematics that will come into the physics of the future**. A good many people are working on the mathematical basis of quantum theory, trying to understand the theory better and to make it more powerful and more beautiful. **If someone can hit on the right lines along which to make this development, it may lead to a future advance** in which people will first discover the equations and then, after examining them, gradually learn how to apply them.*

OTHER'S QUOTES:

- Well, our friend Dirac, too, has a religion, and its guiding principle is *"God does not exist and Dirac is His prophet." ~ Wolfgang Pauli*

'Dirac has done more than anyone this century, with the exception of Einstein, to advance physics and change our picture of the universe. He is surely worthy of the memorial in Westminster Abbey. It is just a scandal that it has taken so long.'

***Stephen Hawking**, Dirac Memorial Address, published in 'Paul Dirac: The Man and His Work' (1998), edited by Peter Goddard*

'FUNDAMENTAL' SHAPE AND ITS HARMONICS

Experimentally, when I overlay a transparent image of a shape over some Cymatics image I am able to determine with some degree of certainty the true shape that is being imaged cymatically by a certain frequency. Thus, it would seem, that a Shape's ***Construction Harmonics*** are what is being imaged by the Cymatics experiment; the ratio remains unseen as it is only obtainable from the ***Mathematical Harmonics*** which are the hidden nested shapes that reside between the ***Construction Harmonics***.

So, what is now knowable about a Shape's Harmonics?

From results of observations and experimentations it would seem that Plane Regular Shape embodies more Harmonics than the rest of Nature combined.

The Harmonics of Nature:

- It can be shown that complete correlation exists between Music Notes and Plane Regular Shape and Square Roots of Integers. These results were in wide Spreadsheets and are not illustrated here.

Construction Harmonics:

- They share the same Inscribing Circle.
- Each inner or intermediate shape exists in harmony with all other inner or intermediate shapes within the same outer or primary shape.

Mathematical Harmonics:

- They are the invisible **nested shapes** that exist between the circumscribing circles of the consecutive apexes of shapes formed by the ***Construction (or Graphical)*** tangents.
- They exist between all ***Construction Harmonics***.
- The outer circle for an inner nested shape becomes the inner circle for the next outer nested shape
- These hidden nested shapes share no common inscribing circle.
- The ratios of all the hidden nested shapes multiply together to give the Ratio for the overall shape.
- The ***Mathematical Harmonics*** may possibly be imaged in a Cymatics experiment by their circles.
- The Outer Construction or Shape may be identified from the multiplication of all the nested Mathematical Harmonics or shapes that could possibly fit within the Outer shape's Circles.

The Stonehenge Theorem:

- *In a set of three or more concentric circles if a shape exists between each adjacent pair of circles then a shape will exist between any pair of these circles. . . (see also Shape x Shape = Shape)*
  (*My Stonehenge Theorem*) (*See also my 7 Concentric Circles*).

Polygon to Complementary Primary Polygram Conversion Harmonics:

- Embedded in a list that is indicative of the continuous, repeating **0.5 – 2 – 1 – 2** multiplying sequence.
- Polygons, when converted to Complementary Polygrams, produce ***Primary*** Polygrams.

Plane Regular Shape is Harmonic because a Shape Ratio x a Shape Ratio = a Shape Ratio.

A GENOME OF SHAPE IS NOT SIMPLISTIC
BUT IT IS ALSO NOT IMPOSSIBLE

THIS IS THE COST OF THE OVERWHELMING CURRENT DESIRE TO USE "AUDIBLE FREQUENCIES" AS TOOLS IN EXPERIMENTS TO 'EXCITE' MEDIUMS THAT ARE INTENDED TO FORM SHAPES – BUT WHAT SHAPES?

MATHEMATICAL GEOMETRY SIMPLIFIED

GOD'S TOE

If a Shape Ratio **multiplied by** another Shape Ratio **=** a third Shape Ratio;

And if **2** is the Ratio for a Shape (The Equilateral Triangle)

Then every Shape Ratio **multiplied by** *2* (The Equilateral Triangle) *is* ***doubled***.

And if a Shape Ratio **divided by** another Shape Ratio **=** a third Shape Ratio;

Then every Shape Ratio ***divided by*** *2 is* ***halved***.

And if a Shape Ratio **multiplied by** itself (a Shape Ratio) **=** a third Shape Ratio;

Then every Shape Ratio ***multiplied*** *by itself is* ***squared***.

And if a Shape Ratio that has its **Square Root** applied = yet another Shape Ratio;

Then every Shape Ratio doubled, halved, squared or square rooted produces a shape ratio which will also produce a Shape.

And a Matrix of Plane Regular Shape Ratios can produce Shape Ratios ad Infinitum.

THE MIND BOGGLES!

SIMPLE COMPLEXITY

OR

COMPLEX SIMPLICITY

AN OUTLINE OF THE JOURNEY TO THE

THEORY OF THE HARMONICS OF PLANE REGULAR SHAPE

AND TO

THE PREVIOUSLY HIDDEN INNER CIRCLE OF HARMONY & ITS ASSOCIATION WITH RIGHT ANGLED TRIANGLES

An Introduction to the ***Theory of the Harmonics of Plane Regular Shape***
An outline of the theory; its initial scope; and some of its possible applications.

Can you see Plane Regular Shape as a Frequency?

