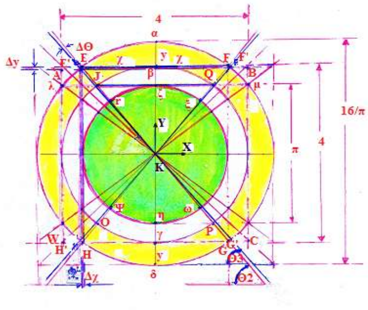
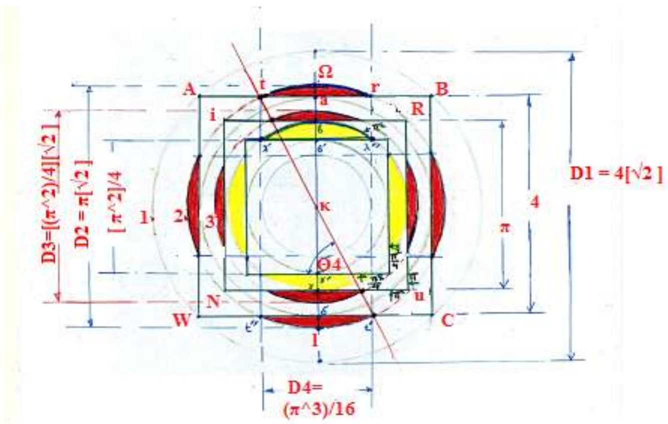
Treatise on Circle – Generator Polyhedron

Harmony and Disharmony



Condition of Three Concentric Circles in Common Ratio



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Back Cover Page [122] : Generator Polyhedron

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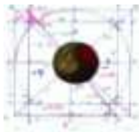
Published Athens April-May 2017 - Heliotropio Stefanides

Generator Polyhedron By Panagiotis Stefanides- 03 April 2017

To my Adorable and Beloved Ones,
my wife Mary and my Daughter Natalia's New Born Family
24 April 2017

Published Athens 2017 – Heliotropio Stefanides



In Anticipation

To the "*discussions*", and "*navigation*" instructions, during lengthy sea and oceanic seafarer's voyages, I received from my father, on the celestial bodies' "*spirals*", their "*temporal*" periodic "*cyclic*" motion "*frequencies*", when clear guiding night or sunny day skies permitted, for stellar, lunar or solar "*timely measurements*", and for the relevant "*calculations*" involved, of the vessel's "*position*" in the sea with acceptable "*errors*" estimation, dependent on mathematics, "*astronomical data*" correctly applied, and with instrument "*sextant* " within acceptable "*functioning condition*" and "*calibration*", for the "*reliable mile safety*" accuracy limit.

Astrolabe Structure by
Captain Mariner Christos P. Stefanides [1911-1999]

FOREWORD

Since 1985, I posed a *Conjecture* to myself, that there should be at least one reliable *Formula or Method* [possibly a ruler and compass one] with its proof for the *Value of* π [as there are many of the kind, but not leading to the same *Exact* Value].

The concept envisaged, should involve *Eucleidean Geometry* [as it bears reliable consequence, and should be easily examined for its *Truth or not]*.

Amongst the various methods that I have come to, [and delivered to various *Conferences and Exhibitions*, nationally and internationally], for some classical problems' solutions, [as those additional ones presented here as contents of the book, which to me are very interesting and challenging], are *problems* with *theoretical geometric solutions and proofs, simply, by ruler and compass,* with purpose of performing, as far as possible, more analytic and more simplified presentations.
The work elaborated here concerns 3 Concentric Circles in Ratio to each other of **$4/\pi$, analyzing and comparing the results, for evident conditions for found Symmetries or Dissymmetries and consequently conditions for Harmony or Disharmony.**

Treatise on Circle

HARMONY and DISHARMONY

$$2y + 4 = 16/\pi$$

$$y[\{16/\pi) - y = [\pi/2]^2$$

$$\pi^4 - [2*\pi^2]*[(8/\pi) - 2]^3 + 48*\pi*[(8/\pi) - 2]^2 - 256*[(8/\pi) - 2] = 0$$

$$64/\pi^2 - 32/\pi + 4 - 128/\pi^2 + 32/\pi + \pi^2/4 = 0$$

$$\underline{\pi^4 + 16\pi^2 - 4^4 = 0}$$

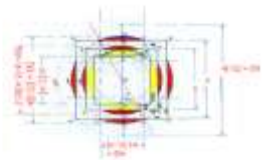
Condition of 3 Circles in Common Ratio

$$(16/\pi)y - y^2 = s^2$$

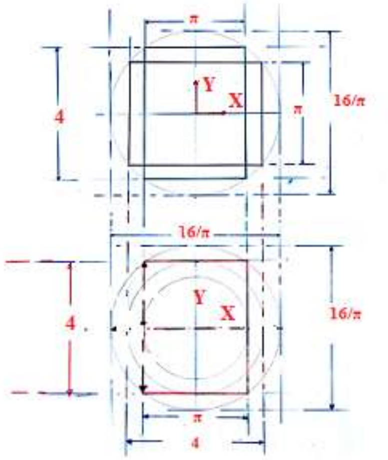
$$2y = (16/\pi) - 4$$

$$(16/\pi)x - x^2 = t^2$$

$$2x + \pi = 16/\pi$$



Treatise on Circle
Harmony and Disharmony, Condition of 3 Circles in Common Ratio

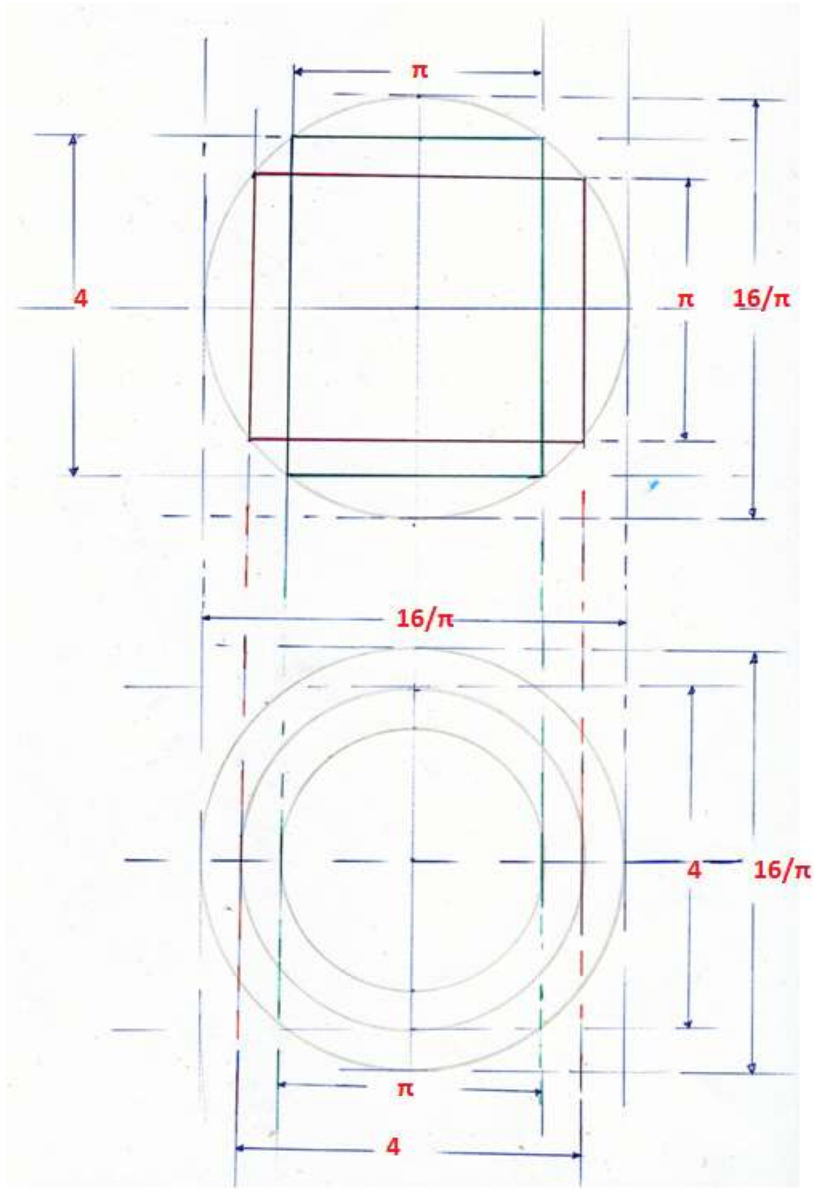


Since 1985, I posed a *Conjecture* to myself, that there should be at least one reliable *Formula or Method* [possibly a ruler and compass one] with its proof for the *Value of* π [as there are many of the kind, but not leading to the same *Exact* Value].

The concept envisaged, should involve *Eucleidean Geometry* [as it bears reliable consequence, and should be easily examined for its *Truth or not]*.

Amongst the various methods that I have come to, [and delivered to various *Conferences and Exhibitions*, nationally and internationally], for some classical problems' solutions, [as those additional ones presented here as contents of the book, which to me are very interesting and challenging], are *problems* with *theoretical geometric solutions and proofs, simply, by ruler and compass,* with purpose of performing, as far as possible, more analytic and more simplified presentations.
***The work elaborated here concerns 3 Concentric Circles in Ratio to each other of* 4/π, analyzing and comparing the results, for evident conditions for found Symmetries or Dissymmetries and consequently conditions for Harmony or Disharmony.**

Diameters D1, D2, D3
[*] D1 =16/π, D2= 4, D3 = π and D1/D2 = D2/D3 or [D1]*[D3] = [D2]^2

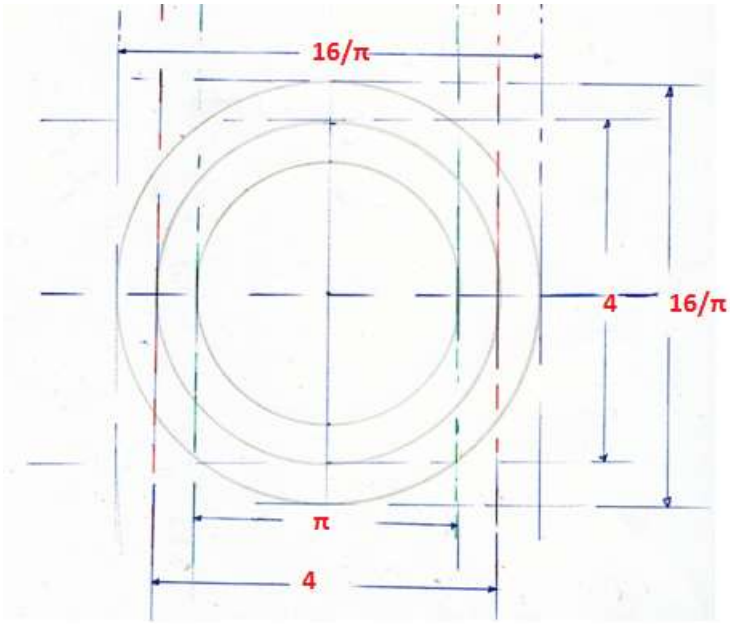


Conjectural Configuration

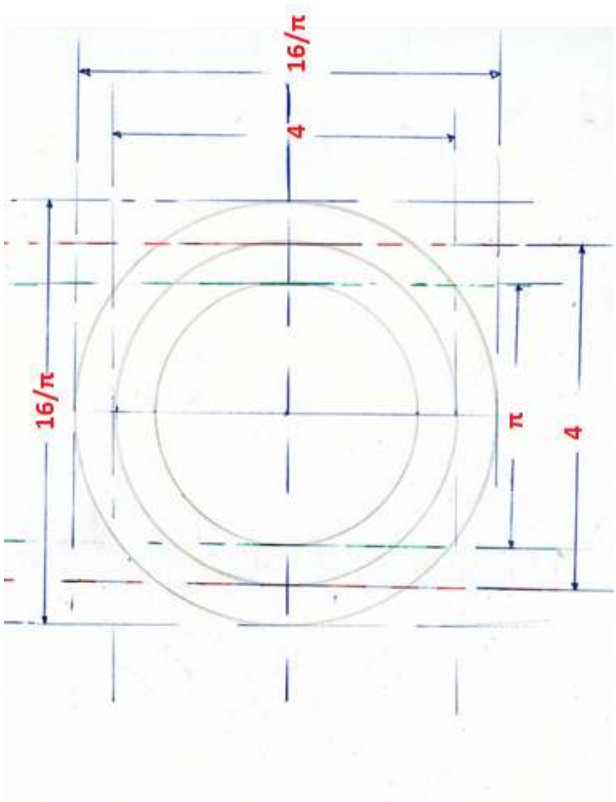
Projection of inner circles' diameters D2 and D3 fit as chords of outer circle of diameter D1.

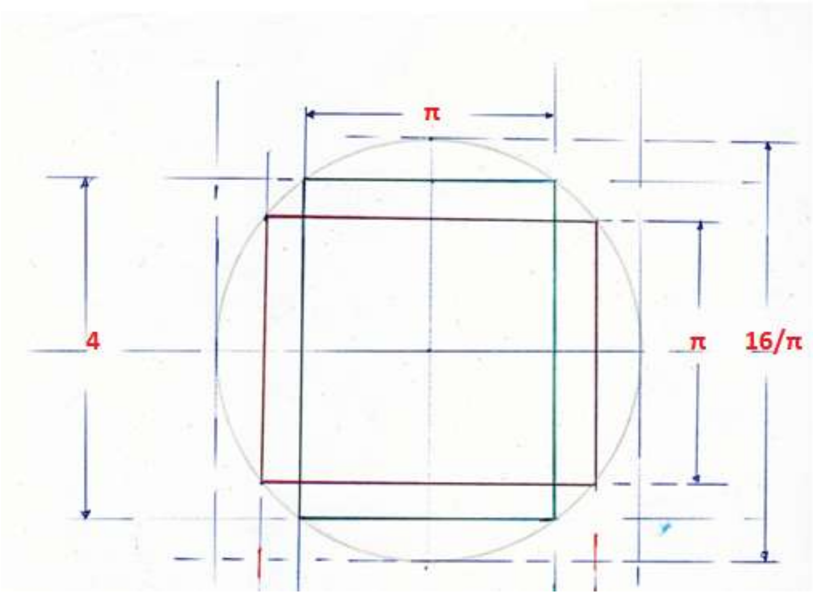
At first contemplation of the two configurations it appears that both comply to the dimensions quoted.
However logic requires that geometrical compliance should be examined according to valid theorems.

One such which shall apply here, is that of the *" Power of Point Theorem"*.

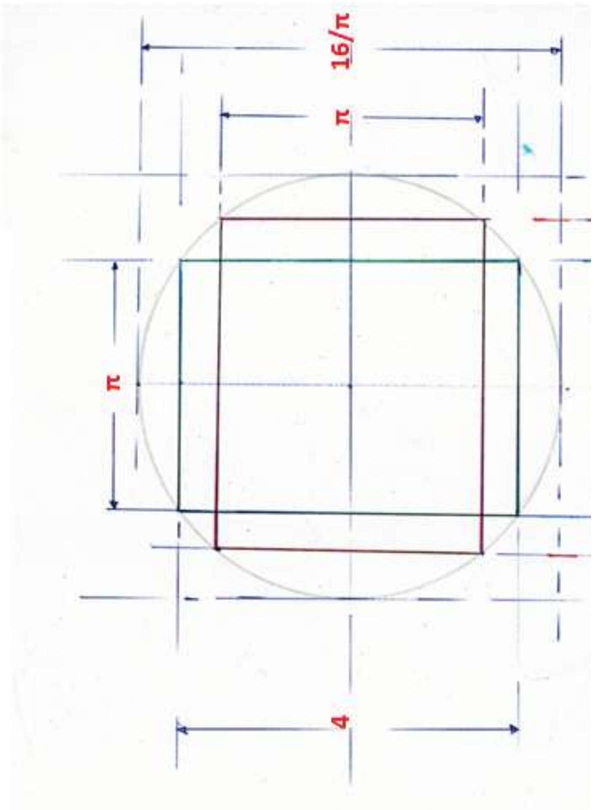


90 DEG. ROTATION OF CIRCLES, SYMMETRY DOES NOT CHANGE.

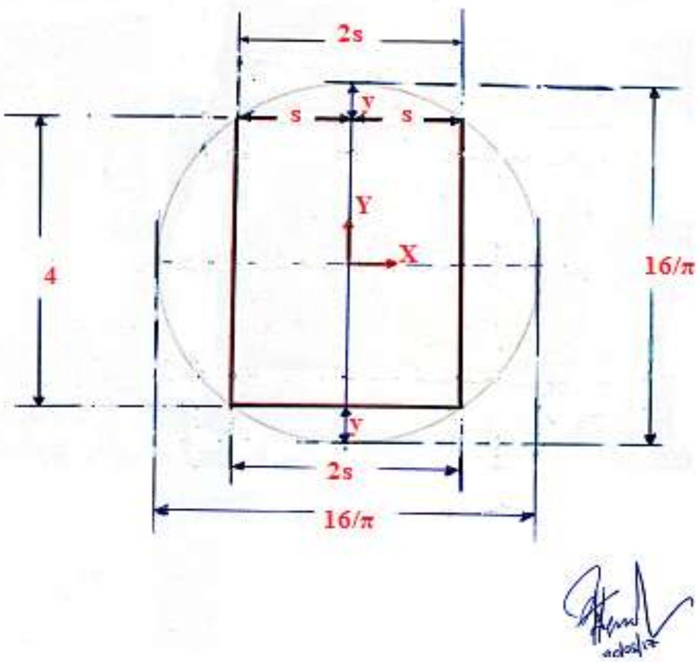




90 DEG. ROTATION OF PARALLELOGRAMMES [WITHIN CIRCLE: D = 16/π],
SYMMETRY DOES NOT CHANGE.



A1



$y[16/\pi - y] = s^2$, [**application of *"Power of Point Theorem"***]

$(16/\pi)y - y^2 = s^2$

$2y + 4 = 16/\pi$, $2y = (16/\pi) - 4$

$y = [(8/\pi) - 2] = 0.546479089$

$(16/\pi)y - y^2 = s^2$

$(16/3.141592654)(0.546479089) - (0.546479089)^2 = s^2$

$s^2 = 2.783195148 - 0.298639395 = 2.484555753$

$s^2 = 2.484555753$, $s = 1.576247364$

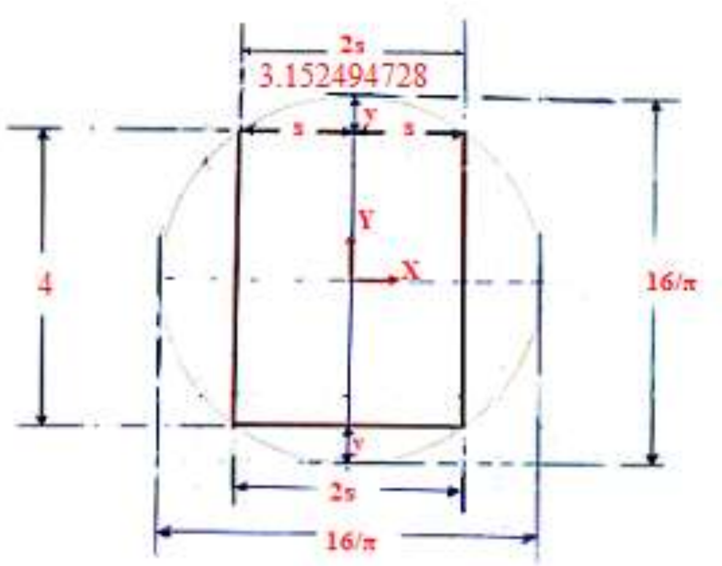
$2s = 3.152494728$

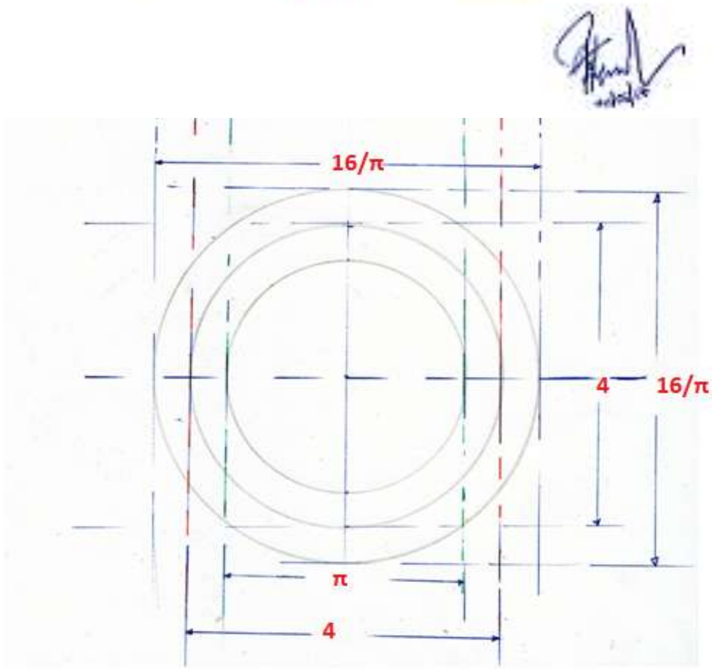
https://www.wolframalpha.com/input/?i=(16%2F3.141592654)(0.546479089)+++%E2%80%93+(0.546479089)%5E2+++%3D+s%5E2

https://www.wolframalpha.com/input/?i=2%7B+SQRT2.48455575086490611179447953534716916867351447531109486736 1%7D+%3D