Observe Plane Regular Shapes to ascertain their common features:

- Polygons and Polygrams; the circle, the square and the equilateral triangle.
- Note that they all have some common characteristics:
  - *Naturally, they are all two-dimensional.*
  - *Given, they are all of course equi-angular and equi-lateral.*
  - *They can all have **Circumscribing AND Inscribing Circles** delineating their outer and inner boundaries. - (The outer edges of the dough in the doughnut).*
  - *Each Shape has a unique **pair** of concentric circles present in a **unique Ratio** for that shape.*
  - *These ratios co-exist in a **set** that displays incredible harmonics – the harmonies of Nature.*

Devise a Method to numerically categorize these Unique Ratios: (using these common characteristics):

- These ratios or numbers are not randomly selected numbers as used for simulation theory but are real, applicable numerical ratios derived from the shapes that actually can be used to produce and represent the shapes.
  - A number is obtained by dividing the shape's Outer Circle by its Inner Circle; As circles can be defined simply by the length of their diameters (all other entities being common to both circles) then the ratio of one diameter to the other diameter provides the ratio of one circle to the other. NB: No **AREA** calculations are required or used. - (*more like Euclid's Line Ratios*)
  - These Numbers epitomize the shapes both mathematically and graphically.
  - They control and represent the angles present in the points; in a reciprocal relationship except in the area of Dark Matter where they have crossed the Singularity and they exhibit an inverse orientation and become the reciprocal of the reciprocal. *In the area of Dark Matter the Outer Circle then becomes the Inner and the Inner Circle then becomes the Outer.*
  - They can be the basis of a system of purely ***graphical mathematics***.
  - They constitute a system that is the epitome of *Visual Mathematics.*

Basic Assumptions:

- *Something from Nothing:-*
  - **Lines** have no width;
  - **Points** have no dimensions;
  - **Tangents** *without thickness* pass through only one *dimensionless* **point** on the *widthless and depthless* circumference of a circle.

- This System of Ratios forms **Harmonic Sequences** which lead to the discovery of ***Shape Theorems***.
    - *A Shape Ratio multiplied or divided by another Shape Ratio will produce yet another Shape Ratio which I refer to as a **Harmonic Multiplier**. These Harmonic Multipliers are also shapes.*
    - *Shape Ratios are only produced from Shape Ratios. (Music Frequencies from Music Frequencies etc.)*
    - *In a set of three or more concentric circles if a shape exists between each adjacent pair of circles then a shape will exist between any pair of these circles.* -- (*My Stonehenge Theorem*) (*7 Concentric Circles*).
- The nature of these ***Shape Theorems*** prompts us to apply ***matrices*** to reveal more shape ratios
    - These new ratios need to be then tested graphically.
    - Eventually there should exist a *'genome'* of Plane Regular Shape. – W*ithin the visible spectrum.*
    - These Ratios should enable the graphic production and testing of the Shapes by Computer.
    - Once a fairly substantial *'genome'* has been established then the pattern (or patterns) of ***harmonic multipliers*** should be revealed. This *'genome'* should, in reality, be infinite.

Approach the Theory as if you were in the period before Trigonometry; as if you were an Ancient:

- There is evidence in Stone and in Clay Tablets that shape harmonics were known 5000 years ago.
    - *Stonehenge; Durrington Walls; The Sanctuary; The Pyramids;*
    - ***Clay Tablets***
        - *BM15285; The Spiral of Squares;*
        - *Ashmolean 1924.457 with the 07:12 table used later by Eratosthenes;*
          *(*Old Babylonian **Marad** School tablet, type III: multiplication table x 7:12.*)*
    - *Hippias and Ptolemy; Plato; Eratosthenes;*
    - **Antedeluvians**: *Anu, Adam, Noah,* ***Enmeduranki and the Divine Kibdu Tablet****;*

Harmonic Sequences within the Theory:

- Not just one but Several Harmonic Sequences are revealed by this theory.
    - **Brian Greene** of Columbia University seeks patterns. He also seeks harmonics *"like Music".*
    - From an 'integer' ordered list of Polygons we can produce a sequence of Complimentary **Primary** shapes (mostly Polygrams) ad infinitum. -- cf. ***Cantor's Continuum Hypothesis***.
    - We can discern **Secondary** Shapes that stem from these Primary Shapes, possibly also from sequences of harmonics;
    - Such harmonics I have classified as either ***construction harmonics*** or as ***mathematical harmonics,*** invisible without further graphical analysis**.**
    - We can devise harmonic lists of ***'Index Numbers'*** for the shapes which illustrate more harmonies and enable the extension of the list of Complimentary Shapes.
    - We then discover a repetitive **code** within Index Numbers existing within lists of these ***polygon – to – primary polygram*** shape conversions:

2, 1, 2 0.5;	2, 1, 2 0.5;	2, 1, 2 0.5;	2, 1, 2, 0.5;	2, 1, 2 0.5;	2, 1, 2 0.5;

- The Size of Shape Ratios exists in some ***reciprocal order*** to that of the angles contained in the shapes except in the area of 'Dark Matter' (Inner circle divided by the Outer circle) where the sizes of angles and ratios are in a similar order.
- There are NO calculations using **π** in this system. There are no ***area*** calculations required nor do we measure the lengths of the circumferences. So, **π** becomes a red herring in this theory. This is a new approach to dealing with circles; - circle mathematics without **π.**
- Numerically ordered lists of certain shape ratios bear complete correlation with **Music Notes** after allowing for a ***harmonic differential*** which contains a microscopic ***'sorting' constant***.
- Numerically ordered lists of certain shape ratios bear complete correlation with **Square Roots of Integers** after allowing for a differential which contains a microscopic 'sorting' ***constant***.
- Numerically ordered lists of certain shape ratios should bear complete correlation with <u>applicable</u> lists of **Ptolemy's Chords** after allowing for a refinement of Ptolemy's numeration. *(*His work was, by his own admission, *'sufficient for the senses').*
- The ratio **√2** and the ratio **2** (√2x√2) along with multiples exist in all three entities: Music; Shape; Square Roots. They are the basic underlying harmonic influences. (I submit that they could be the source of the **anthyphairesis** theories of the late David Herbert Fowler of the Maths Institute at Warwick University in the U.K. and of the late Wilbur Knorr)
- The number 2 is a shape ratio (for the Equilateral Triangle) and in this theory does not refer to *doubling* or *halving*. When a shape ratio is being multiplied or divided by 2 it is being multiplied or divided by the equilateral triangle; by a shape in the true nature of the shape theorems.

<u>The Incommensurable Nature of Shape Ratios:</u>

- With the exception of 2 and its integer multiples all plane regular shape ratios are incommensurable numbers which give an insight into the workings of ***Infinity*** in our Universe. (But even 2 is √2 x √2.)
  - Although Shape, Music and Square Root Ratios are incommensurable they co-exist with other ratios *harmonically* in a totally commensurable manner <u>within their own system</u>.
  - They also co-exist *harmonically* in a totally commensurable manner <u>with systems of other entities</u> such as Music and Square Roots and Ptolemy's Chords (*and possibly therefore with Trigonometry subject to issues of accuracy?)*.
  - This harmonic existence within the mechanism we know as *infinity* requires a rethinking of our approach to this notion.
    - Without *infinity* there would be NO Shape.
    - Without *infinity* there would be NO Music.
    - Without *infinity* there would be NO Square Roots.
    - Without *infinity* there would be NO Trigonometry.
    - Without *infinity* there would be NO Sorting Constants.
  - This theory requires that we embrace Infinity not avoid it. **Mandelbrot** avoided Infinity specifically when he was developing his fractals theory. He set boundaries between +/- **2**.
  - We can embrace Infinity by accepting and recognizing the unique and special work played by infinite numbers in Music, Shape and Square Roots and by realizing that they can be commensurable in their own way with each other in their own environment.

Affinities between Plane Regular Shape, Music, Frequency, Vibrations:

- The mathematical correlation discovered between Music and Shape through the use of these Shape Ratios infers that it is certainly possible, if not simple, to develop a mathematical system to account for Cymatic (*Modal Phenomena*) *and other vibrational experiments* that produce shape and/or other ***stray frequencies*** in their results. *Could Shape Frequencies be interfering with their results?*
- The accuracy of existing **theses** in the areas of *Vibrations, Resonances* and *Frequencies, & Modal Phenomena* would be enhanced by the use of this system of mathematics, ratios and harmonics.

PEOPLE WITH RELEVANT RESEARCH

  - There would no longer be a need to *assume* reasons for inexplicable results.
  - Similarities that have been found in the past need no longer remain "unexplained".
  - **Classifications of Crystals** may be enhanced.
  - **Resonance Theory** – The frequency of a shape can be important. Do Shapes influence resonance?
  - **Steven Lehar**'s unfinished work on harmonics in the Brain could be enhanced. He could proceed past the fourth chapter.
  - **Lord Raleigh**'s work on earthquakes and vibrations.
  - **Fourier** Fast Transforms – FFT – explanations of the existence of currently unexplained harmonics. Estimates no longer required?
  - The concept of **THD+N** (Total Harmonic Distortion plus Noise) experienced with Low Frequencies could possibly be further explained – the symbiotics between shape and music (Cymatics).
  - **Jay Hambidge** could have applied this theory in his *Dynamic Symmetry* Theory. (√2, √2, √2 . . .)
  - The **Quadrature** can be seen in a new light if we overlook '*area*'. (√2, √2, √2 . . .)
  - Perhaps an enlightened view of **David Fowler**'s (and **Wilbur Knorr**'s) Anthyphairesis Theory.
  - Could **Chun Ti Chang** of Cornell Uni have improved his analysis of *Constrained Sessile Drops* with an improved and expanded version of this knowledge of shape and frequency?
  - Could this theory be developed into a laboratory reference work?
  - Could **Wave Theory** be enhanced by this Shape Theory?
  - **David Attenborough** would make fine use of this theory especially in episodes such as his *Puffer Fish Love Nest* and plant roots responding to frequencies.
  - **Jack Kassewitz** in Florida USA is attempting to understand '*Dolphin Speak'* by analyzing dolphin sounds cymatically; the one thing missing from his work is a system of maths that is applicable to this type of analysis.
  - **John Stuart Reid** in the U.K. would also benefit in these applications and anyone using his *CymaScope.*
  - **Resonance** studies would benefit from this theory;
  - **Alexander Lauterwasser** in producing his book *"Water Sound Images"* would have known that the *circles produced by Nature* within each of his photographs were actually the Inner or Outer or Intermediate Circles applicable to the Plane Regular Shape harmonics present in his images.
  - **Dr. Hans Jenny** *obtained results* in his experiments that I have *theorised* from my maths.
  - **Linden Gledhill** in America with his 5000 frames per second camera could understand his results more easily and realise that there is more in his results than just art. Is he aware of the occurrence of multiple ***Shapes in Phase*** sharing the same Ratio as their corresponding ***Single Phase Ratios***?

- **Alexander Lauterwasser** with his perfect high resolution images has captured the method of analyzing these shapes; Nature is obviously not hiding these Circles from us.
- **Dr. Sungchul Ji** should be keen to obtain this knowledge before he uses a Cymascope in his biological cell research; he should be aware of the Ratios of Plane Regular Shape.
- The physicists at Bulgaria too. Quantum use of audible freq agitation.
- **We would all** realise that *Mother Nature* knows this form of Mathematics so perfectly that she includes visual examples of the applicable circles in many Cymatics results. These circles can discern whether the resulting shape is a 10 point polygram or two pentagrams in phase.
- **Dr. Brian Greene** might just find the harmonies and the patterns that he seeks and give up on multiverses.

- Cymatic analysis of the correlation between Music and Shape leads to a suggestion that shape could exist in the scale of Frequency in the Very Low and Ultra Low Frequency areas. (In areas where low frequency noise is experienced and specifically ***filtered out*** of equipment.) SO:-
  - **Is** shape a frequency?
  - Does shape merely ***act like*** a frequency?
  - Is shape something else that ***responds*** to frequency?
  - Is shape symbolic of the agitation of electrons whose ***paths are altered*** by frequency?
- With the exception of the integer **2** and its integer multiples (and squares and square roots thereof) all plane regular shape ratios are incommensurable numbers.
  - Are those incommensurable ratios that give us shape ***reserved solely for shape*** in the spectrum of frequencies (if shape is a frequency)?
  - Can other entities ***share*** an incommensurable ratio with a shape? (**√2** and multiples excluded).
  - How many entities contain **2** and **√2** as major harmonic multipliers?
  - Do the ***incommensurable values*** of Music, Shape and Square Roots (*all with **2** and **√2** as major harmonic multipliers*) and other physical entities reside alongside each other in the spectrum with ***unallocated values*** becoming background microwave radiation?