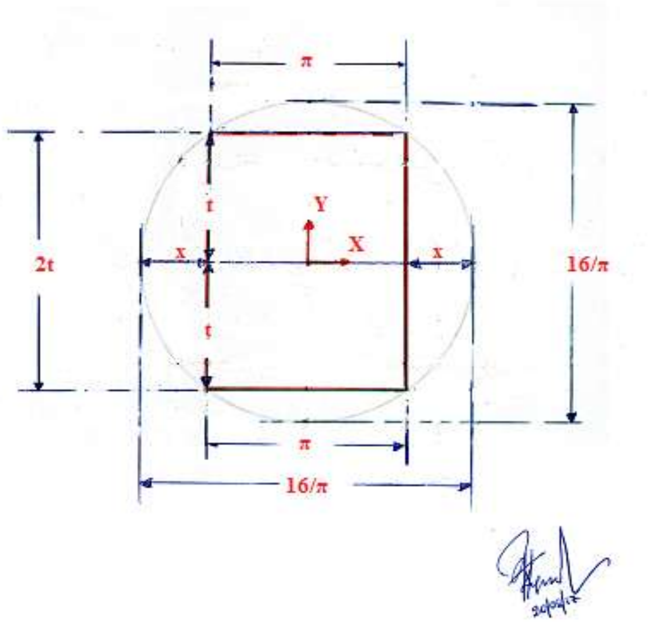
https://www.wolframalpha.com/input/?i=2%7B+SQRT2.484555750864906111794479535347169168673514475311094867361%7D+%3D

A1a





A2



x[16/π - x] = t^2 , [**application of *"Power of Point Theorem***]

(16/π)x – x^2 = t^2

2x + π = 16/π , 2x = [(16/π) – π] = 1.951365525

x = [(8/π) – (π/2)] = 0.975682763

(16/π)x – x^2 = t^2

(16/3.141592654)(0.975682763) – (0.975682763)^2 = t^2

t^2 = 4.969111505 - 0.951956854 = 4.017154651

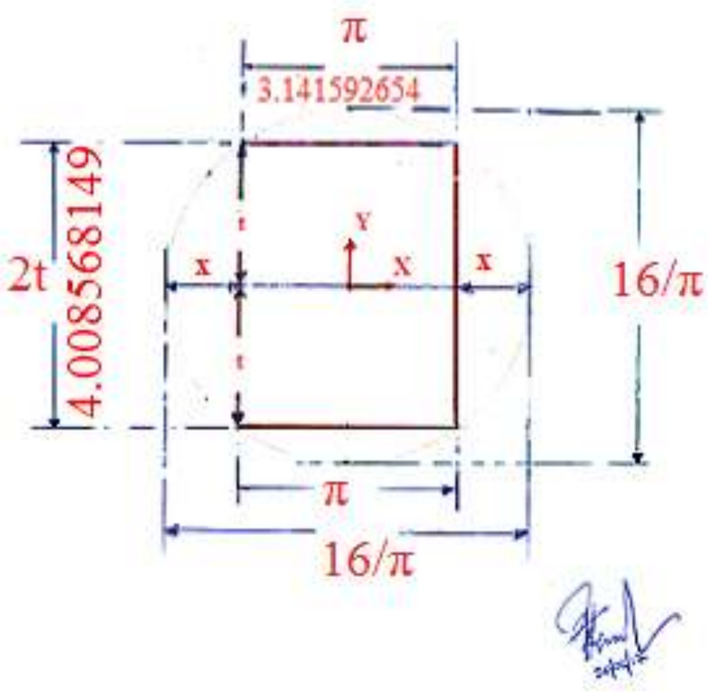
t^2 = 4.017154651, t = 2.004284074

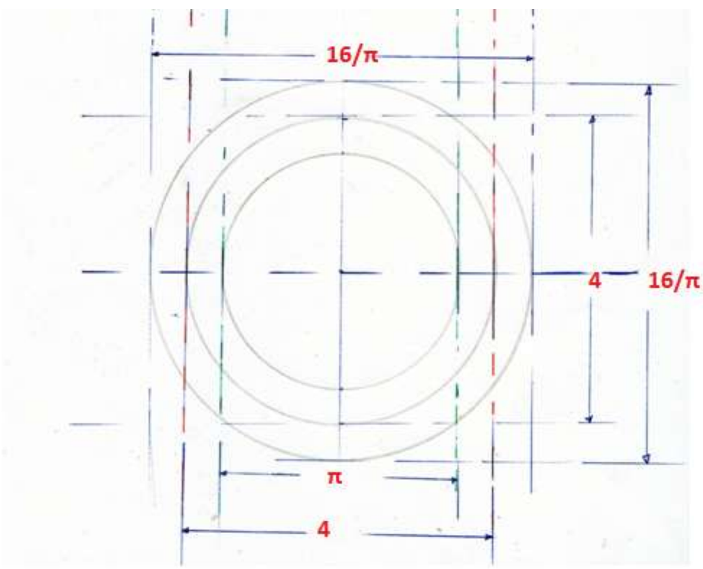
2t = 4.008568149

https://www.wolframalpha.com/input/?i=(16%2F3.141592654+)(+0.975682763++)+++%E2%80%93+(0.975682763)%5E2+++%3D+t%5E2

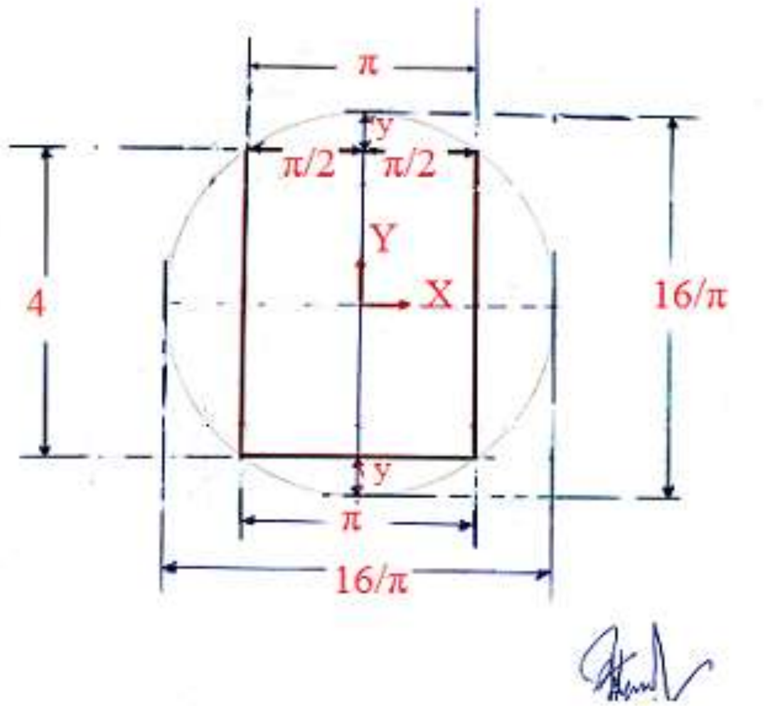
https://www.wolframalpha.com/input/?i=2*SQRT%7B4.017154653208117223706586077979796549396948010561524568678%7D%3D

A2a





B1



$2y + 4 = 16/\pi$

$y = [8/\pi - 2]$

$y[(16/\pi) - y] = [\pi/2]^2$, [**application of *"Power of Point Theorem"***]

$y^2 - (16/\pi)y + (\pi^2)/4 = 0$

$[8/\pi - 2]^2 - (16/\pi)[8/\pi - 2] + (\pi^2)/4 = 0$

$[(8/\pi)^2 - 2.(8/\pi).2 + 2^2] - (16/\pi)(8/\pi) + (16/\pi)(2) + [(\pi^2)/4] = 0$

$64/\pi^2 - 32/\pi + 4 - 128/\pi^2 + 32/\pi + \pi^2/4 = 0$

$64/K^2 - 32/K + 4 - 128/K^2 + 32/K + K^2/4 = 0$

For $\pi = K$ **[compatible for Wolfram Alpha Solution]**

Alternative Formulae:

$\pi^4 + 16\pi^2 - 4^4 = 0$

π^4 - [2*π^2]*[(8/ π) - 2]^3 +48*π*[(8/ π) -2]^2 -256* [(8/π) -2] =0

For π = L [compatible for Wolfram Alpha Solution]

L^4 - [2*L^2]*[(8/L) - 2]^3 +48*L*[(8/L) -2]^2 -256* [(8/L) -2] =0

Real positive solution :

2 sqrt(2 (-1 + sqrt(5))) **[= { 4/ [sqrt{ (sqrt(5) +1)/2}]}** = $\dfrac{4}{\sqrt{\frac{1}{2}\left(\sqrt{5}+1\right)}}$ **]**

Note

[*] **D1 =16/π, D2= 4, D3 = π and D1/D2 = D2/D3 or [D1]*[D3] = [D2]^2**

[16/π]: 4 = 4: [π]

[16/π]*[π] = 16

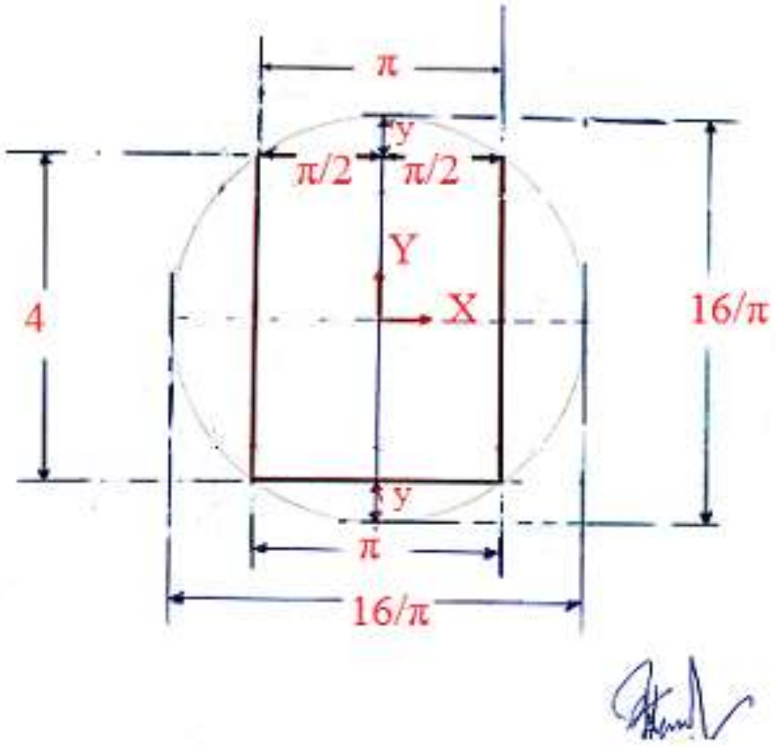
Triangular – Orthogonal- Relationship.

Ref. [Page 45]: http://www.stefanides.gr/pdf/BOOK_1997.pdf and

B1a

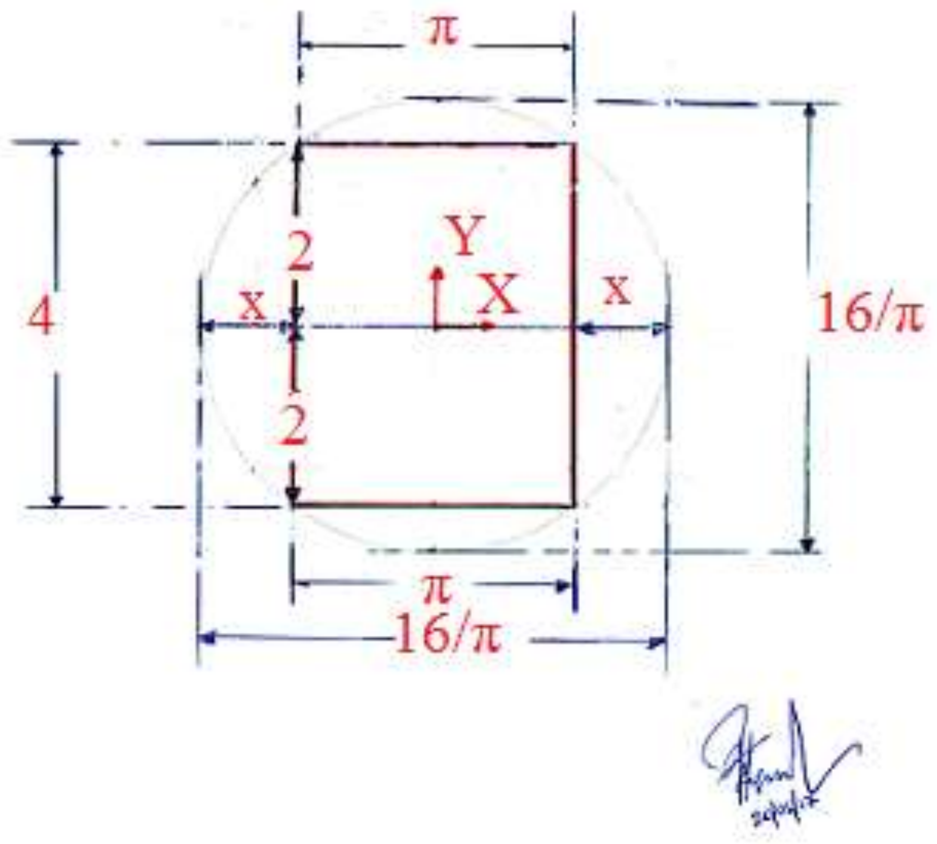
$$y = \sqrt{2\left(1+\sqrt{5}\right)} - 2$$

$\pi = 4/[\sqrt{\frac{1}{2}(\sqrt{5}+1)}]$



$$16/\pi=4*[\sqrt{\frac{1}{2}(\sqrt{5}+1)}]$$

B2



$2x + \pi = 16/\pi$

$x = [8/\pi - \pi/2]$

$x[16/\pi) - x] = [2]^2$, [**application of *"Power of Point Theorem"***]

$x^2 - (16/\pi)x + 4 = 0$

$[8/\pi - \pi/2]^2 - (16/\pi)[8/\pi - \pi/2] + 4 = 0$

$[(8/\pi)^2 - 2. (8/\pi).2 + 2^2] - (16/\pi)(8/\pi) + (16/\pi)(2) + [(\pi^2)/4]= 0$

$64/\pi^2 - 32/\pi + 4 - 128/\pi^2 + 32/\pi + \pi^2/4 = 0$

$64/L^2 - 32/L + 4 - 128/L^2 + 32/L + L^2/4 = 0$

For π = L **[compatible for Wolfram Alpha Solution]**

https://www.wolframalpha.com/input/?i=64%2FL%5E2++-+32%2FL+%2B4+%E2%80%93+128%2FL%5E2+%2B+32%2FL+%2BL+%5E2%2F4+%3D+0

Alternative Formulae:

π^4 + 16π^2 – 4^4 = 0

π^4 - [2*π^2]*[(8/ π) - 2]^3 +48*π*[(8/ π) -2]^2 -256* [(8/π) -2] =0

For π = M **[compatible for Wolfram Alpha Solution]**

M^4 - [2*M^2]*[(8/M) - 2]^3 +48*M*[(8/M) -2]^2 -256* [(8/M) -2] =0

Real positive solution :

2 sqrt(2 (-1 + sqrt(5))) **{ = { 4/[sqrt{ (sqrt(5) +1)/2}] }** = $\dfrac{4}{\sqrt{\frac{1}{2}\left(\sqrt{5}+1\right)}}$ **}**

$x = 2\sqrt{\sqrt{5}-2}$

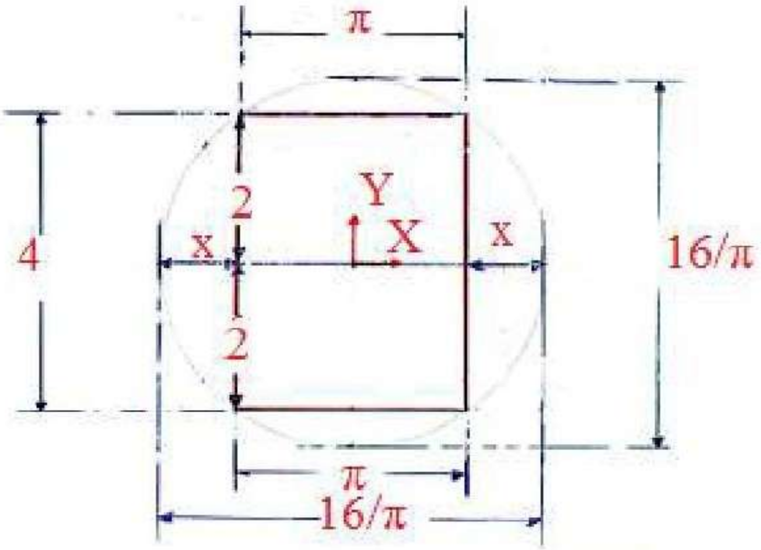
Computed by Wolfram|Alpha

B2a

$$x = 2\sqrt{\sqrt{5} - 2}$$

Computed by Wolfram|Alpha

$$\pi = 4/\left[\sqrt{\tfrac{1}{2}(\sqrt{5} + 1)}\right]$$



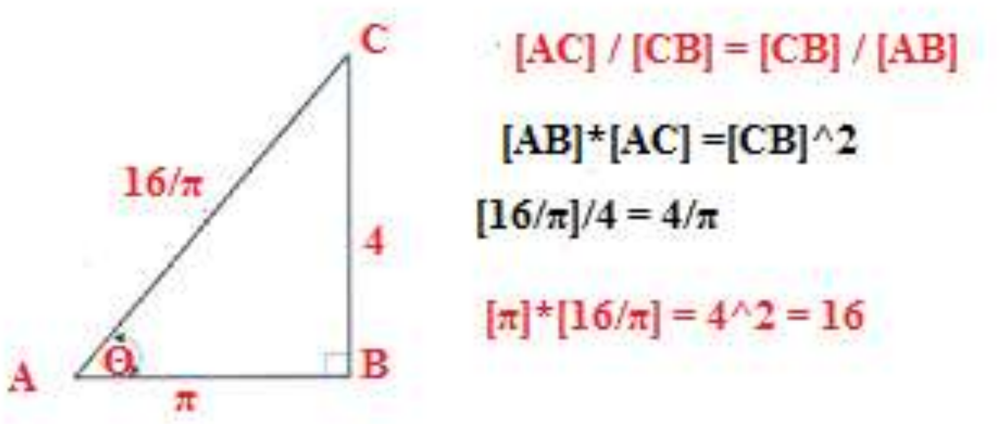
$$16/\pi = 4*\left[\sqrt{\tfrac{1}{2}(\sqrt{5} + 1)}\right]$$

Note

[*] **D1 =16/π, D2= 4, D3 = π and D1/D2 = D2/D3 or [D1]*[D3] = [D2]^2**

[16/π]: 4 = 4: [π]