- A new graphical perspective and a unique equation could now be given to the Golden Mean which is possibly now also the ratio for a plane regular shape. (The Inner Septagram?)

Analysis of Harmonics: - Undertones and Overtones:

- Just as music notes can generate *undertones*, shapes also contain *harmonic 'undertones'*. E.g. the 12 pointed polygram actually contains 3 squares (ratio √2) and 4 equilateral triangles (ratio 2) within its outline. These are what I call ***Construction Harmonics.***
- When the note or frequency that produces the 12 point polygram cymatically is played it is necessary to refine and extract from the results the undertone frequencies for these *undertone shapes*.
- Undertones for Music are deemed to be *in an Arithmetic and Integer relationship* with the fundamental frequency. Shapes seem to produce undertones which are in a *Harmonic relationship* with the fundamental shape. Calculation of Harmonic relationships of shape ratios require multiplication or division, not addition or subtraction.

- Are ***shape undertones*** that are found in Cymatic experiments indicative of the ***music to shape*** relationship?

    - If Music and Shape correlate then are the ***musical undertones*** found in the cymatically displayed note those that produce the known ***shape undertones*** of the required resulting shape?
    - Would this explain problems experienced by UK's John Stuart Reid in his attempt to illustrate '*Dolphin Speak'* for Jack Kassewitz in Florida USA?
    - Would this explain the difficulty in obtaining precise results from tuning frequencies and amplitudes in cymatics experiments?
    - Would this explain the variances between Reid's results for the first two octaves of the piano and my attempt to align Music frequency with shape ratios? I know they correlate mathematically.
    - Would this assist those attempting to explain vibrations in major electrical generating equipment?
    - Would this remove the necessity to use *estimates* in Fourier Fast Transforms?
    - Does ***amplitude*** define whether a whole primary shape is displayed in a Cymatics experiment or whether we are seeing only the inner circle with perhaps one or two intermediate ones?

Shape Ratios do not require a Unit of Measurement:

- Regardless of physical size a square will always have a ratio of **√2**.
    - **2** will always be the ratio for the Equilateral triangle.
    - **√5 -1** will always be the ratio for the Pentagon.
    - **√5 + 1** will always be the ratio for the Pentagram. (NOT Φ as we are led to believe).
    - Note that these last two are *square roots* **+/-** 1. They are therefore not entities sharing a ratio.

- Perhaps these ratios, ***requiring no unit of measurement***, can indicate a way to reconcile quantum theory with relativity.
- Perhaps the two concentric circles that define each shape could be seen to represent the ***strong*** and ***weak*** forces giving shape to atoms of matter. The equation **$E=MC^2$**, by itself, does not immediately allow for shape.
- When the Inscribing Circle equals the Circumscribing Circle the ratio of the circles is 1 – *the **Singularity***, - *(which is the ratio for the circles)*. *When the strong force equals the weak force . . .*
- When the size of the Inscribing Circle is greater than that of the Circumscribing Circle there then exists a relationship between the circles which produces shape ratios that are the reciprocals of those on the other side of the Singularity. These reciprocal ratios are *Dark (or Anti) Matter* being less than 1.
- **There is no zero in this theory**. There is no "nothing". A "*Universe from nothing"* becomes meaningless.
- There is no beginning and no end . . . just positive and negative infinity.

The Original & Only *ALWAYS WAS* *ALWAYS WILL BE*

The Universe and two – dimensional Circles:

- Black Hole formation relies heavily on circular structure. One can almost discern the presence of Inscribing, Intermediate and Circumscribing circles in their structure.
- The Rings of Saturn are a set of concentric circles.
- There are Spiral Galaxies. *In space these appear more as two dimensional than as three dimensional.*
- Rotations of Planets are more two-dimensional than three-dimensional.

Two Dimensional Shape versus Three Dimensional Shape:

- Since **Plato** introduced the five Regular Solids there has been little or no interest shown in two dimensional shapes. We have all accepted that **Euclid** had this area well covered. But, although Euclid used Inscribing and Circumscribing circles with his shapes he did not use them ***both together at the same time in a ratio one to the other***. This is a very fine distinction which has far reaching results.
- Although **Kepler** used both Circumscribing and Inscribing Circles together at the same time and seemed to be aware of the existence of some type of harmonics within the circuits of the planets he did not succeed in completely refining these harmonics. His harmonics consisted of ratios of certain whole integers. He fitted a plane shape *'plus a little more'* between the circuits of the planets. I think this *'little more'* is what I have refined as a Differential which I have found to contain a constant that enables shape ratios to sort square roots and music into order. I have not tried to refine Kepler's '*little more'* but I would hope that it could be done.
- ***Kim Veltman***, a mathematician, has written an unpublished thesis on Plato's Regular Solids which is what I call *the phone book of polyhedraphiliac mathematicians*. He has listed every person in the last 2500 years who dealt in any way with Plato's 3 dimensional regular solids but none who dealt specifically with 2 dimensional plane regular shapes. He also champions *"Visual Mathematics".*

<u>Areas needing expansion and refinement in this theory</u>:

- Correcting some ***erroneous numbers*** I have used to date which have some effect on the results.

For example, for the ratio for the Octagram I had used Φ^2 or 2.618033991065290; for the Octagon I had used 1.0803630270: Unknowingly, I had made a compensating error for the correct ratios were 2.6131259297527620 and 1.082392200292390. When the incorrect ratios are multiplied they produce the quadrature ratio 2.82842712474619 (or 2 x √2) (or √2 x √2 x √2) (or √8). When the corrected ratios were multiplied <u>they produced the same result</u>!