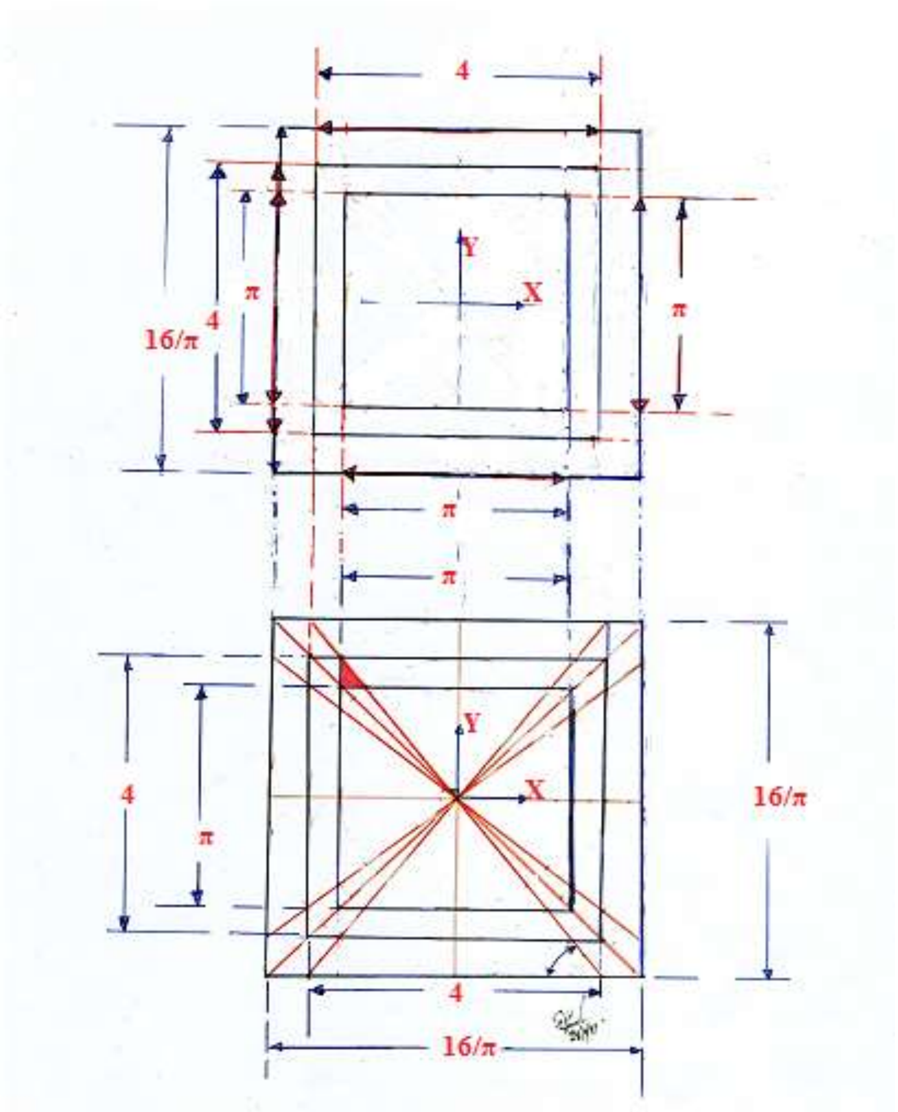
[16/π]*[π] = 16

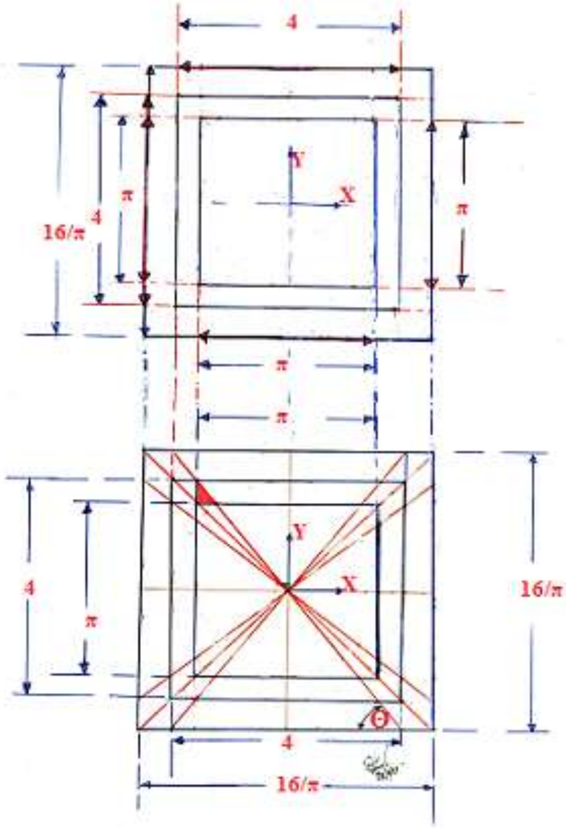


Triangular – Orthogonal- Relationship.

Ref: [Page 45]: http://www.stefanides.gr/pdf/BOOK_1997.pdf

Forms of Circles Related to Squares and





RATIOS

16/ π : 4 = 4: π = 4/π

[16/π]/[4] =[4][/π]

[16/π]*[π] =[4]*[4] = 4^2 = 16

Tan(Θ) = [16/π]/4 = 4/π

For π = 3.141592654.

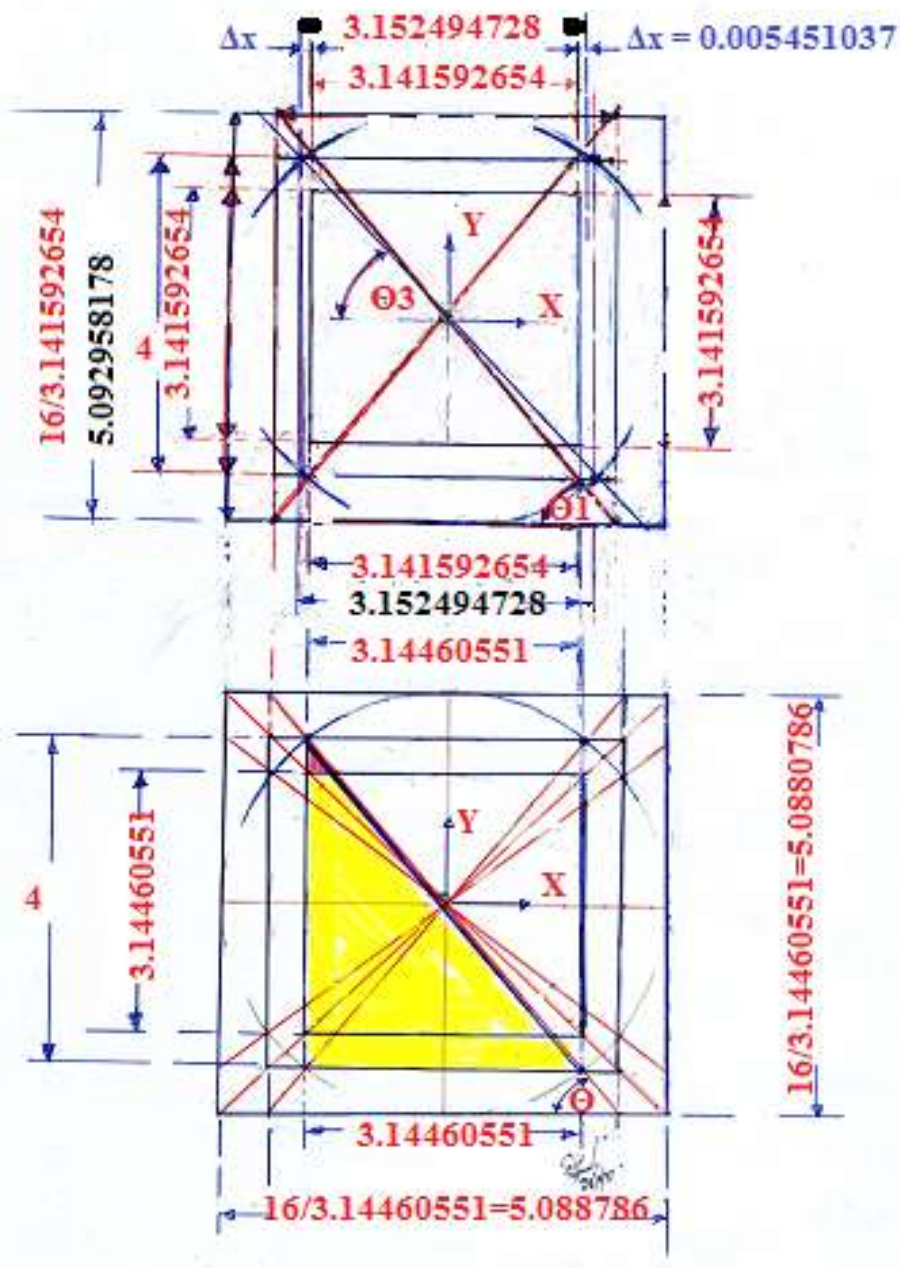
Tan(Θ) = 4/ 3.141592654 = 1.273239545, and

Θ = 51.85397401 deg.

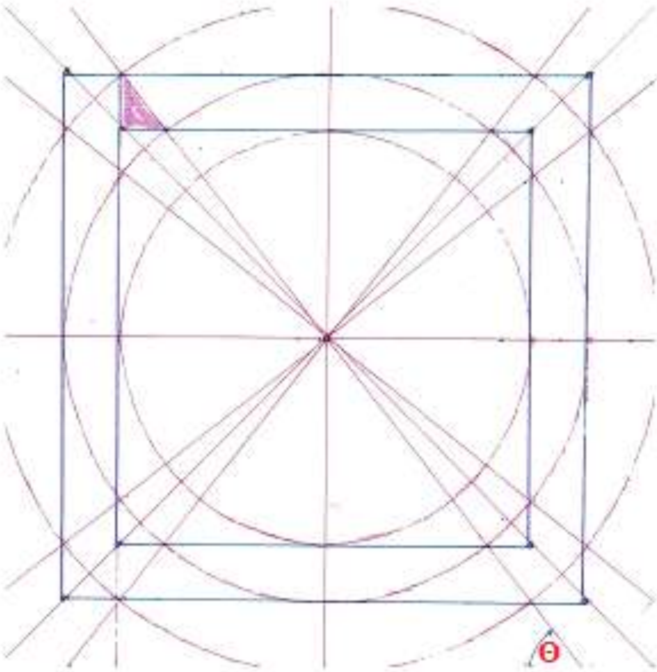
For π =4/ SQRT[{SQRT(5)+1}/2] = 3.14460551

Tan(Θ) = 4/3.14460551 =1.27201965, and

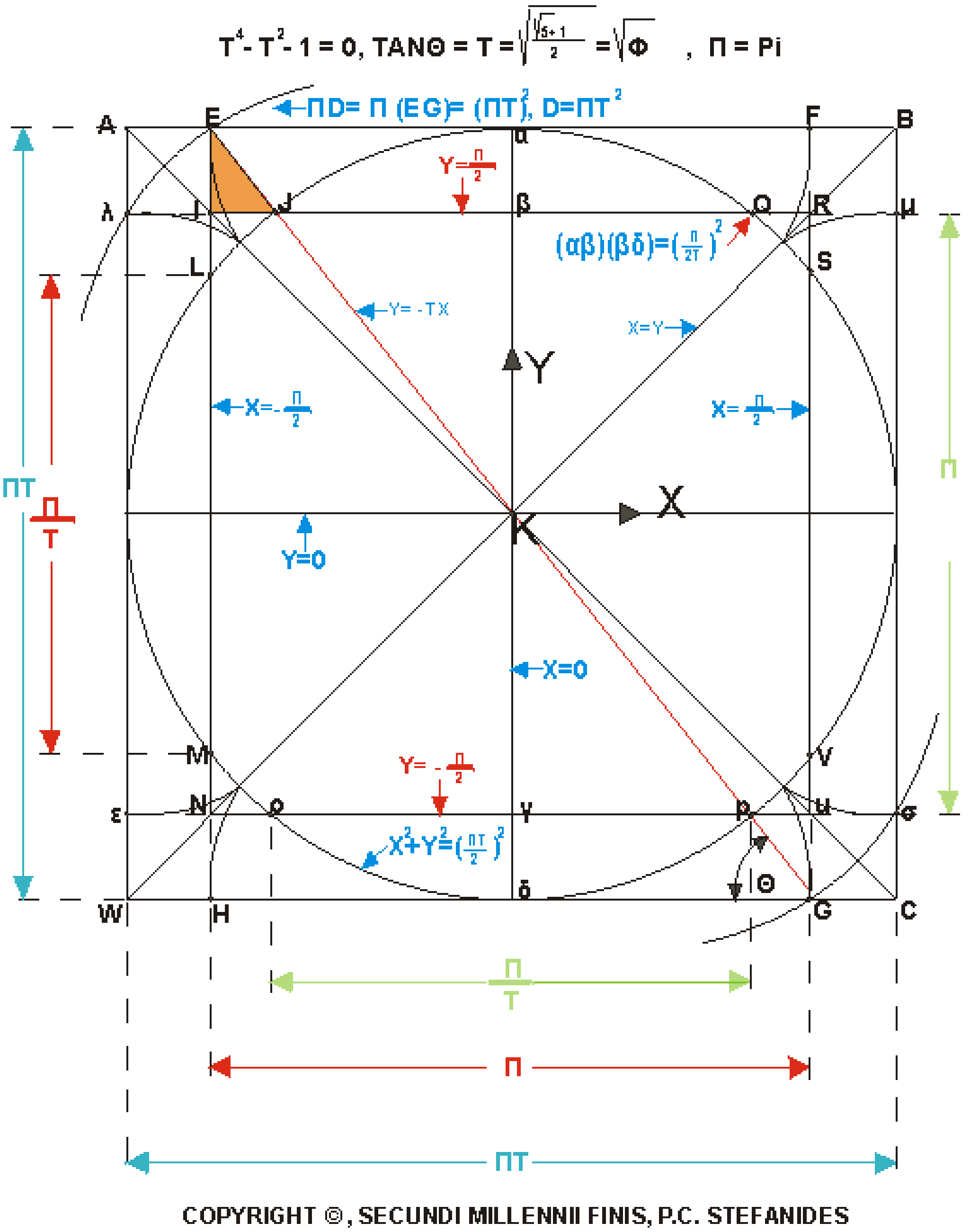
Θ = 51.82729238 deg.



$$4 \,/\, \left[\sqrt{\tfrac{1}{2}(\sqrt{5}+1)}\,\right] = 3.14460551$$



http://www.stefanides.gr/Html/quad.html



http://www.stefanides.gr/Html/theo_circle.html

RELEVANT PERFORMED WORK

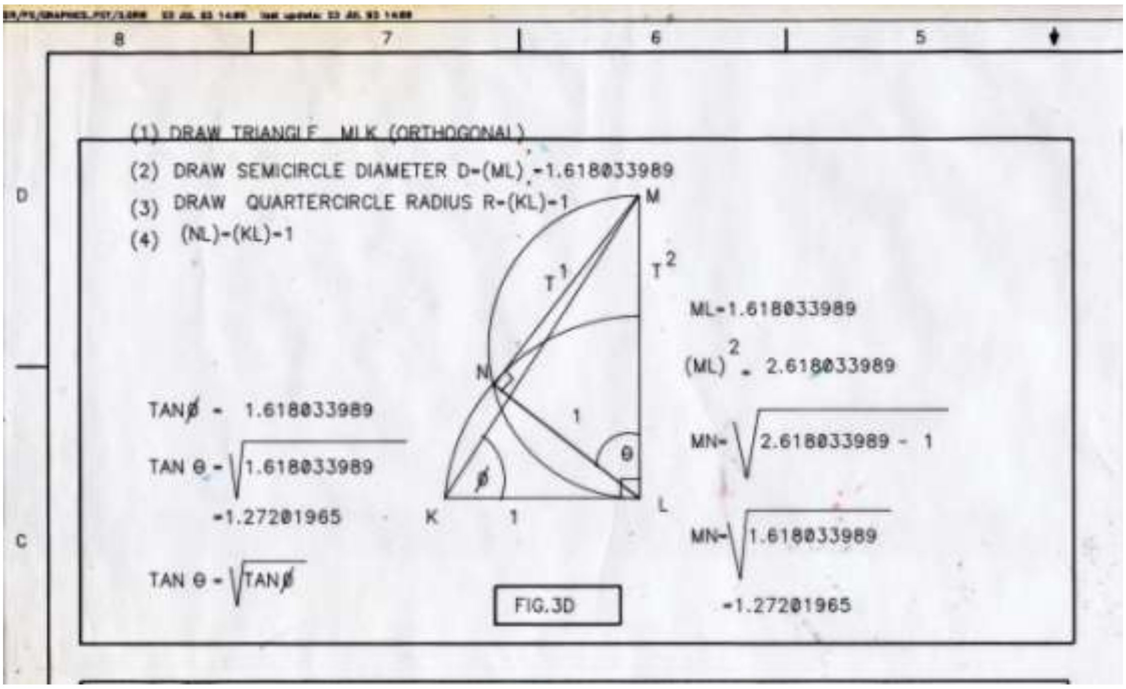
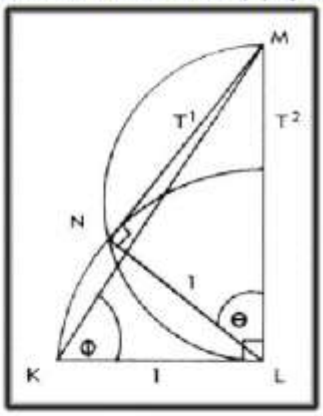


FIG.3D

http://www.stefanides.gr/pdf/BOOK_1997.pdf

Geometric Mean Ratio (T) by Ruler and Compass



(1) DRAW TRIANGLE MLK (ORTHOGONAL)
(2) DRAW SEMICIRCLE DIAMETER D = (ML) = 1.618033989
(3) DRAW QUARTERCIRCLE RADIUS R = (KL) = 1
(4) (NL) = (KL) = 1

$$\tan \Phi = 1.618033989$$

$$\tan \Theta = \sqrt{1.618033989}$$

$$= 1.27201965$$

$$\tan \Theta = \sqrt{\tan \Phi}$$

$$T^4 - T^2 - 1 = 0$$

$$ML = 1.618033989 = T^2$$

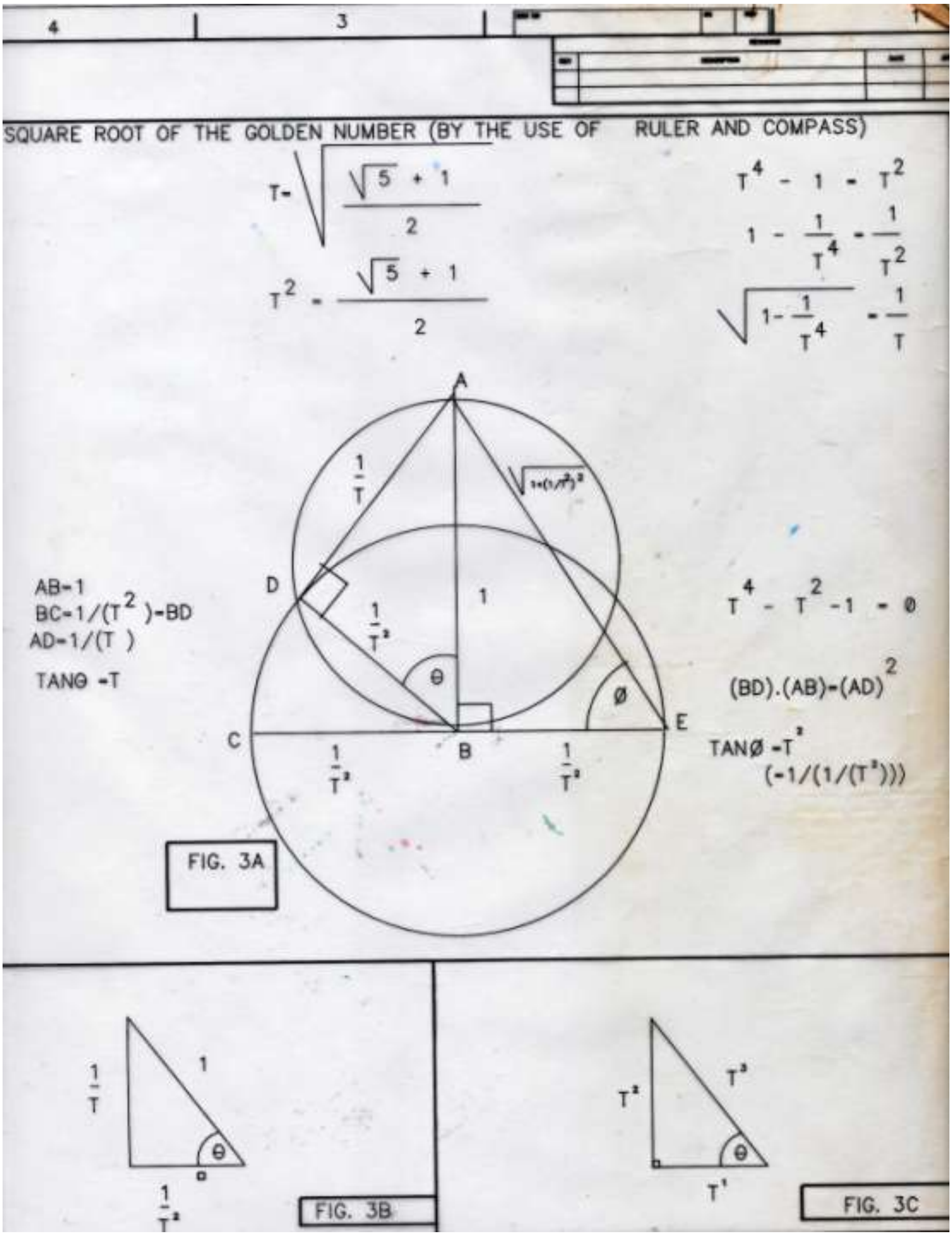
$$(ML)^2 = 2.618033989$$

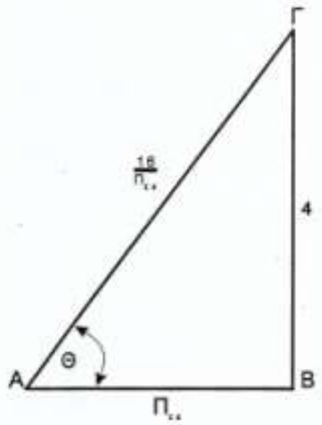
$$MN = \sqrt{2.618033989 - 1}$$

$$MN = \sqrt{1.618033989} = T$$

$$T = 1.27201965$$

ΓΕΩΜΕΤΡΙΚΟΣ ΜΕΣΟΣ ΑΝΑΛΟΓΟΣ (Τ) ΜΕ ΚΑΝΟΝΑ ΚΑΙ ΔΙΑΒΗΤΗ


SQUARE ROOT OF THE GOLDEN NUMBER (BY THE USE OF RULER AND COMPASS)
T= √((√5 + 1)/2)
T² = (√5 + 1)/2
T⁴ - 1 = T²
1 - 1/T⁴ = 1/T²
√(1 - 1/T⁴) = 1/T
A
D
C
B
E
AB=1
BC=1/(T²)=BD
AD=1/(T)
TANθ =T
T⁴ - T² -1 = 0
(BD).(AB)=(AD)²
TANØ =T²
(=1/(1/(T²)))
FIG. 3A
FIG. 3B
FIG. 3C



$$\Pi_{\Sigma X}^{4}+4^{2}\,\Pi_{\Sigma X}^{2}-4^{4}=0$$

$$\Pi_{\Sigma X}^{2}+4^{2}-\frac{4^{4}}{\Pi_{\Sigma X}^{2}}=0$$

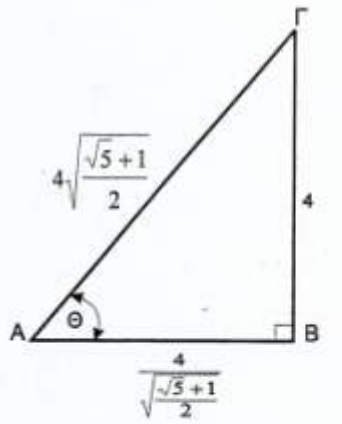
$$\Pi_{\Sigma X}^{2}+4^{2}=\frac{4^{4}}{\Pi_{\Sigma X}^{2}}$$

$$\Pi_{\Sigma X}^{2}+4^{2}=\left(\frac{4^{2}}{\Pi_{\Sigma X}}\right)^{2}$$

$$\text{TAN }\Theta=\frac{4}{\Pi_{\Sigma X}}$$

$$\text{TAN }\Theta=\frac{4}{\dfrac{4}{\sqrt{\dfrac{\sqrt{5}+1}{2}}}}$$

$$\text{TAN }\Theta=\sqrt{\frac{\sqrt{5}+1}{2}}$$



ΔΙΑ (FOR) **2ΠR=4** =ΒΓ=Κ

$R=\frac{4}{2\Pi}$ $R=\frac{2}{\Pi}$

$$\Delta IA\ (FOR)\ \Pi=\Pi_{\Sigma X}=\frac{4}{\sqrt{\frac{\sqrt{5}+1}{2}}}=AB$$

$$4X\Pi_{\Sigma X}R^2=4X\Pi_{\Sigma X}\left(\frac{2}{\Pi_{\Sigma X}}\right)^2$$

$$4X\Pi_{\Sigma X}R^2=\frac{16}{\Pi_{\Sigma X}}=\frac{16}{\frac{4}{\sqrt{\frac{\sqrt{5}+1}{2}}}}=4\sqrt{\frac{\sqrt{5}+1}{2}}=A\Gamma$$

$$\textbf{TAN }\Theta=\sqrt{\frac{\sqrt{5}+1}{2}}=1.27201965$$

ΔΙΑ (FOR) 2ΠR=3.996167588=ΒΓ=Κ

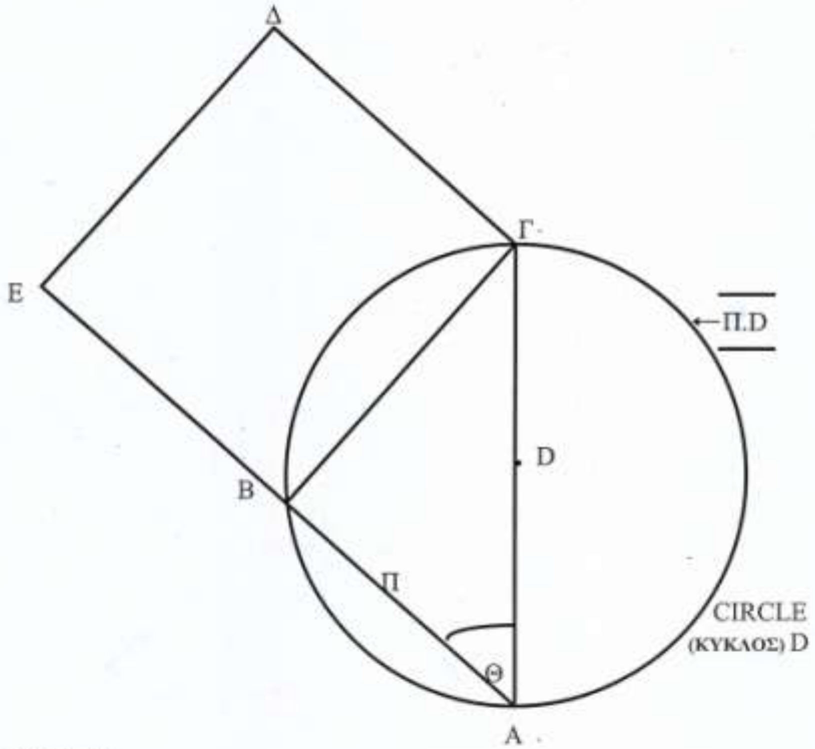
Π=3.141592654=ΑΒ

ΑΓ=5.083203694

TAN Θ=1.27201965

$$\tan\Theta = T = \sqrt{\frac{\sqrt{5}+1}{2}}$$

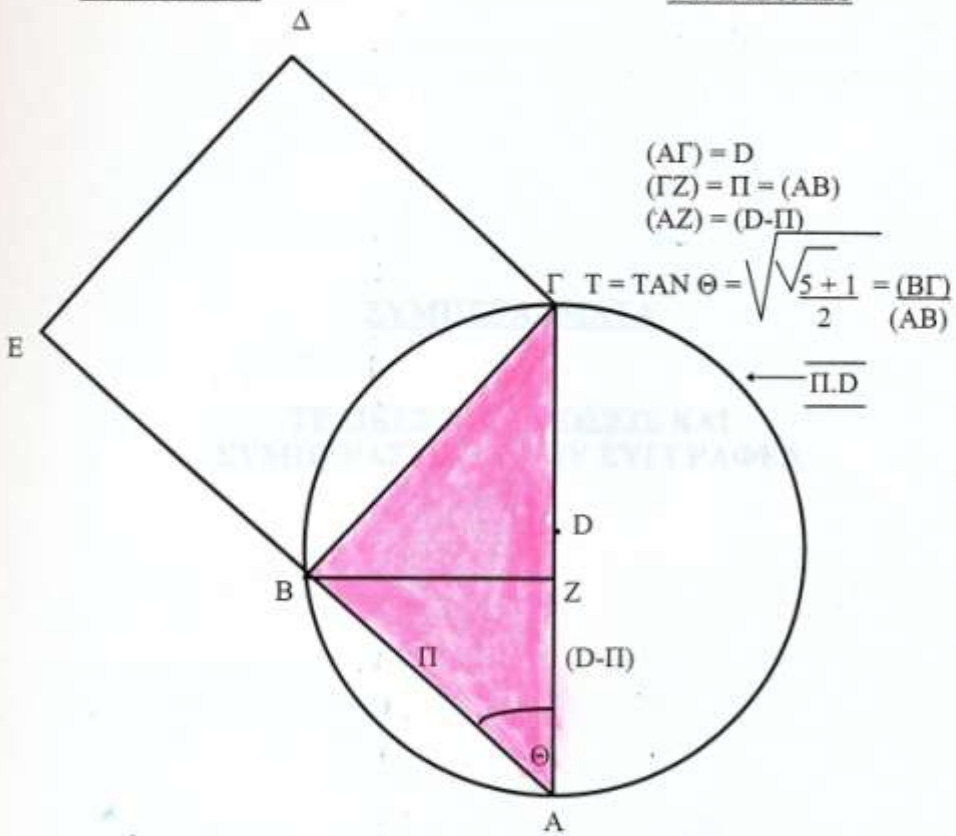
(ΒΓ) = (ΓΔ) = (ΔΕ) = (ΕΒ)
(SQUARE / ΤΕΤΡΑΓΩΝΟ ΒΓΔΕΒ)



(ΑΒ) = Π
(ΑΓ) = D
(ΑΒ) . (ΑΓ) = Π.D = (ΒΓ) . (ΓΔ) = $(ΒΓ)^2$
Π.D = ΠΕΡΙΦΕΡΕΙΑ ΚΥΚΛΟΥ
= CIRCLE CIRCUMFERANCE
(ΒΓ) . (ΓΔ) = ΕΜΒΑΔΟΝ (ΒΓΔΕΒ) ΤΕΤΡΑΓΩΝΟΥ
= AREA OF (ΒΓΔΕΒ) SQUARE

http://www.stefanides.gr/pdf/BOOK_1997.pdf

ΣΥΜΜΕΤΡΙΕΣ — SYMMETRIES



$$(BZ)^2 = \Pi\,(D - \Pi)$$

$$(BZ) = \sqrt{\Pi\,(D - \Pi)}$$

$$(BZ).(B\Gamma) = \Pi^2$$

$$(B\Gamma) = \sqrt{D^2 - \Pi^2}$$

$$\sqrt{\Pi\,(D - \Pi)}\ .\ \sqrt{(D^2 - \Pi^2)} = \Pi^2$$

$$\Pi\,(D - \Pi)\,(D^2 - \Pi^2) = \Pi^4$$

$$\Pi^2 + \Pi.D - D^2 = 0 \qquad D = \Pi\left(\frac{\sqrt{5}+1}{2}\right)$$

(POSITIVE ROOT/ΘΕΤΙΚΗ ΡΙΖΑ)

$$(B\Gamma) = (AB)\,.\mathrm{TAN}\Theta$$

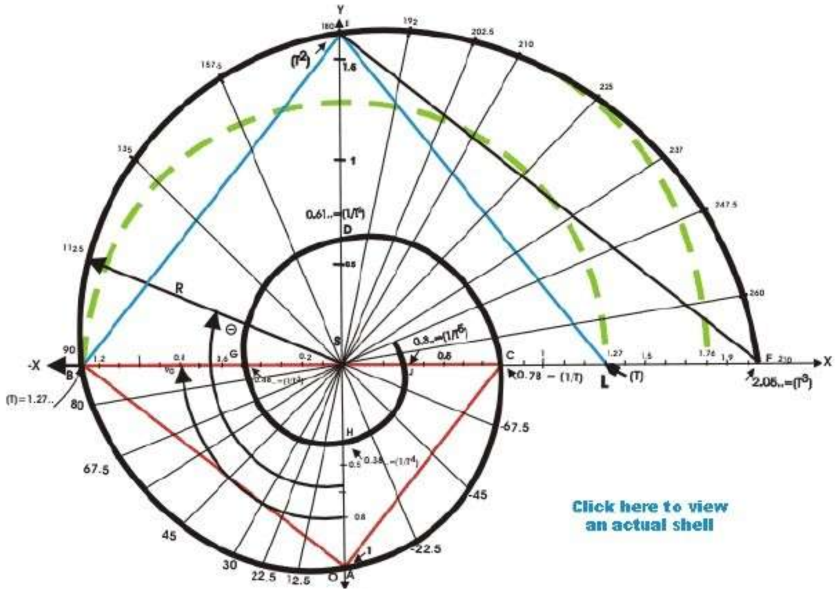
$$(B\Gamma) = \Pi\sqrt{\frac{\sqrt{5}+1}{2}}$$

$$(B\Gamma)^2 = \Pi^2\left(\frac{\sqrt{5}+1}{2}\right) = \Pi.D$$

$$D = \Pi\left(\frac{\sqrt{5}+1}{2}\right) = T^2.(\Pi)$$

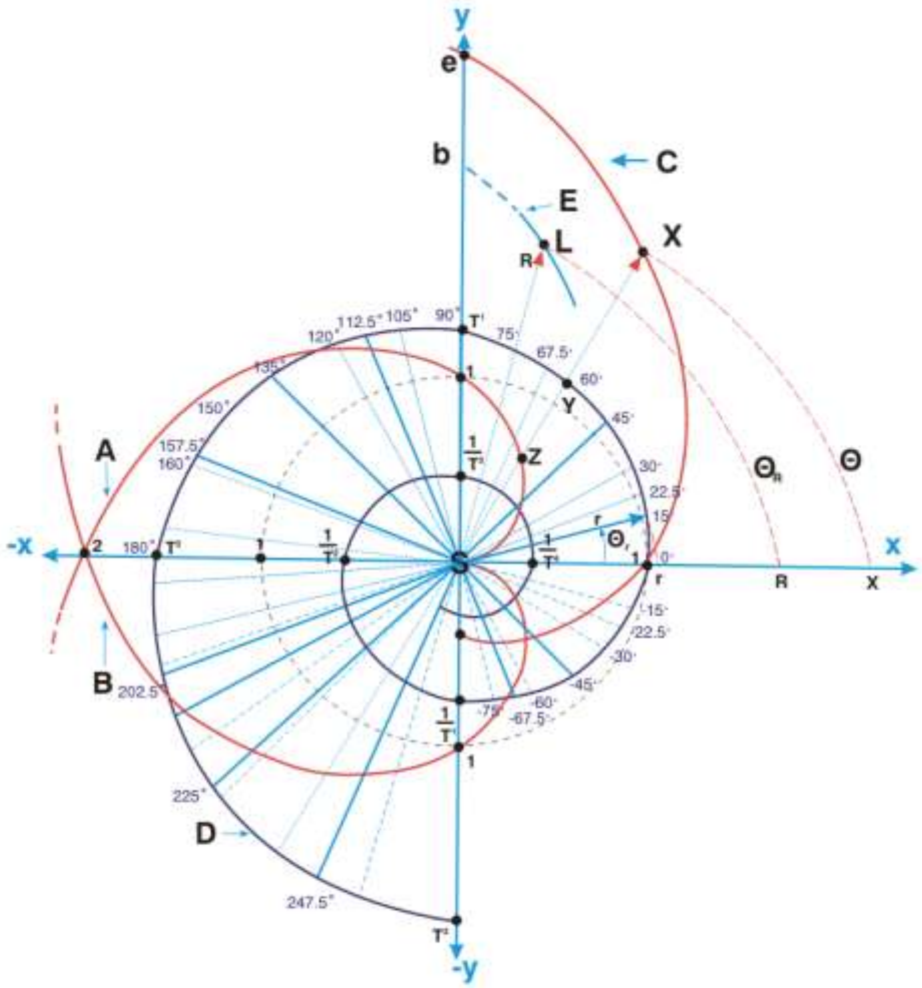
$$\frac{D}{\Pi} = \left(\frac{\sqrt{5}+1}{2}\right) = T^2$$