- The correct **alignment** of music frequencies with shape ratios to correctly identify the cymatics.
- **Refining** methods in cymatic experiments (**<u>Extra fine</u>** frequency and amplitude tuning needed in equipment);
- **Refined frequency** selection is outside the range of normal proprietary equipment; my mathematics has been calculated to 15 decimal places; (*we are dealing with incommensurables*);
- **GOOD Signal Equipment** becoming more rare, obsolete and difficult to obtain creates an emergency; filtering out the low frequency noise in experiments would filter out some shapes.
- Cymatics (or ,if you prefer, Modal Phenomena) should become **a full science** using this theory of shape, given that it is now capable of complying with a system of Maths;
- My numbers, by the very nature of the theory, rely upon each other for their harmonics; I made a grave error in my calculation of the ratios for the Octagram and Octagon and proceeded to produce ratios for 10 years. There is doubt now that Φ exists in any ratio. My Octagram's ratio was Φ^2. My inner Septagram's ratio was Φ. Harmonics should still exist but the theory requires ***re-enumeration***.

*If you think that Plane Regular Shape is already completely dealt with under the auspices of Geometry and Trigonometry then you are mistaken. These two branches of the sciences do not introduce **Shape Harmonics**. It seems to be that the Harmonics revealed through the **Ratios** of Plane Regular Shape address matters in Mathematics and Physics not otherwise accurately dealt with in these sciences.*

*There also seems to be a **relationship** between the harmonics in one entity and the harmonics in another entity. (Music – Shape – Square Roots of Integers – Planetary Motion – Nautical Creatures).*

*This is a totally new approach to this area of Mathematics and Physics and will not be found anywhere else. As it is a new approach I am aware that it will require time to be absorbed and assessed. There are no textbooks or references in existence. I can only refer to the work and theses of others who seem to be aware that they have something **missing** in the explanations for their frequency results. Their missing parameters can possibly be provided by this theory.*

***Adam Spencer**, one of the 'sleek geeks', in a recent (Aug 2015) Australian edition of Q&A on television stated that there seems to be a missing **'canonical' mathematical theory**. I am not saying that this theory is positively **it** but it is certainly missing from current mathematical content and is, I believe, a good candidate to be **'canonised'**.*

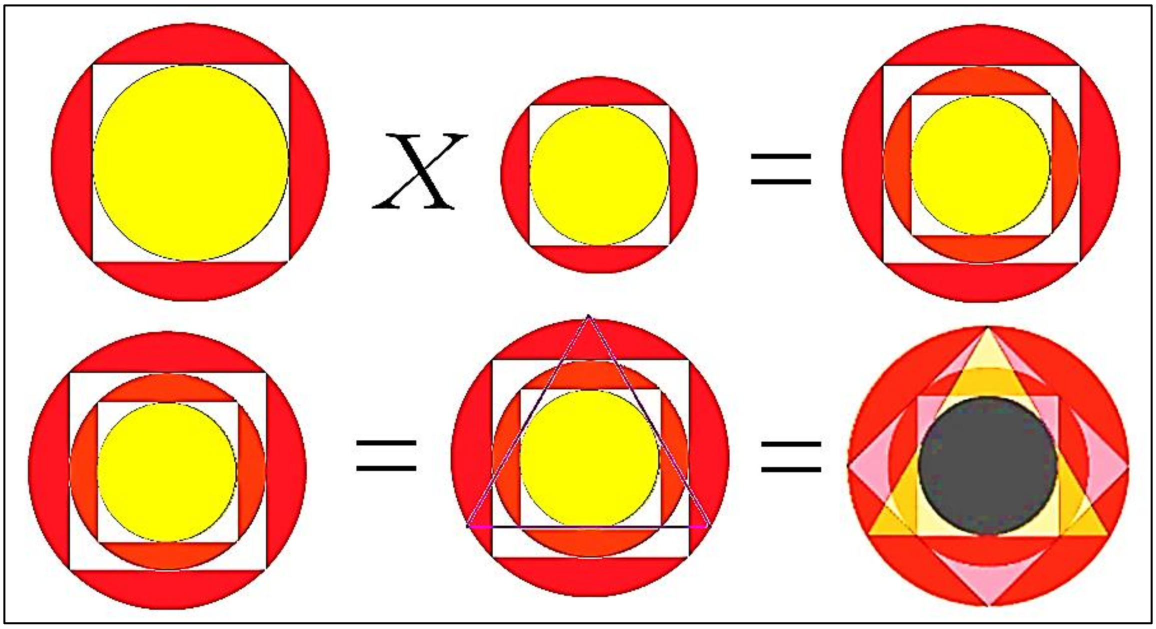
This area has been overlooked as we have developed Trigonometry and have rested upon our laurels safe in the belief that this area of Mathematics has been completely covered. **Ptolemy Claudius***, the 'father of Trigonometry', (though some claim Hippias), in 150ad developed his Chords to provide length measurements derived from angles of Polygons. He commenced with polygons as their angles were known at that time and the sides of the polygons became his chords. He merely estimated the chords for the angles in between using a rough method of harmonics based on integers. (30/29, 31/30, 32/31 . . .). At one point in his list of chords he threw all harmonics out the door and jumped 13 digits to arrive at a predetermined number.*

*Unknown to him **he was the closest person in history** to **not** discover this theory although he did relate the harmonics of music to the planetary motions. I only discovered Ptolemy's proximity to this theory after 10 years of research and I had the book containing his chords on my shelf the whole time! With one simple extra step he could have related his polygons to complimentary polygrams. His chord triangles, when inverted with the chord then lying along the diameter of his base (circumscribing) circle, provided the diameter for the inscribing circle for the complementary polygram. The ratio of his chord (with a little refinement) to the diameter of his Circumscribing circle actually would have shown him these harmonics and we could have had them for the last 1865 years. Instead we inherited Trigonometry which seems to have satisfied our thirst for knowledge in this area ever since.*

And this is just a brief Outline of the subject theory!