$$\frac{\Pi}{(D-\Pi)} = \left(\frac{\sqrt{5}+1}{2}\right) = T^2$$

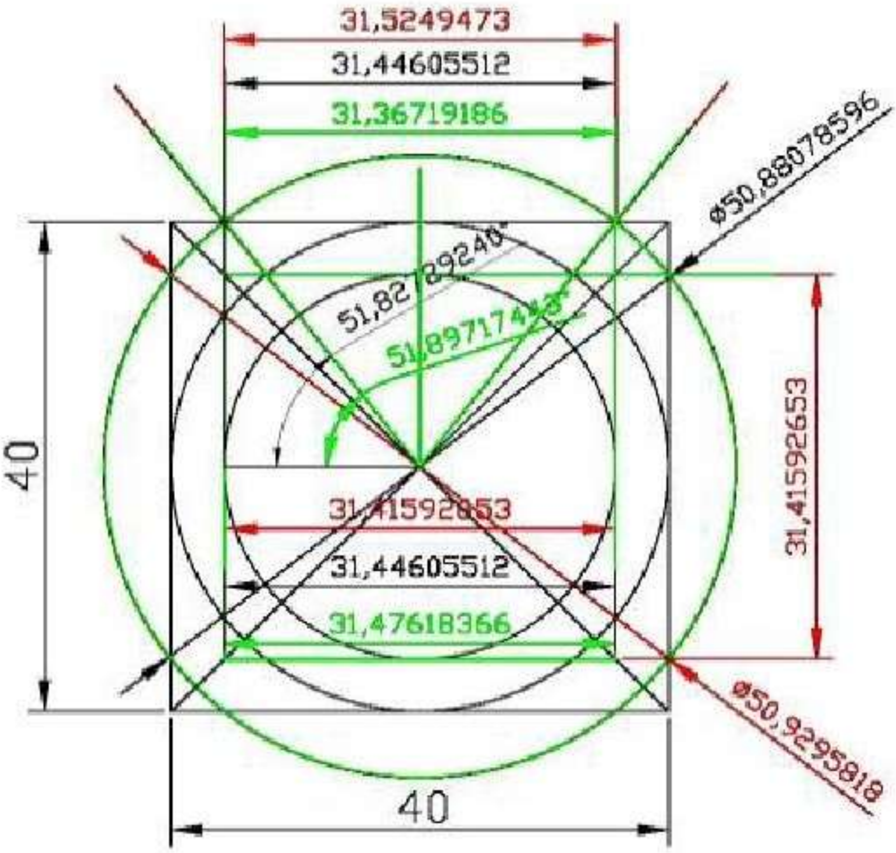


http://www.stefanides.gr/Html/Nautilus.html

http://www.stefanides.gr/Html/why_logarithm.html



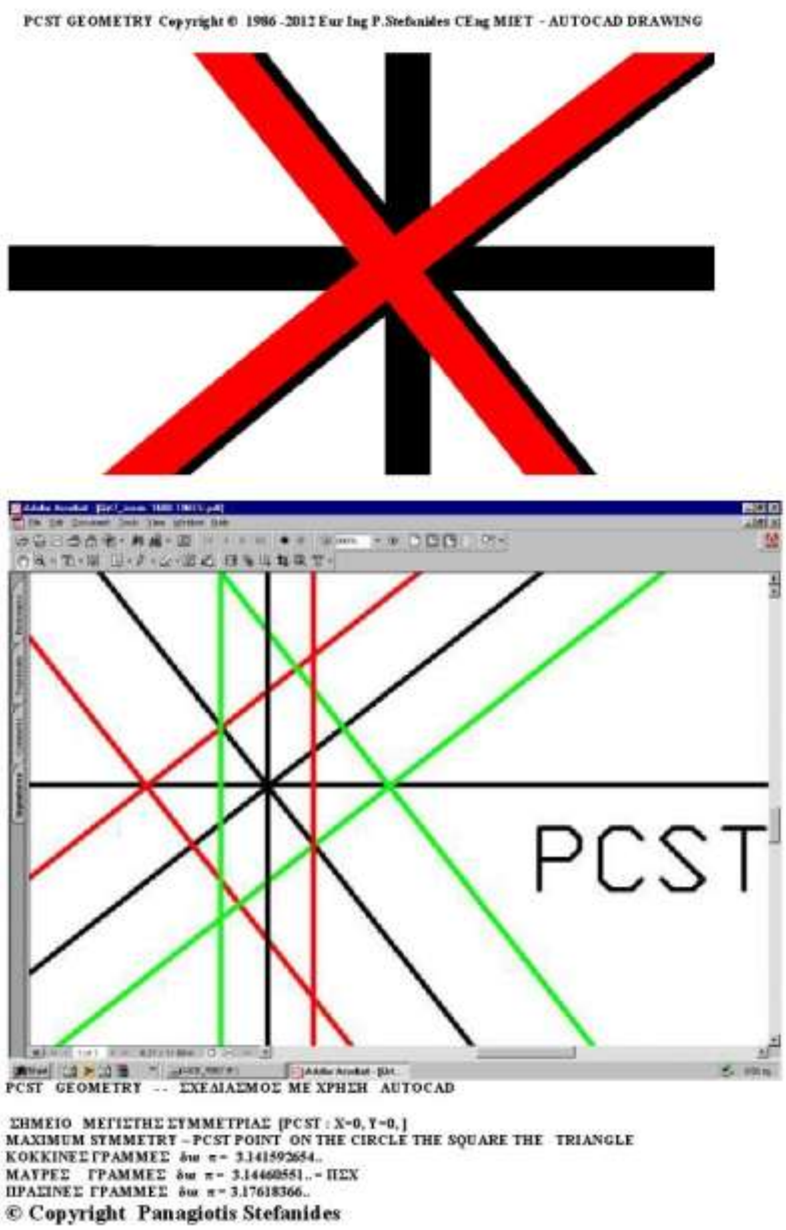
http://www.stefanides.gr/pdf/BOOK%20_GRSOGF.pdf



QUADRATURE OF CIRCLE
MICROCOSMOS Geometrically Related to the MACROCOSMOS
" Nested Circles, Squares, Triangles"
Quadrature of the Circle, Compass and Ruler - NOVEL CONCEPT - via "The Quadrature Triangle"
CONFIGURATION EXHIBITNG MAXIMUM SYMMETRY

For Value of $\pi = 4 / \sqrt{\varphi}$ [= 3.14460551..]

Circumference of Circle [$D = 40*\sqrt{\varphi}$ =50.88078596..] = Square [Side 40] Perimeter, and Product 40*D= Area of this Circle = A Square area of Side 45.11353941..
Geometry Design and Vector Definition of Coordinates by P.Stefanides, http://www.stefanides.gr
AutoCad Computerized Drawing by Dr. J. Kandylas

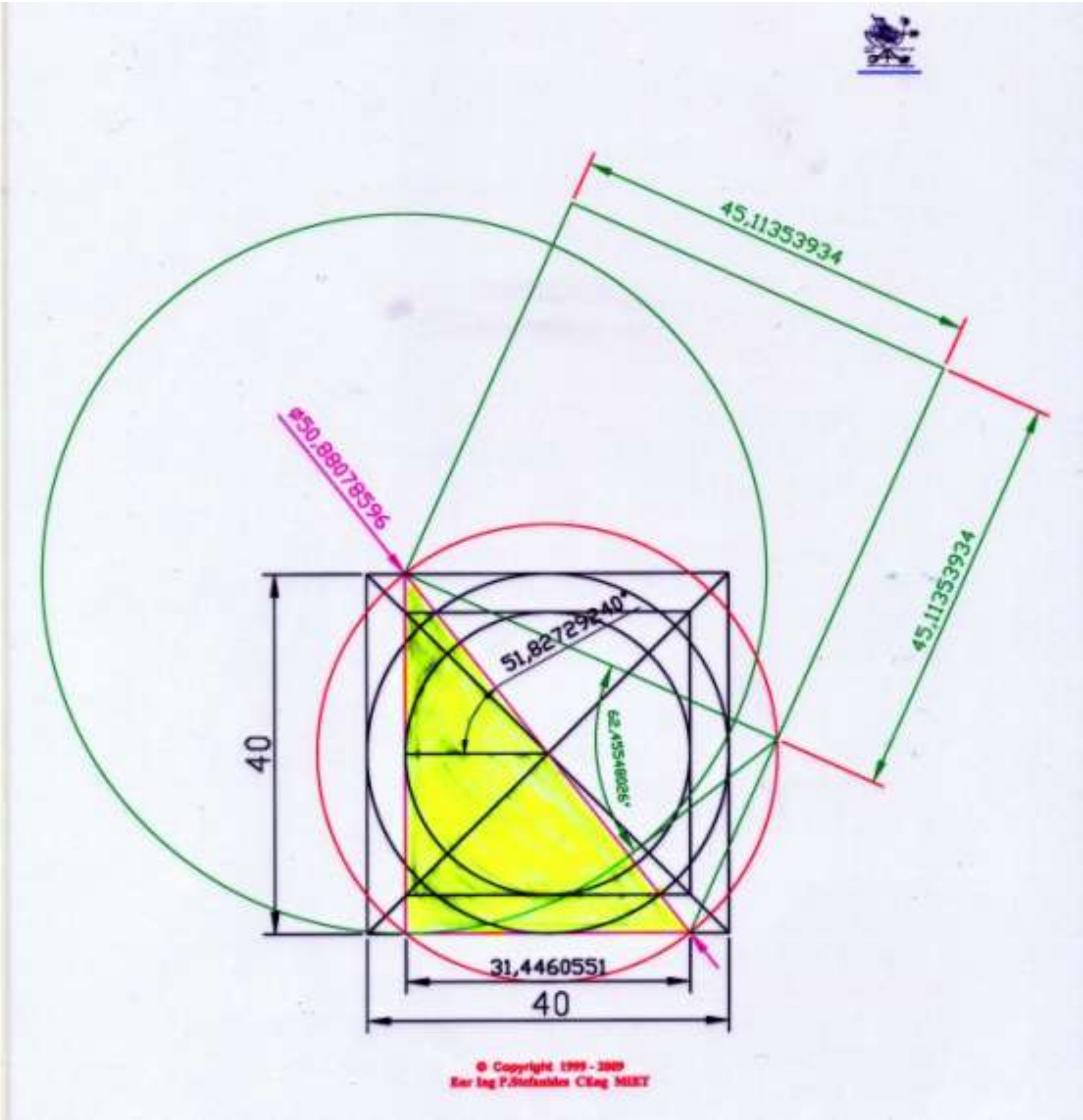


http://www.stefanides.gr/pdf/2012_Oct/PHOTO_09_PCST_GEOMETRY.pdf

https://www.linkedin.com/pulse/microcosmos-geometrically-related-macrocosmos-panagiotis-stefanides

https://www.researchgate.net/publication/295387242_O3

https://www.researchgate.net/publication/314626390_Triangular_and_Circular_Relationships



For: $\pi = 4 / \sqrt{\varphi}$

Quadrature of the Circle, Compass and Ruler - NOVEL CONCEPT - via "The Quadrature Triangle"

D = 40* $\sqrt{\varphi}$=50.8807859.., π*D =4*40 = 160 = Square [Side 40] Perimeter =

= Circle[Red] Circumference , [π/4]*D^2 = 1600* $\sqrt{\varphi}$= [45.1135394..]^2 = Circle[Red] Area =
= Square [Side 45.113539..] Area= 2035.2314..

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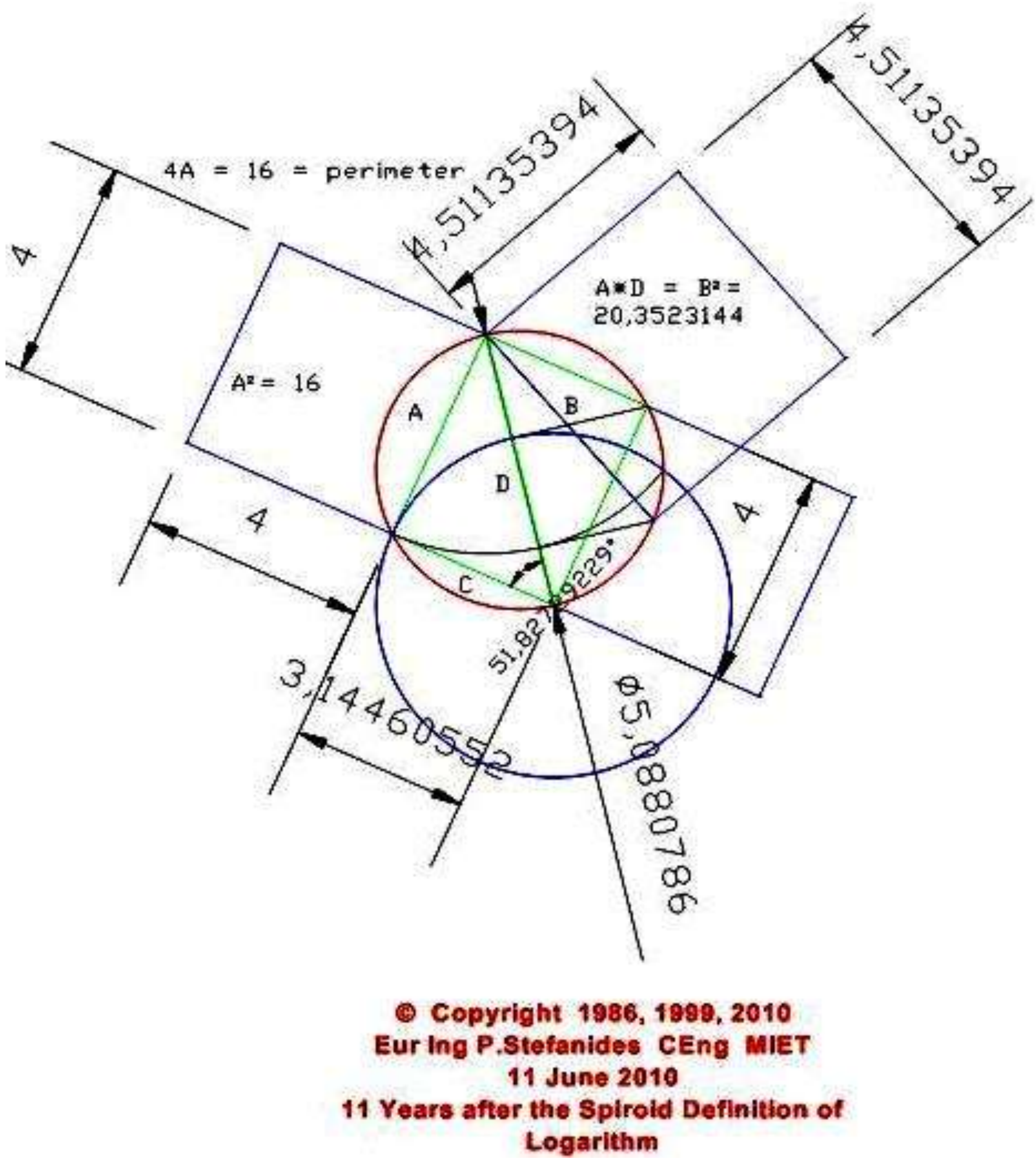


For: $\pi = 4/\sqrt{\varphi}$

Quadrature of the Circle, Compass and Ruler - NOVEL CONCEPT - via "The Quadrature Triangle"

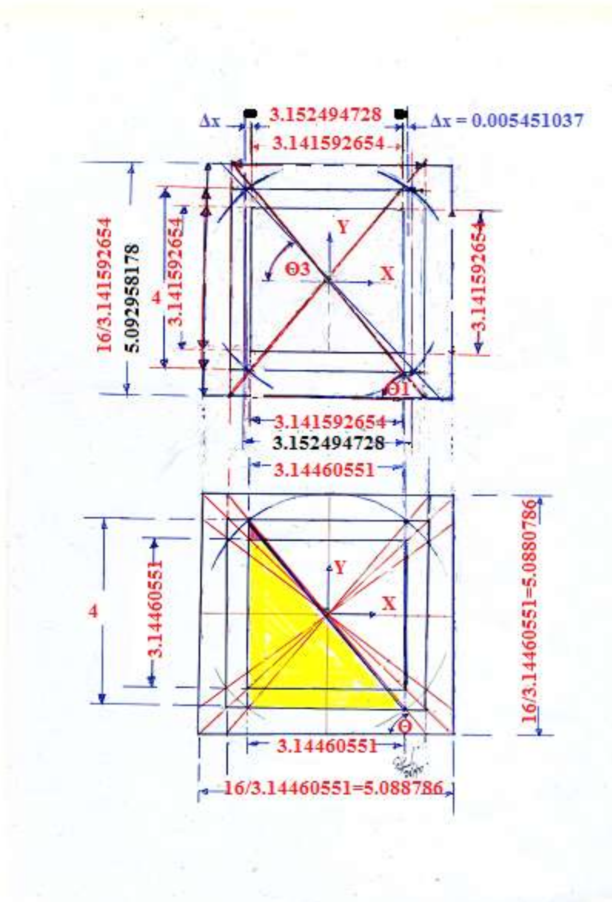
D = 4*$\sqrt{\varphi}$=5.0880786.., [Red Circle], π*D = 4*4 = 16= Square [Side 4] Perimeter = Circle[Red] Circumference , [π/4]*D^2 = 16*$\sqrt{\varphi}$= [4.51135394..]^2 = Circle[Red] Area = = Square [Side 4.51135394..] Area= 20.3523144..

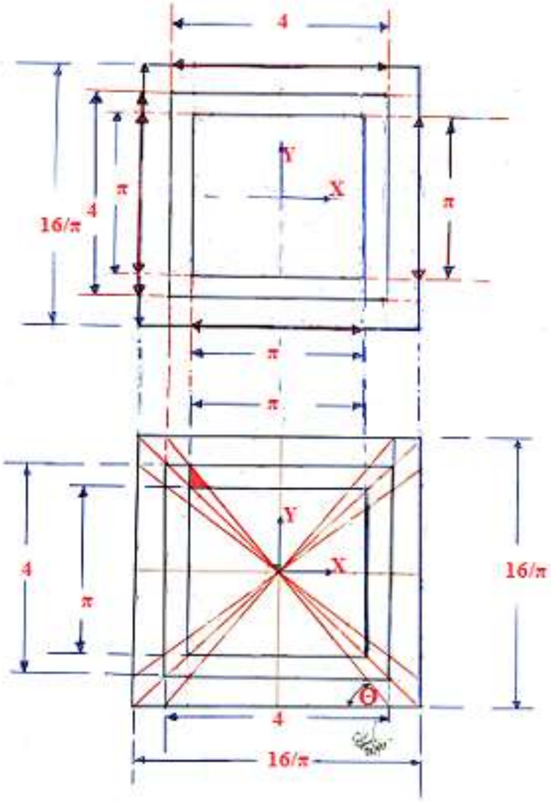
Geometry Design and Vector Definition of Coordinates by P.Stefanides, http://www.stefanides.gr

AutoCad Computerized Drawing by Dr. J. Kandylas

https://www.linkedin.com/pulse/bridges-2014-pstefanides-exhibits-panagiotis-stefanides

Three Concentric Squares In Common Ratio With Circles and Triangles Compass and Ruler Interstructures





RATIOS

16/ π : 4 = 4: π = 4/π

[16/π]/[4] =[4][/π]

[16/π]*[π] =[4]*[4] = 4^2 = 16

Tan(Θ) = [16/π]/4 = 4/π

For π = 3.141592654.

Tan(Θ) = 4/ 3.141592654 = 1.273239545, and

Θ = 51.85397401 deg.

For π =4/ SQRT[{SQRT(5)+1}/2] = 3.14460551

Tan(Θ) = 4/3.14460551 =1.27201965, and

Θ = 51.82729238 deg.

Squares' Sides : S1 = [16/π], S2 = [4], S3= [π]

Squares' Sides' Ratios : [16/π]: [4] = [4]: [π] = [4/π]

[S1]/[S2]=[S2]/[S3]

[S1]*[S3] =[S2]^2

[S2]^2 +[S3]^2 = [S1]^2

[4]^2 + [π]^2 = [16/π]^2

[4^2]*[π^2] +[π]^4 = [16]^2

$\pi^4 + 16\pi^2 - 256 = 0$ For x = π [for WolframAlpha solution]:

x^4 +16x^2 -256 =0

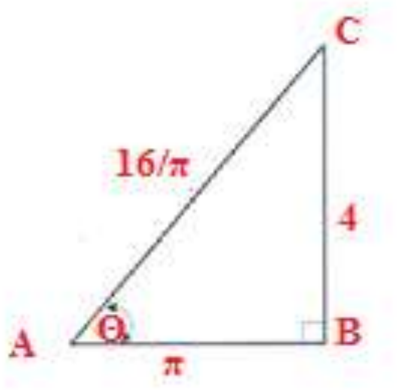
[**https://www.wolframalpha.com/input/?i=x%5E4+%2B16x%5E2+-256+%3D0**](https://www.wolframalpha.com/input/?i=x%5E4+%2B16x%5E2+-256+%3D0)

$$x = 2\sqrt{2\left(\sqrt{5} - 1\right)}$$

Computed by Wolfram|Alpha

= 3.144605511…

$$= 4/\left[\sqrt{\tfrac{1}{2}\left(\sqrt{5} + 1\right)}\right]$$



[AC] / [CB] = [CB] / [AB]

[AB]*[AC] =[CB]^2

[16/π]/4 = 4/π

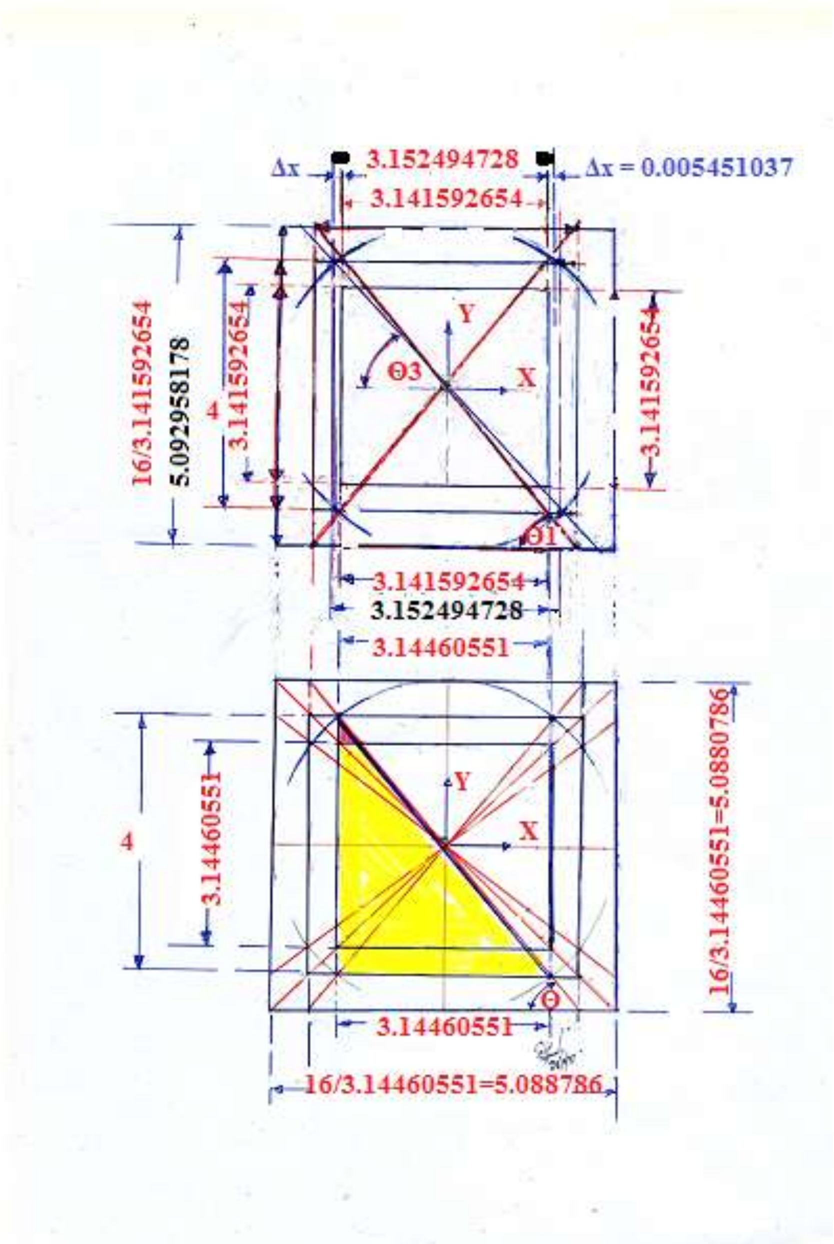
[π]*[16/π] = 4^2 = 16

$$\text{Tan}[\Theta] = [4/3.14460551] = \sqrt{\tfrac{1}{2}\left(\sqrt{5} + 1\right)} = 1.27201965$$

$$\Theta = \text{ArcTan}\left[\sqrt{\tfrac{1}{2}\left(\sqrt{5} + 1\right)}\right]$$

Θ = 51.82729238 .. Deg

Triangular and Circular Relationships



[16/3.14460551]=5.0880786 {= Circle circumference [16] diameter crossing parallel sides of square perimeter [16] - for π = 3.14460551 }

[16/3.141592654]= 5.092958178 {Circle circumference [16] diameter crossing parallel sides of square perimeter [16] - for π = 3.141592654 }

From Pythagoras Theorem

SQRT{[5.092958178]^2 – [4]^2 }= 3.152494728

SQRT{[5.0880786]^2 – [4]^2} =3.14460551
3.152494728 - 3.141592654 = 0.010902074 = 2Δx

Δx =0.005451037

Trigonometrically

5.092958178[Cos(Θ3)] – 3.141592654 = 2Δx

Sin(Θ3) = 4/[5.092958178] = 0.785398164

Θ3 = ArcSin [0.785398164] = 51.75751853.. Deg

[Cos(Θ3)]= [Cos(51.75751853)]= 0.618990892

5.092958178[0.618990892] = 3.152494728

3.152494728 – 3.141592654 = 2Δx = 0.010902074

Δx = 0.005451037

https://www.researchgate.net/publication/311156470_No_Detection_of_Imperfection_of_Circle_Challenges_the_Transcendence_of_p_By_Panagiotis_Stefanides

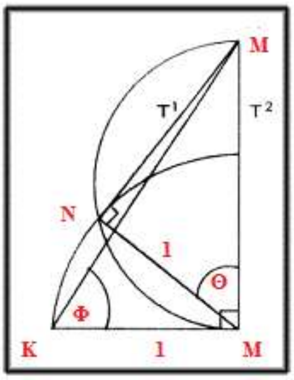
https://www.linkedin.com/pulse/detection-imperfection-circle-challenges-%CF%80-panagiotis-stefanides

https://www.linkedin.com/pulse/chords-sectors-squares-circumscribed-subscribed-%CF%80-value-stefanides

Drawing of Concentric Squares and Fitting Trianglularly Concentric Circles

Drawing by “*ruler and compass*” the Orthogonal Triangle Angle Θ, of Tangent [T]:

$$T = \sqrt{\frac{1}{2}(\sqrt{5}+1)} = \sqrt{\Phi}$$



$$TAN\,\Phi = 1.618033989$$

$$TAN\,\Theta = \sqrt{1.618033989}$$

$$= 1.27201965$$

$$TAN\,\Theta = \sqrt{TAN\,\Phi}$$

$$T^4 - T^2 - 1 = 0$$

$$ML = 1.618033989 = T^2$$

$$(ML)^2 = 2.618033989$$

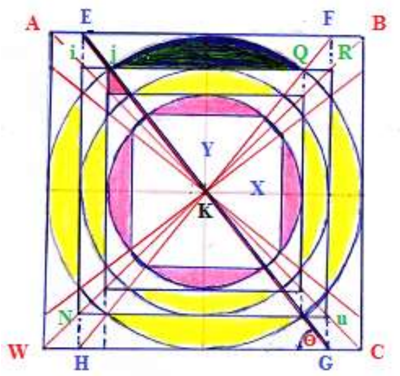
$$MN = \sqrt{2.618033989 - 1}$$

$$MN = \sqrt{1.618033989} = T$$

$$T = 1.27201965$$

$$T = \sqrt{\frac{1}{2}(\sqrt{5}+1)} = \sqrt{\Phi}$$

http://www.stefanides.gr/Html/gmr.html



http://www.stefanides.gr/Html/theo_circle.html

RULER and COMPASS constructions

1. A Square [ABCW] of Perimeter [16] units, Side Length [4] units is drawn.

2. Diagonals [AC] and [BW] are drawn fixing its Center point K [x=0, y=0], on X,Y axes [drawn for reference].

3. A Square Inscribed Circle of Diameter [4] and Circumference [4π] is drawn.

4. Line [EG] is drawn, passing Center point K, with Slope $\sqrt{\frac{1}{2}(\sqrt{5}+1)}$.

Slope =Tan [Θ] = $\sqrt{\frac{1}{2}(\sqrt{5}+1)}$ [= 1.27201965].

Similarly Line [FH] drawn .

[EF]=[HG] = [EH]/Tan[Θ] = 4/ [$\sqrt{\frac{1}{2}(\sqrt{5}+1)}$] = π [for π= 3.14460551].

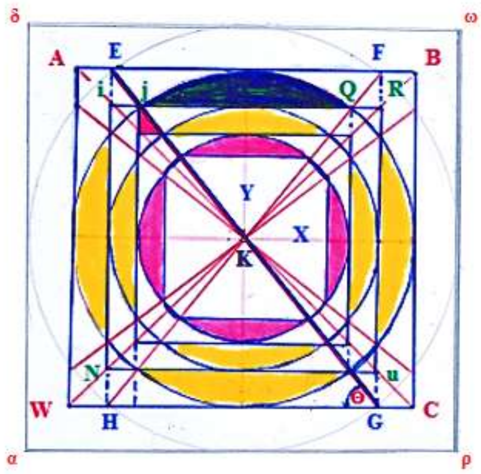
[EG]^2 = [EH]^2 + [HG]^2 = [4]^2 + {4/[$\sqrt{\frac{1}{2}(\sqrt{5}+1)}$]}^2

[EG] = √([4]^2 + {4/[$\sqrt{\frac{1}{2}(\sqrt{5}+1)}$]}^2) [= 5.088078598]

5. Circle drawn with [EG] Diameter, is of Circumference π[EG],

π[EG] = {4/ $\sqrt{\frac{1}{2}(\sqrt{5}+1)}$}*{√([4]^2 + {4/[$\sqrt{\frac{1}{2}(\sqrt{5}+1)}$]}^2)} = [16],

which is Equal to the Perimeter of Square [ABCW], [16].



This Circle defines the Construction by *"ruler and compass"* of its Circumscribed Square [δωρα having Perimeter defined by the product [16]*[4/π] = 64/π , with Square Side 16/π.

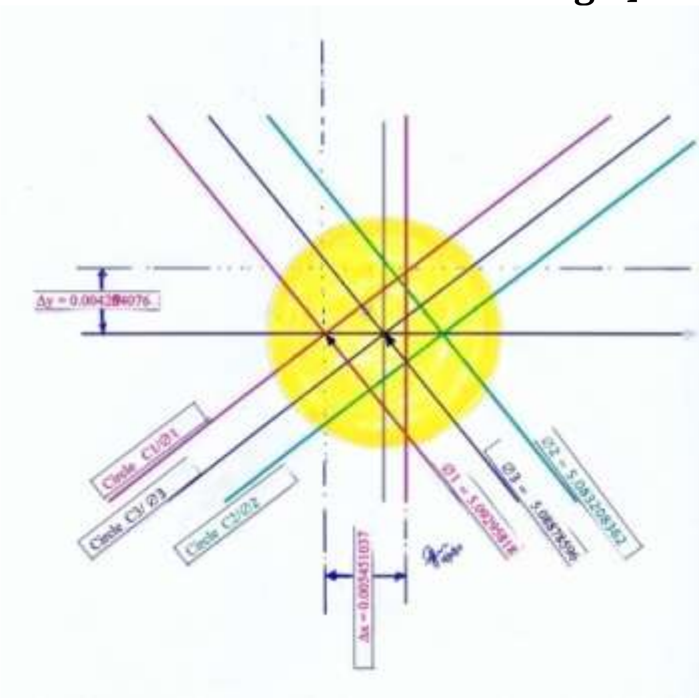
Noting also here, that the Parallelogramme [EFGH] has an Area, equal to [EH]*[HG] = [4π], which is Equal to the Circumference of the Circle with Diameter [4].

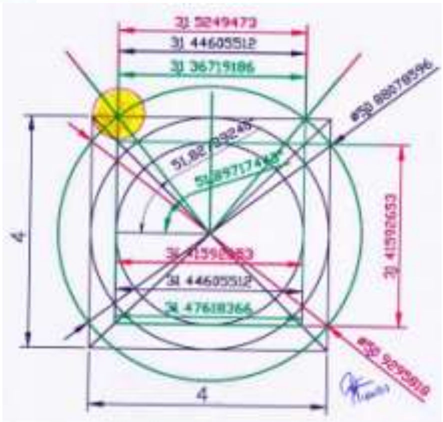
6. Joining Line [jQ] and extending it to [ji] crossing [EH] drawn, at [i] and similarly, [QR] crossing [FG] drawn at [R],the Square [iRuN] is being drawn with Sides equal to [EF],

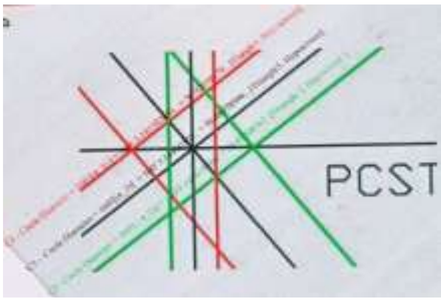
Equal to π = 4/[$\sqrt{\frac{1}{2}(\sqrt{5}+1)}$] = [4/T]= 3.14460551 [π*T=4] with Perimeter Equal to [4π]

Under which is being drawn, the Inscribed Circle of Circumference [4π]*[π/4] = [π^2]

Analysis of the PCST [Point on the Circle The Square the Triangle]



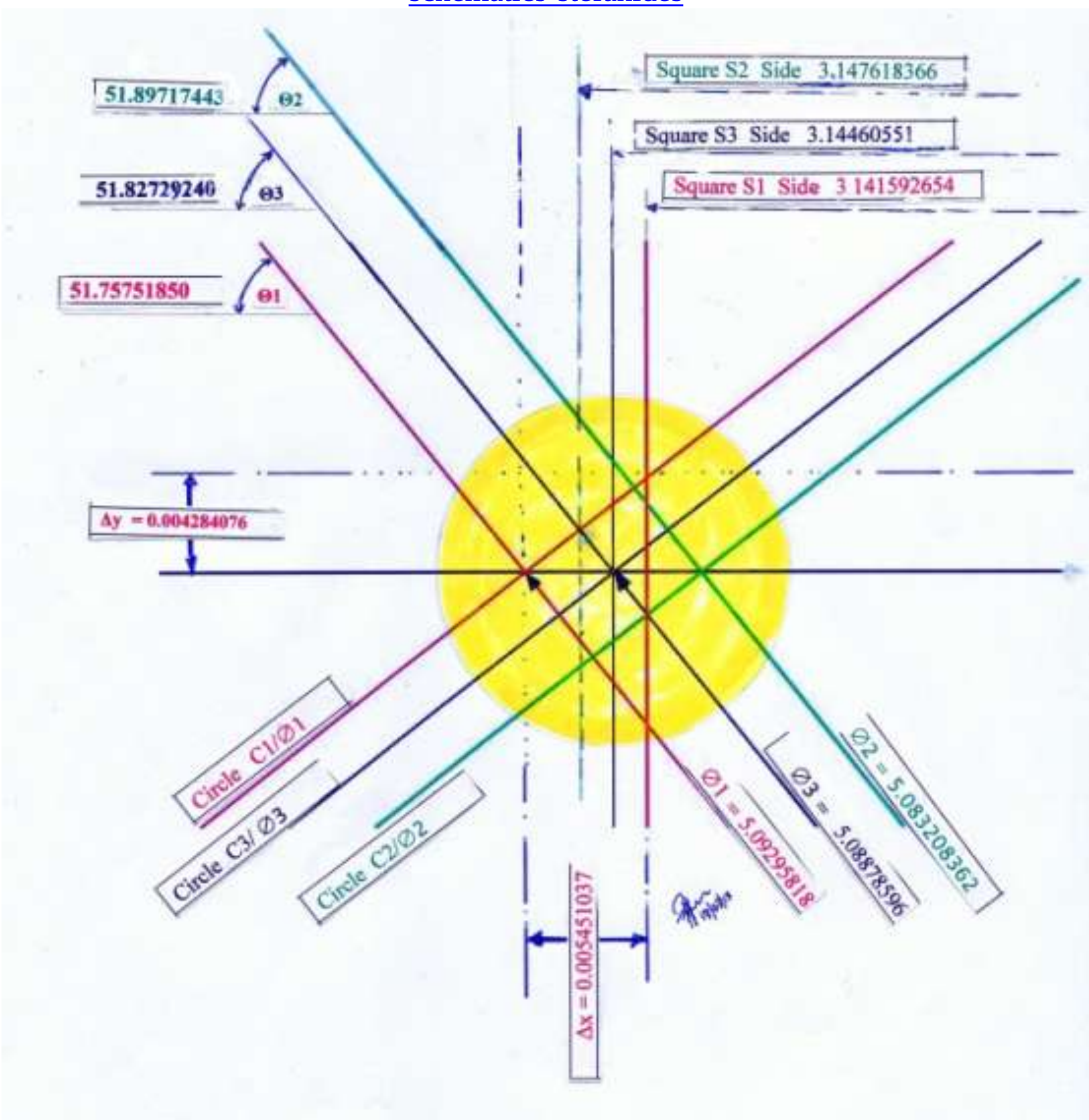




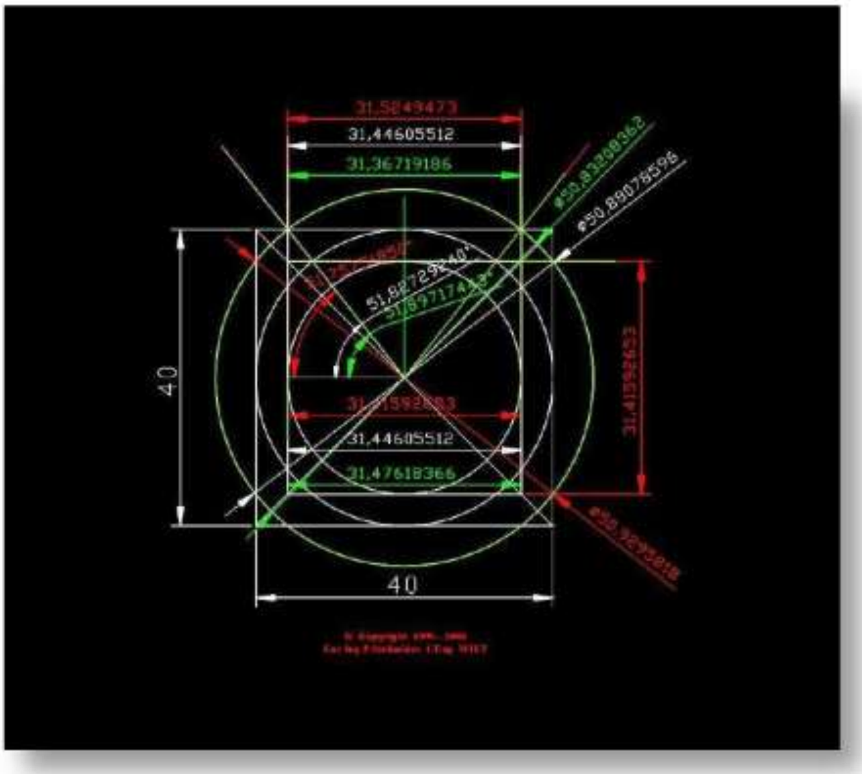
AutoCad Schematics

Complementary Notes added to the Analysis of the AutoCad** Schematics *

https://www.linkedin.com/pulse/complementary-notes-added-analysis-autocad-schematics-stefanides



*** Geometry Design and 2D Vectors' Definition for AutoCad Computing by Panagiotis Stefanides.**
**** AutoCad Computerized Drawing by Dr. Giannis Kandylas.**



MICROCOSMOS Geometrically Related to the MACROCOSMOS
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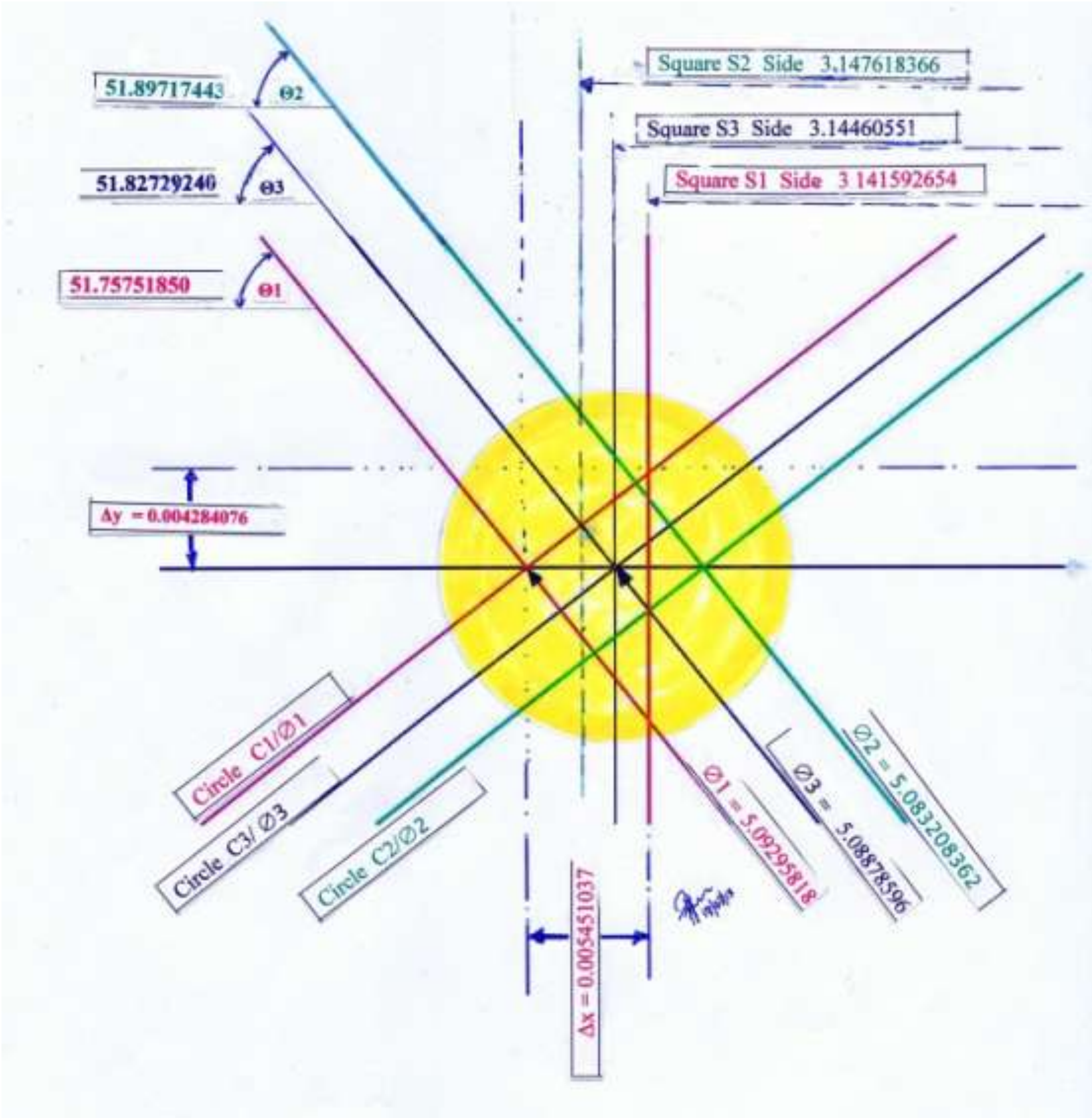
AutoCad Computerized Drawing by Dr. J. Kandylas

https://www.linkedin.com/pulse/interpreting-magnified-figures-nested-circles-squares-stefanides