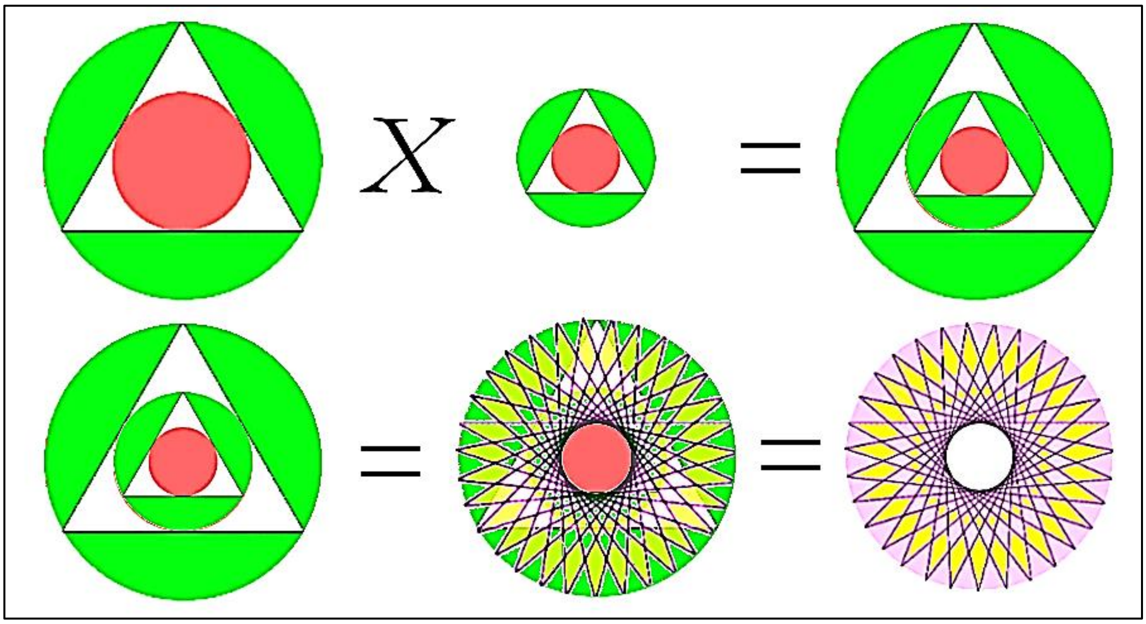
GRAPHICAL GEOMETRY SIMPLIFIED

NESTING THE SHAPES TO FORM NEW RATIOS:



√2 x √2 = 2.000000000

Square x Square = Equilateral Triangle



2 x 2 = 4.000000000

Equilateral Triangle x Equilateral Triangle = 31 point polygram

√2 = 1.414213562 = Square

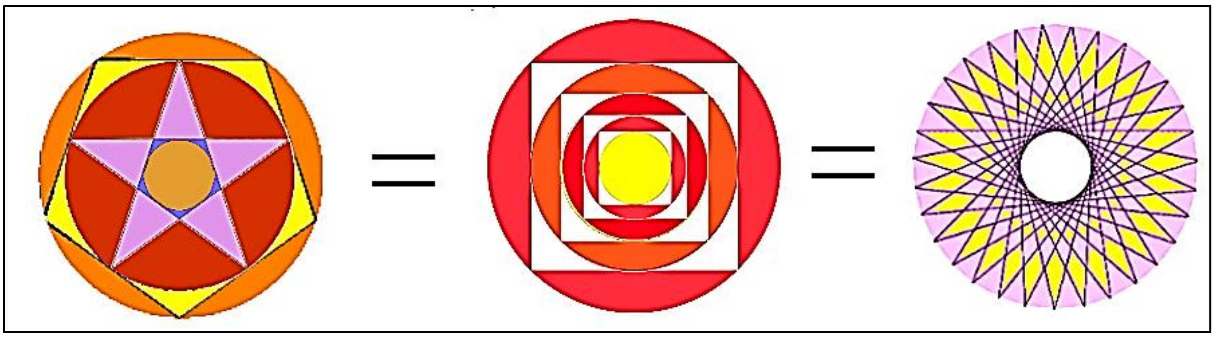
2 x 2 = 4.000000000 = 31 Point Polygram

THE *HIDDEN* **MATHEMATICAL HARMONICS** OF THE *HIDDEN* SHAPES, WHEN MULTIPLIED TOGETHER, WILL EQUAL THE RATIO OF THE OUTER SHAPE.

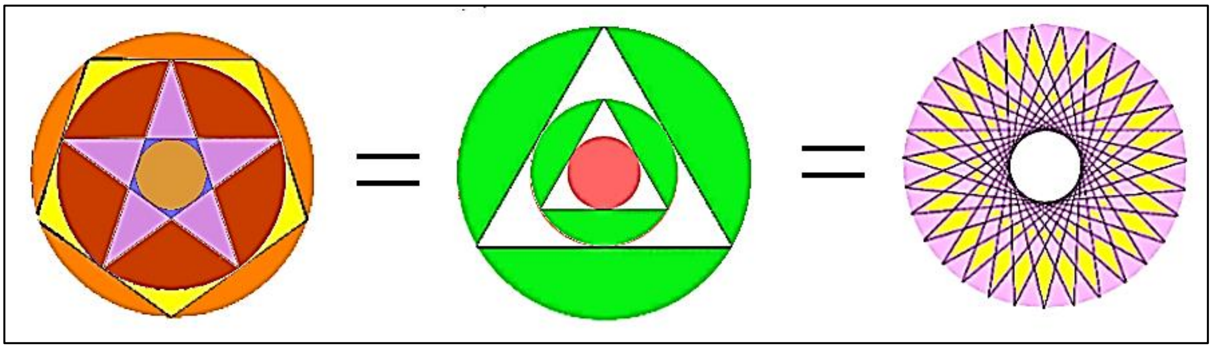
THE MULTIPLICATION OF THE RATIOS OF THE **CONSTRUCTION HARMONIC** SHAPES FALL SHORT OF THE FINAL SHAPE RATIO BY AN AREA FOR WHICH ONLY **MATHEMATICAL HARMONICS** WILL PROVIDE THE FINAL RATIO.