Complementary Notes added to the Analysis of the AutoCad** Schematics *



https://www.linkedin.com/pulse/complementary-notes-added-analysis-autocad-schematics-stefanides

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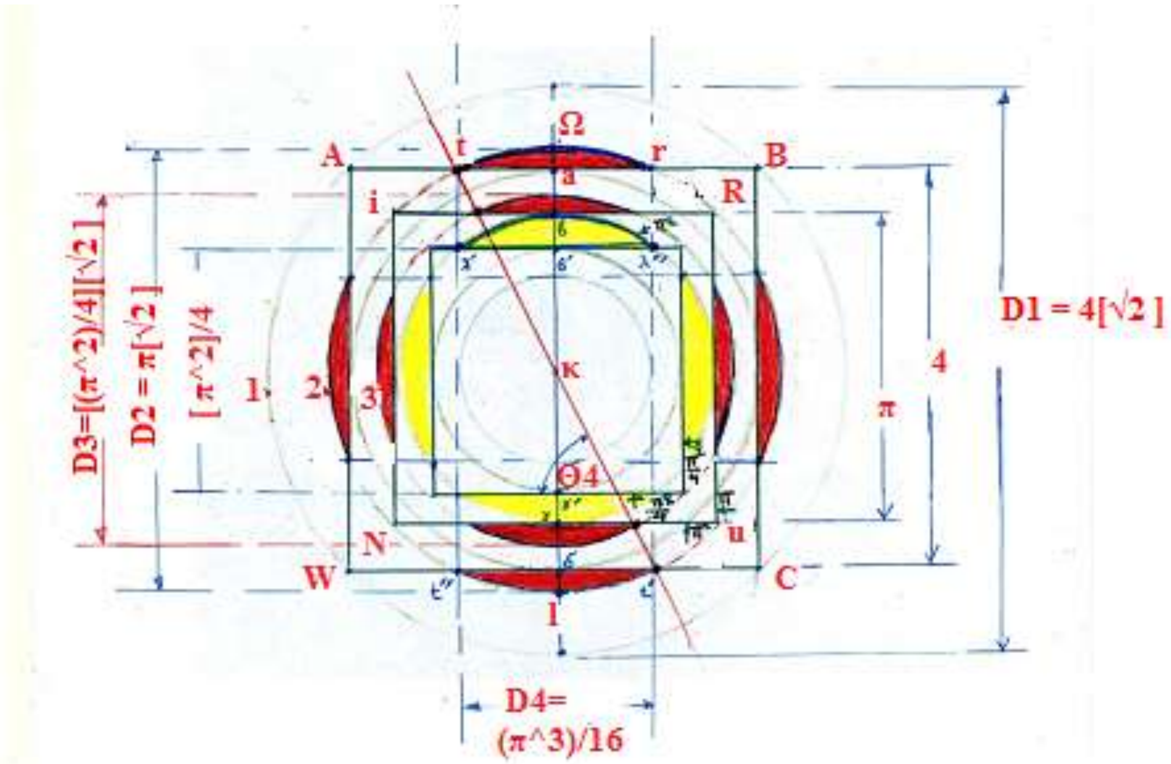
**** AutoCad Computerized Drawing by Dr. Giannis Kandylas.**

Chords of Sectors of Squares' Circumscribed and Subscribed Circles', evaluated for SYMMETRIES-_ASSYMETRIES, dependent on the Trancendental π Value



CIRCLES 1, 2, 3, - DIAMETERS D1, D2, D3

D1 = 4[√2] = Diagonal of SQUARE with SideLength [4]
D2 = π[√2] = Diagonal of SQUARE with SideLength [π]
D3=[(π^2)/4][√2] = Diagonal of SQUARE with SideLength [(π ^2)/4]

CIRCLE with Diameter [aδ] Subscribed to SQUARE [ABCW]

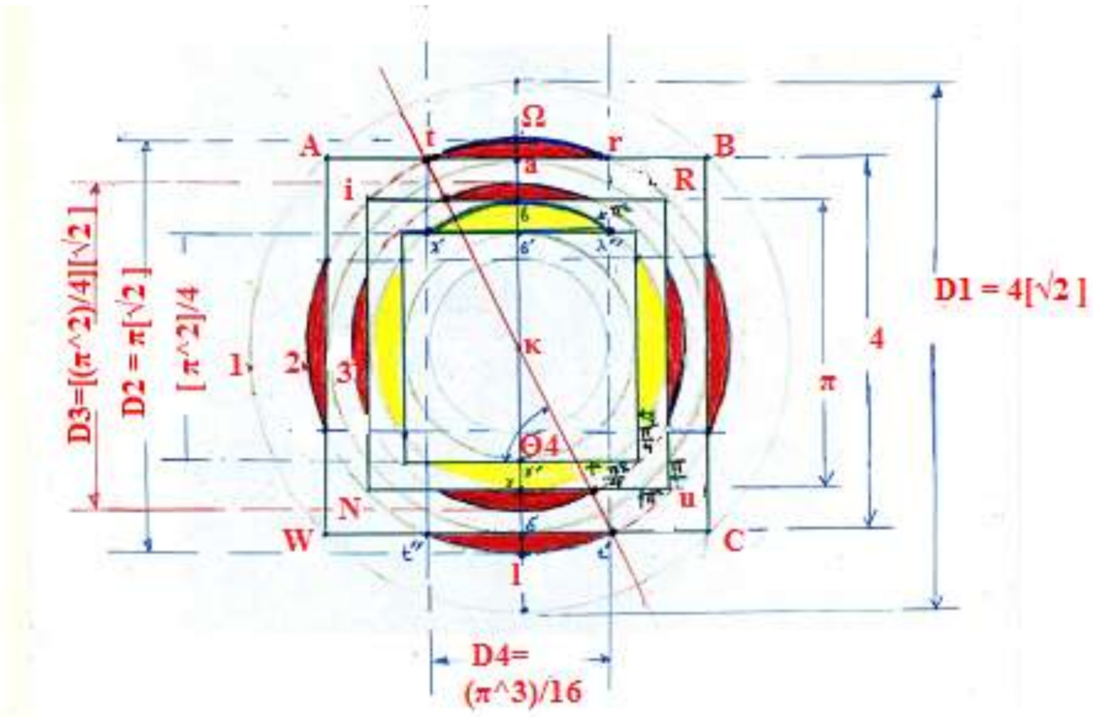
CIRCLE with Diameter [βγ] Subscribed to SQUARE [iRuN]

CIRCLE with Diameter [β΄γ΄], Subscribed to SQUARE with SideLength (π^2)/4

CIRCLE of Diameter D4 = (π^3)/16, Subscribed to SQUARE with SideLength (π^3)/16

SQUARE [iRuN] with SideLength π

SQUARE [ABCW] with SideLength 4



Find Chord Length [λ´λ´´]

POWER OF POINT THEOREM APPLICATION

[λ´β´] = [β´λ´´]

[ββ´] = [γγ´]

[ββ´] + [(π^2)/4] + [γγ´] = π = 2[ββ´] + [(π^2)/4],

2 [ββ´] = π - [(π^2)/4] or

[ββ´] = π/2 - [(π^2)/8] = 0.337095777..
[ββ´] * [(π^2)/4 + ββ´] = [λ´β´]*[β´ λ´´] = [λ´β´]^2 or

[ββ´] * [(π^2)/4 + ββ´] = [λ´β´]^2 or

[λ´β´]^2 = [0.337095777..]* [2.4674011 + 0.337095777..] =

= 0.95384053.. , or

[λ´β´] = 0.97230862.. and

2[λ´β´] = [λ´λ´´]

[λ´λ´´] = 1.94461724..

[Compare with (π^3)/16 = 1.937892293.. < 1.94461724..]
[ratio error = 1.003470238]

NOTE: For π = Πσχ =4/sqrt[{sqrt(5) + 1}/2] = 3.14460551..

π = 2[ββ´] + [(π^2)/4],

2 [ββ´] = π - [(π^2)/4] = = 0.672469557..or

[ββ´] = π/2 - [(π^2)/8] =

[ββ´] = 0.336234778.. [< 0.337095777.. .. using π = 3.141592654..]

[ββ´] * [(π^2)/4 + ββ´] = [λ´β´]*[β´ λ´´] = [λ´β´]^2 or

[ββ´] * [(π^2)/4 + ββ´] = [λ´β´]^2

[λ´β´]^2 = [ββ´] * [(π^2)/4 + ββ´] or

[λ´β´]^2 = [0.336234778..] * [(π^2)/4 + 0.336234778..] =

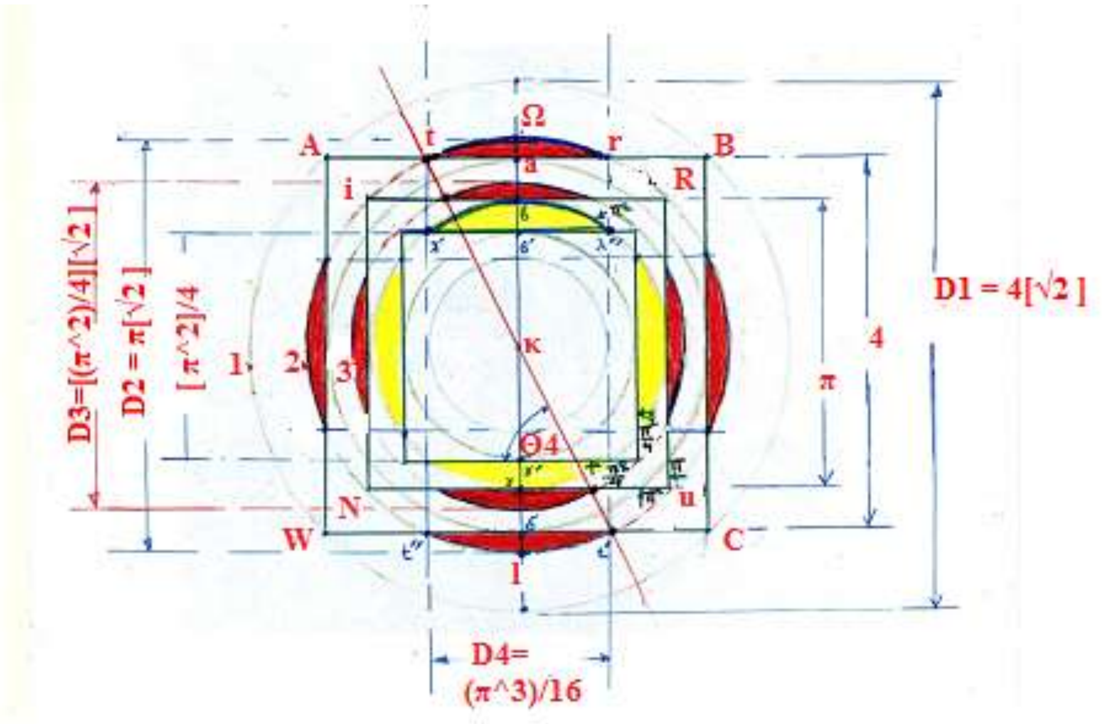
= 0.94427191..

[λ´β´] = 0.971736544.. , and 2[λ´β´] = 1.943473087..

2[λ´β´] = [λ´λ´´]

[λ´λ´´] = 1.943473087.. [< 1.94461724.. using π = 3.141592654..]

[Compare with (π^3)/16 =1.943473087.. i.e equal]



SIMILARLY

Find Chord Length [tr]

POWER OF POINT THEOREM APPLICATION

$$[\Omega\alpha]*[al] = [ta]*[ar]= [(tr)/2]^2 = [ta]^2$$

$$[\ \Omega a\ ] = [\ \delta\lambda\ ],\quad [\ ta\ ] = [\ ar\ ],\quad [\ \Omega l] = [\Omega a\ ] +[\ a\delta] +[\ \delta l]$$

$$[\Omega\alpha]*[al] = [ta]^2$$

$$[\Omega a]*[a\delta + \delta l] = [\Omega a]*[4 + \delta l] = [\Omega a]*[4 + \Omega a], \text{ or}$$

$$[\ ta]^2= [\Omega a]*[4 + \Omega a]\ ..$$

$$\{4+[\Omega a + \delta\lambda]\} = \{\ 4 + 2[\Omega a]\} = D2 = \pi[\sqrt{2}\ ],\quad \text{or}\quad [\Omega a]= \{\pi[\sqrt{2}] - 4\} / 2$$

$$[\Omega a]= 0.221441469..$$

$$\{\quad [\ ta]^2= [\Omega a]*[4 + \Omega a]\quad \}$$

[ta]^2 = [{π[√2] – 4} / 2]*[4 +{π[√2] – 4} / 2] = 0.934802201..

[ta] = sqrt { [{π[√2] – 4} / 2]*[4 +{π[√2] – 4} / 2] } = 0.966851695..
and
2[ta]= [tr] = 2(sqrt { [{π[√2] – 4} / 2]*[4 +{π[√2] – 4} / 2] }) = [tr]

[tr] =1.93370339..

[Compare with (π^3)/16 = 1.937892293..> 1.93370339.., ,

ratio error 1.002166259]

Tan(Θ4) = [Ka]/[ta] =

= (4/2)/ sqrt { [{π[√2] – 4} / 2]*[4 +{π[√2] – 4} / 2] } =

= 2/0.966851695..= 2.068568998.. , Θ4 = 64.19967679.. deg.

NOTE: For π = Πσχ =4/sqrt[{sqrt(5) + 1}/2] = 3.14460551..

[Ωα] = 0.22357188.. [> 0.221441469.. .. using π = 3.141592654..]

[ta]= 0.971736544.. , 2[ta]= [tr]

[tr] = 1.943473087.. [> 1.93370339.. using π = 3.141592654..]

[Compare with (π^3)/16 = 1.943473087.. , i.e equal]

Tan(Θ4)= 2/[ta] = 2.058171027.. , 1 / 2.058171027.. = 0.485868272..

Θ4 = 64.08635381..deg.

1/ Tan(Θ4) = 0.485868272.. ,

[1/ Tan(Θ4)]^2 = 0.236067978.. = 2Φ – 3, [Φ = { sqrt(5) -1}/2]

0.236067978..+ 4 = 1/ 0.236067978..= 4.236067978..

sqrt [4.236067978..] = 2.058171027..], 1 / 2.058171027..
=0.485868272..

SUMMARY OF RESULTS

A

Calculations Based on : Πσχ = 4/sqrt[{sqrt(5) + 1}/2]
[= 3.14460551..]

Chord Length [λ΄λ΄΄] = 1.943473087..

[Value Equals to Circle Diameter D4 =
([Πσχ]^3)/16 =[(4/sqrt[{sqrt(5) + 1}/2])^3]/16 = 1.943473087..]

Chord Length [tr] = 1.943473087..

[Value Equals to Circle Diameter D4 =
([Πσχ]^3)/16 =[(4/sqrt[{sqrt(5) + 1}/2])^3]/16 = 1.943473087..]

THESE DEMONSTRATE EVIDENT SYMMETRIES

B

Calculations Based on : π [= 3.141592654..]

Chord Length [λ΄λ΄΄]= 1.94461724.. [> (π^3)/16 = 1.937892293..]

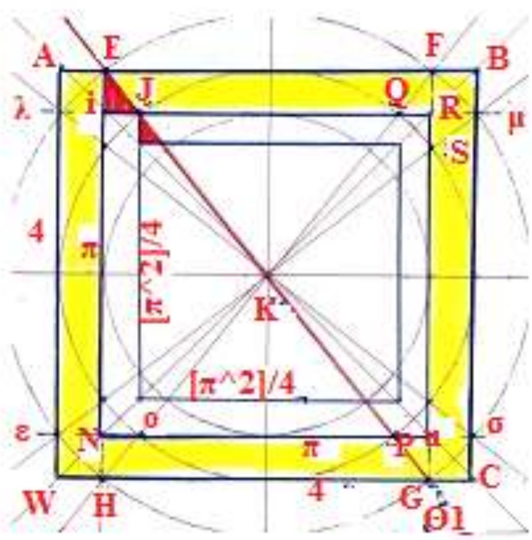
[Value Bigger than Circle Diameter D4 =
= (π^3)/16 = {(3.141592654..)^3}/16 =1.937892293..]

Chord Length [tr] = 1.93370339.. [< (π^3)/16 = 1.937892293..]

[Value Smaller than Circle Diameter D4 =
= (π^3)/16 = {(3.141592654..)^3}/16 =1.937892293..]

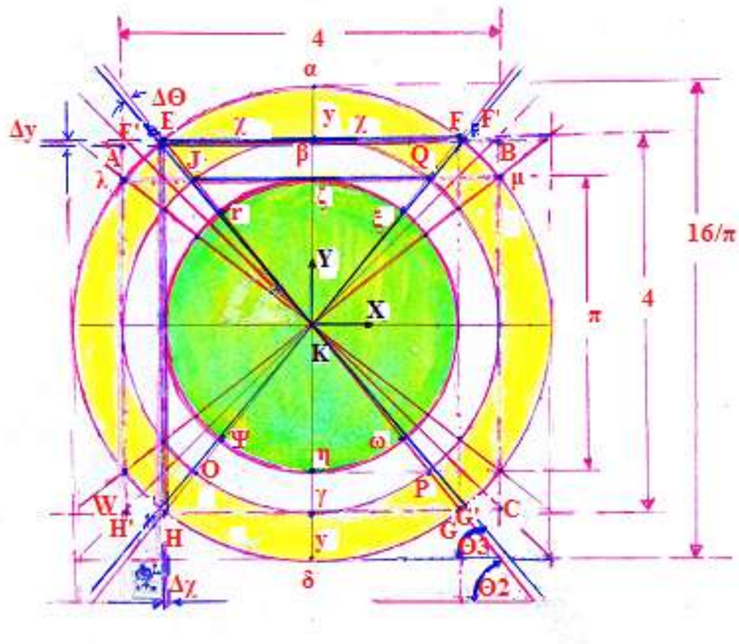
THESE DEMONSTRATE EVIDENT ASYMMETRIES

No Detection of Imperfection of Circle, Challenges the Transcendence of π



SQUARES in RATIOS of 4/π

https://www.linkedin.com/pulse/detection-imperfection-circle-challenges-%CF%80-panagiotis-stefanides?trk=prof-post



CIRCLES in RATIOS of $4/\pi$ [as SQUARES in same RATIOS]

Power of Point Theorem Application

$[a\beta].[\beta\delta] = \chi^2$

$[y].[(\beta\gamma) + (y)] = \chi^2$

$[y].[(JP) + (y)] = \chi^2$

$[y].[(4) + (y)] = \chi^2$

$y^2 + 4y - \chi^2 = 0$, $y = a\beta = \gamma\delta = [D1 - D2] / 2 = y = 0.54647909..$

$[0.54647909..]^2 + 4[0.54647909..] = 2.484555753.. = \chi^2$

$\chi = 1.576247364..$, $2\chi = 3.152494728.. = [E'F']$

D1 = EG = $a\delta = 16/\pi = 5.092958179..$, Circumference = 16

D2 = JP = $\beta\gamma = 4$, Circumference = 4π

D3 = $\zeta\eta = \tau\omega = \pi$, Circumference = π^2

D1/D2 = $a\delta/\beta\gamma = [16/\pi]/4 = 4/\pi$

D2/D3 = $\beta\gamma/\zeta\eta = 4/\pi$ = D1/D2

D1-D2 = 5.092958179.. – 4 = 1.092958179.. = $a\beta = \gamma\delta = 2y$, y = 0.54647909..