RATIO 4.000000000

Pentagon x Pentagram = Square x Square x Square x Square = a 31 point Polygram

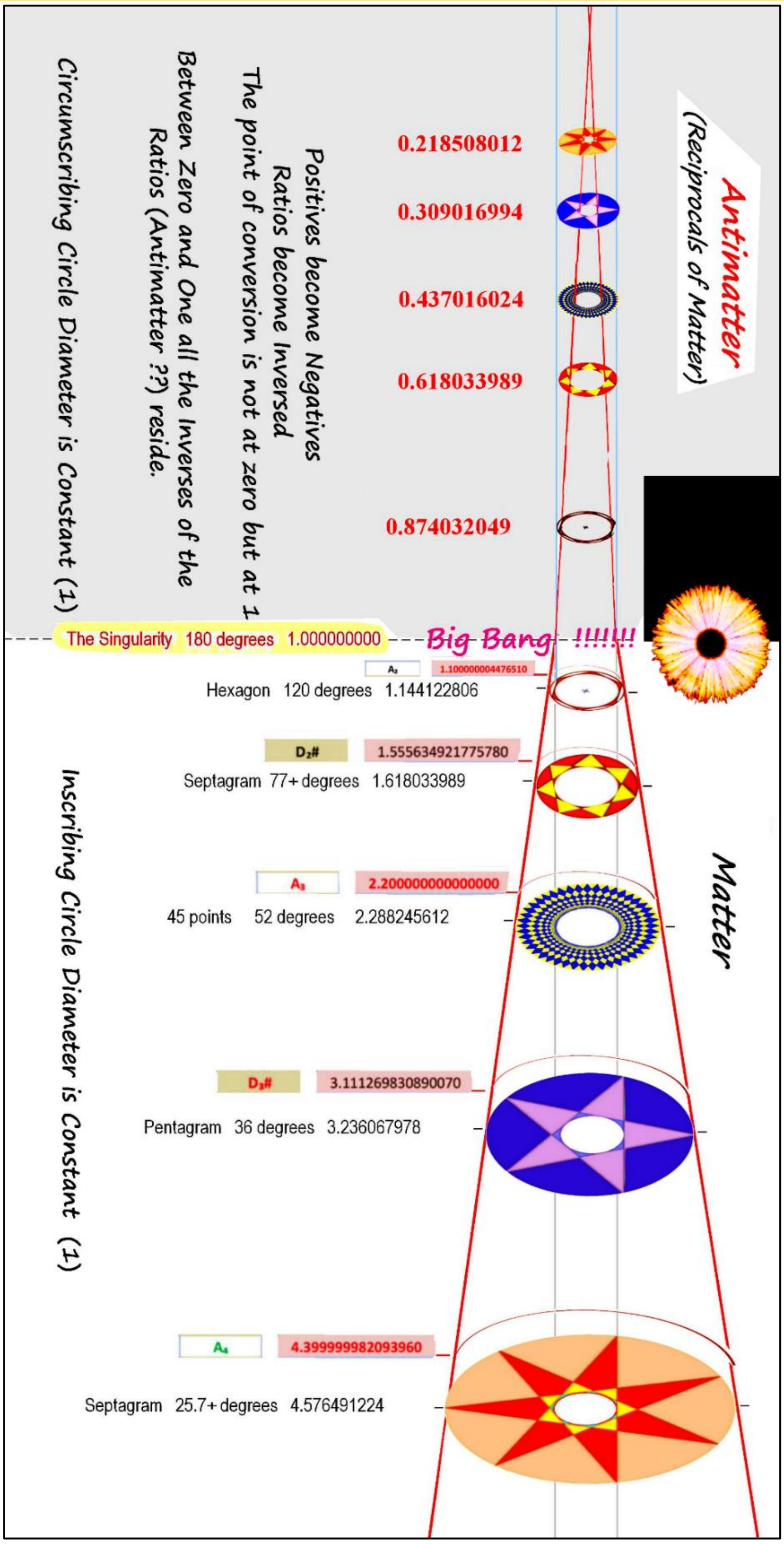


Pentagon x Pentagram = Equilateral Triangle x Equilateral Triangle = a 31 point Polygram



Square x Square x Square x Square = Equilateral Triangle x Equilateral Triangle

IF OVERALL SIZE IS UNIMPORTANT TO SHAPE RATIOS THEN DOES THIS THEORY TRANSCEND THE RELATIVITY/QUANTUM BOUNDARIES?



A CONCEPT TO CONSIDER

In this illustration there are some conceptual assumptions.

To the right of the Singularity or Big Bang we have a common ***Inscribing*** Circle of Unit value which becomes
To the left of the Singularity or Big-Bang
a common ***Circumscribing*** Circle of the same Unit value.

At this Singularity or Big-Bang the Circumscribing Circle equals the Inscribing Circle of the same Unit value – presenting a Singularity.

To the left of this Singularity the Circumscribing Circles are shown as having a Common Unit value.

In Maths terms: - The system to the left is the reciprocal of the system to the right. The system to the right produces shapes to 'positive' infinity. The system to the left, being the reciprocal of that to the right, must therefore produce shapes to 'negative' infinity.

This therefore gives us the Biblical concept of *"Always was and always will be."*

To the left of the Singularity or Big Bang the outer circle becomes the inner circle and vice versa. Each shape is turned inside out relative to the previous orientation of the circles?

If we considered the two circles to be *forces* in the manner that we consider the strong and the weak forces one could consider the alignment of dark matter as it passes the "Singularity" where the Inner circle becomes the Outer circle and vice versa.

Is Creation not therefore the point at zero and not the 'Big Bang' at 1? Can we not therefore have both a Creation and a Big Bang? Is not this Zero point also contiguous with Infinity? But, we cannot have both a Zero and Infinity. My system of Ratios does not allow for Zero. There is no Zero point in Infinity. So, I am back at two separate concepts:
'Zero' and 'Always was, always will be.'
(Not the Indigenous Version! The Biblical One.)

Attached is an Addendum containing some Shape Ratios I have derived but which also has INFINITELY much more work yet to be done. I am sure that it still contains many errors.
It is my initial attempt to produce a ***GENOME OF SHAPE.***

Always remembering that ***Shape x Shape = Shape.***

If ***Shape Ratios*** are compiled of INFINITE numbers
and if the ***available number of Shapes*** is also INFINITE then

THIS IS THE NEVER-ENDING STORY!
IT IS INFINITE!

PS: for 'finite' accuracy purposes I used 15 decimal places.

0

Deg	Shape	Ratio
1		
2	16.000000000000000	
3	14.809836694575200	
4	13.708203932499200	
5	11.313708498984800	
6	10.472135954999500	
7	9.152982445082920	
8	8.472135954999500	
9	8.000000000000000	6.854101966249600
10	6.992256391181140	7.404918347287620
11		
12	15 pt Primary polygram	9.152982446 plus
13	12.5 degrees ? pts	9.152982446
14		
15		
16	20 GON X 20 GRAM	7.258610467482560
17	OCTAGRAM SQUARED	6.828427126000000
18	18 deg 20pts	6.472135954999560
19	18.947 deg 38pts	6.111456184000000
20	20 degrees nonogram	5.656854249492380
21		5.545084971874640
22	16pts 22.5deg	5.236067977499790
23		4.944271909999160
24	24 degrees 30pts	4.846581983000000
25	septagram 25.7142857	4.576491223248880
26		4.321452107803630
27	27 deg 40pts	4.236067978000000
28	45pts	4.176904000000000
29	31pts 29.032258deg	4.000000000000000
30	12pts	3.853220324000000
31	29pts 31.03448deg 17 pts	3.702459175000000
32	31.76470588deg	3.629305232154990
33	33 degrees 120pts	3.496128197000000
34	34 degrees 37pts	3.427050986000000
35		3.464101616000000
36	pentagram 36 deg	3.236067977499790
37		
38		
39		2.995352394225280
40	18pts	2.936169615
41	13pts 41.53846154deg	2.828427124746190
42	56pts 41.78571429	Stonehenge
43	29pts	2.772542489
44		2.724600000000000
45	45 degrees octogram	2.613125930000000

Deg	Shape	Ratio
46		
47		
48	48 deg 30pts	2.472135954999580
49	11pts 49.0909090909	2.423290987000000
50	36pts	2.380952381000000
51	14 pts 51.4285712 deg	2.334368543059490
52	52 degrees 45pts	2.288245610000000
53		
54	20pts	2.212962963000000
55	72pts	2.180232558000000
56	??	2.160726055
57	41pts	2.118033990000000
58		
59		
60	60 deg Equilateral Triangle	2.000000000000000
61		
62		
63	63 deg 40pts	1.926610162000000
64		
65	72pts	1.888543820000000
66	66 deg 60pts	1.851229586000000
67	16pts 67.5deg	1.847759066000000
68		1.814652616077490
		1.748064098502690
69	13pts 69.23076923deg	1.666666666666660
70	35pts	
71	33pts 70.909090deg	
72	10pts decagram	1.732050808000000
73		1.713525493000000
74		
75	75 deg 24pts	1.650647824000000
76	76 degrees 45pts	
77	7pts ф 77.14285714deg	1.618033989000000
78	60pts	1.572302755514850
79		
80	80 degrees 18pts	
81	11pts 81.818181deg	1.527864046000000
82		
83		
84	84 degrees 15pts	1.497676197000000
85		
86		
87	22.5deg series 45pt	1.448274121000000
88		
89		
90	Square	1.414213562373100

Deg	Shape	Ratio
91		
92	45pts est ratio	1.386271242968660
93		
94		
95	71pts (95.0704)	1.362319110000000
96	30pts	1.349166667
97	13pts 96.923deg	1.335402142000000
98	22pts 98.181818deg	1.323746919000000
99	40pts	1.315789474000000
100	inner nonogram	1.309016994000000
101		
102		
103	14 pt polygram	1.272019649514070
104		
105		
106		1.253914971405500
107		1.249431391
108	pentagon	1.236067977499790
109		
110		1.211645495722230
111		
112	16pts 112.5deg	1.205357143000000
113		
114	11pts 114.545454 deg	1.190710563000000
115		1.189207115002720
116		
117	40pts	1.167184270000000
118		
119		
120	hexagon	1.154700538379250
121		
122		
123		1.127838485561680
124	45pts est ratio	1.131319763600000
125	13pts 124.75 deg	1.133330000000000
126	20pts	1.121516995000000
127		1.111785940502840
128	7pts 128.5714 septagon	1.104854344000000
129		0.000000000000000
130		
131		
132	15pts	1.100+/-
133		1.090507732665260
134		
135	8pts octogon	1.082392200342570

Deg	Shape	Ratio
136		
137		
138		1.069636763408670
139		1.061997403745260
140	9pts nonogon	1.059016995000000
141		1.058198208485710
142		1.054412604487850
143		
144	10pts decagon	1.053333300000000
145		
146		
147	147.375deg 11sided	1.047142857000000
148	45pts	1.040719200441880
149		
150	12 sided gon	1.038092722000000
151		
152	152.5deg 13sided	1.033333000000000
153		
154	14sided gon	1.031027796+/-
155		1.030532582573330
156	15 sided gon	1.030+/-
157	157.5 deg 16 sided gon	1.020156458000000
158		
159		1.014438521517910
160		1.014242384554290
161		
162	20 sided gon	1.0133333+/-
163		
164	45 pts	
165		
166		
167		
168		
169		
170		
171		
172	45 sided gon	
173		
174		
175		
176		
177		
178		
179		
180	straight line	1.000000000000000