2χ = 3.152494728.. = [E΄F΄]

Ratios:

[E΄H΄]/ [$\zeta\eta$] = $4/\pi$ = 1.273239545.. [Θ = 51.85397401…Deg]

[EH]/ [$\zeta\eta$] =[EH]/ [HG] = $[4 + 2\Delta y]/\pi > 4/\pi$

[Δy = 0.004284076 ..]

Ref : https://www.linkedin.com/pulse/detection-imperfection-circle-challenges-%CF%80-panagiotis-stefanides?trk=prof-post

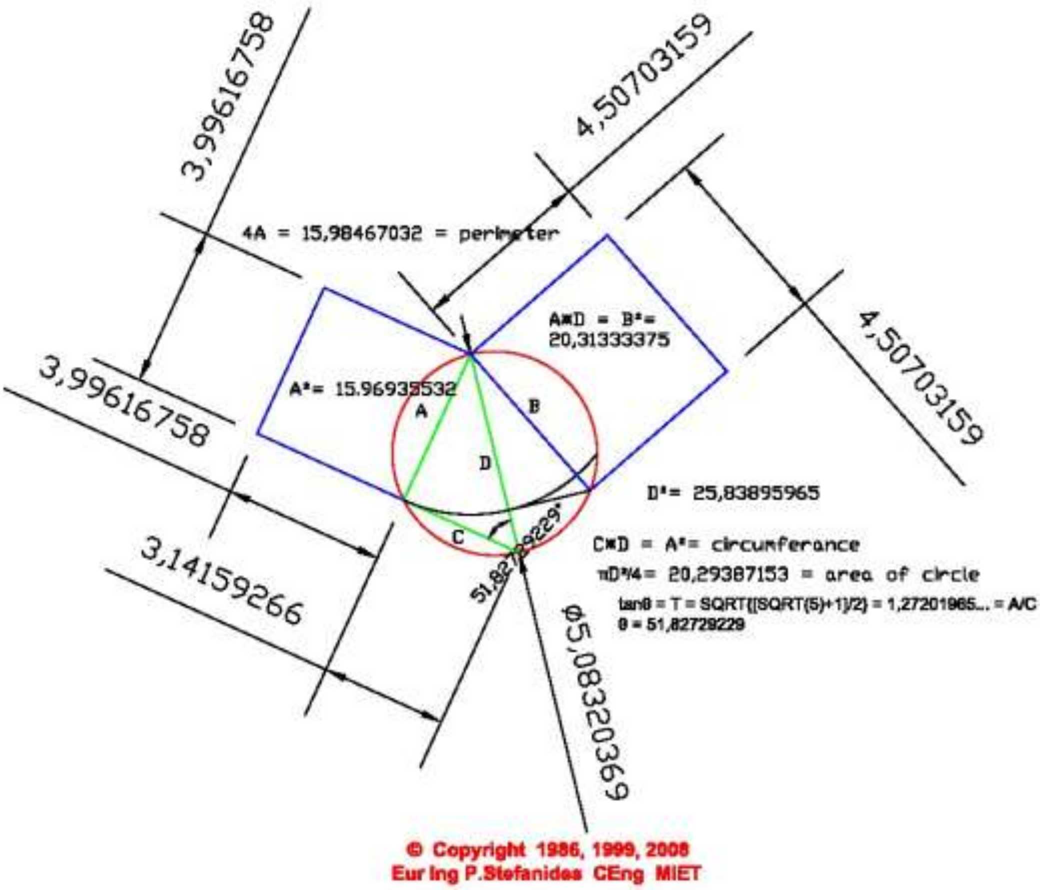
[EH]/ [$\zeta\eta$] =[EH]/ [HG] = $[4 + 2\Delta y]/\pi$ = 1.275966872

Corresponding to slope of angle 51.91351208..Deg. = $\Theta 2$

[E΄H΄]/ [H΄G΄] = 4/[E΄F΄] = 4/3.152494728.. = 1.26883638..

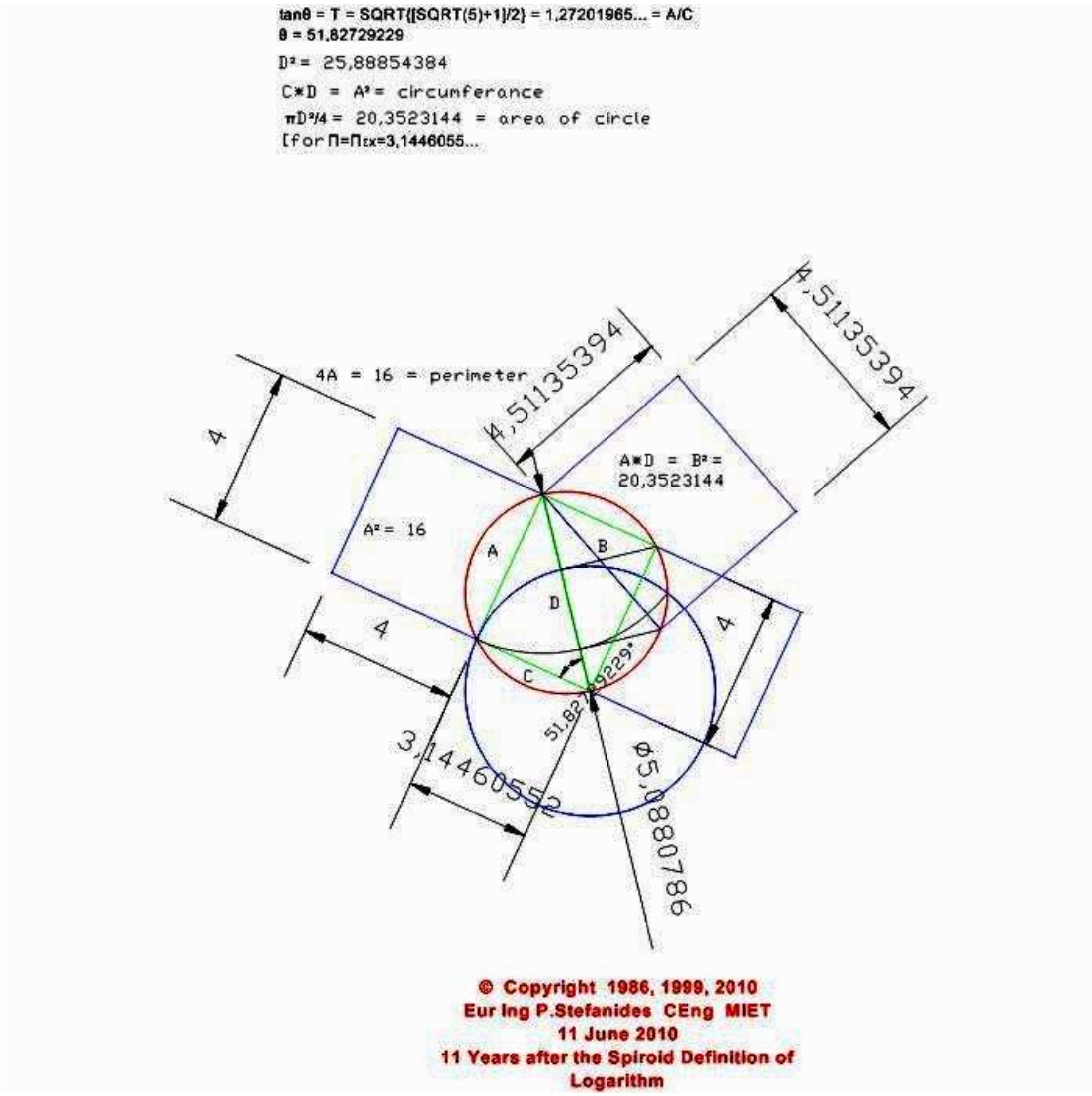
Corresponding $\Theta 3$ = 51.75751853…Deg.

TRANSCENDENTAL π [= 3.141592654..] does not Square the Circle



NOTE: For $\pi = \Pi\sigma\chi$ =4/sqrt[{sqrt(5) + 1}/2] = 3.14460551..

$\Delta\chi = 0$, $\Delta y = 0$ and $\Delta\theta = 0$, [E΄F΄] = [EF] and [[EH] = [E΄H΄]


tanθ = T = SQRT{[SQRT(5)+1]/2} = 1,27201965... = A/C
θ = 51,82729229
D² = 25,88854384
C*D = A² = circumferance
πD²/4 = 20,3523144 = area of circle
[for Π=Πεx=3,1446055...
4A = 16 = perimeter
4,51135394
4,51135394
A*D = B² =
20,3523144
A² = 16
A
B
D
C
4
4
4
3,14460552
Ø5,0880786
© Copyright 1986, 1999, 2010
Eur Ing P.Stefanides CEng MIET
11 June 2010
11 Years after the Spiroid Definition of
Logarithm

For: $\pi = 4/\sqrt{\varphi}$

Quadrature of the Circle, Compass and Ruler - NOVEL CONCEPT - via "The Quadrature Triangle"

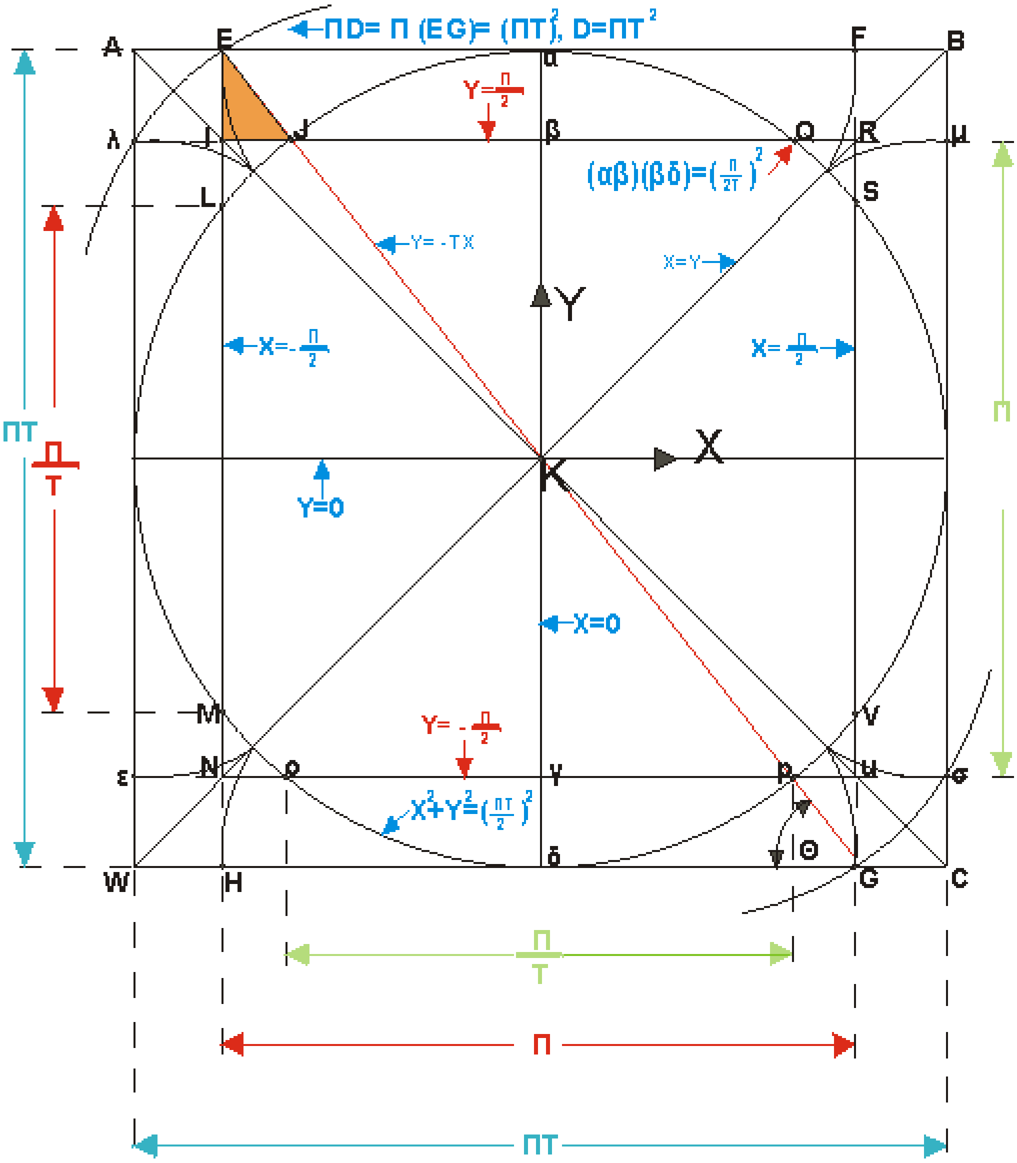
D = 4* $\sqrt{\varphi}$=5.0880786.., [Red Circle], π*D = 4*4 = 16= Square [Side 4] Perimeter = Circle[Red]

Circumference , [π/4]*D^2 = 16* $\sqrt{\varphi}$= [4.51135394..]^2 = Circle[Red] Area =
= Square [Side 4.51135394..] Area= 20.3523144..

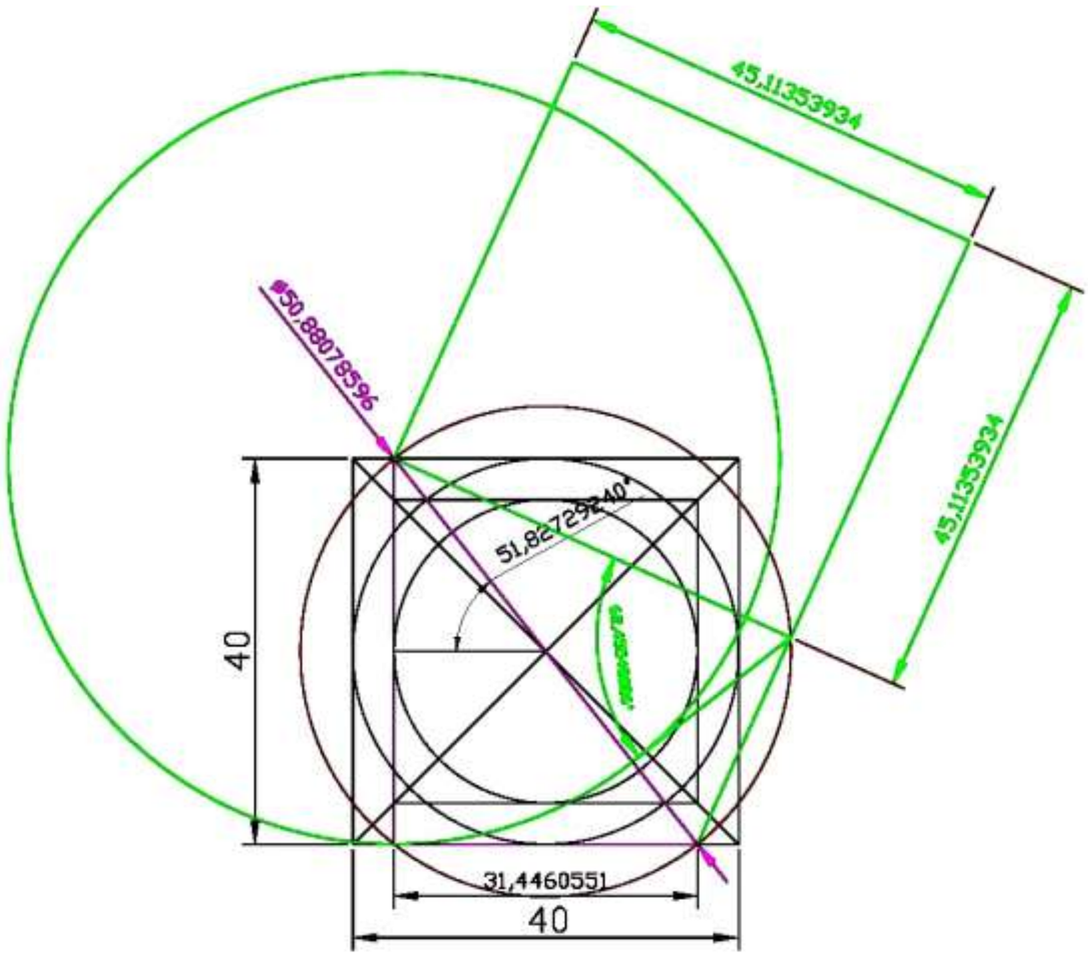
Geometry Design and Vector Definition of Coordinates by P.Stefanides, http://www.stefanides.gr

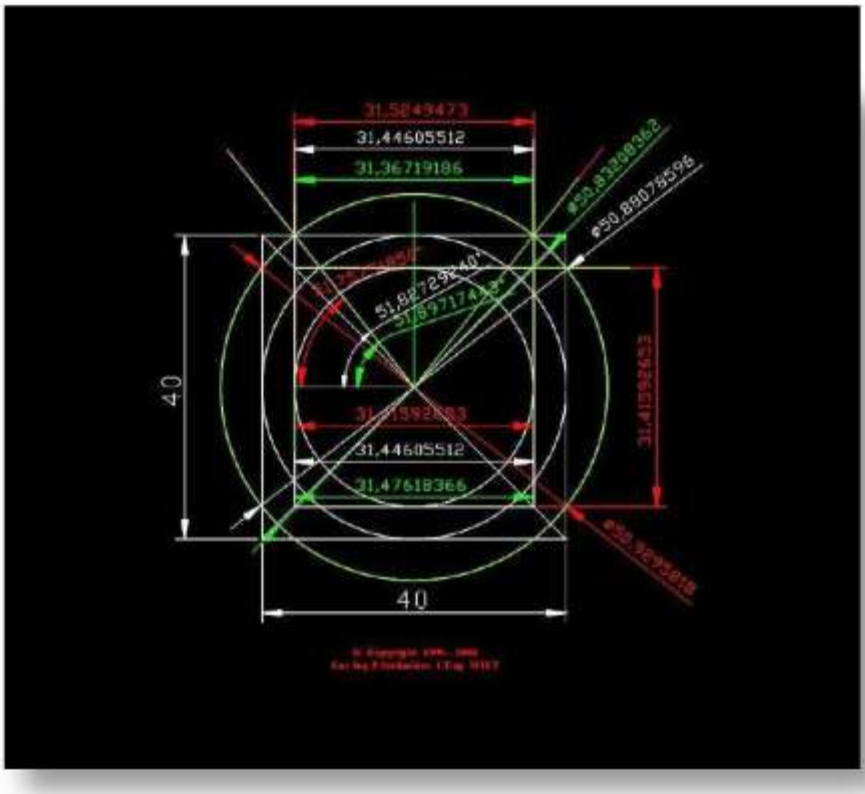
AutoCad Computerized Drawing by Dr. J. Kandylas

$$T^4 - T^2 - 1 = 0,\ TAN\Theta = T = \sqrt{\frac{\sqrt{5}+1}{2}} = \sqrt{\Phi}\quad,\ \Pi = Pi$$



COPYRIGHT ©, SECUNDI MILLENNII FINIS, P.C. STEFANIDES


45,11353934
45,11353934
Ø50,88078596
51,82729240°
40
31,4460551
40
© Copyright 1999 - 2009
Eur Ing P.Stefanides CEng MIET



MICROCOSMOS Geometrically Related to the MACROCOSMOS

" Nested Circles, Squares, Triangles"

Quadrature of the Circle, Compass and Ruler - NOVEL CONCEPT - via "The Quadrature Triangle"

CONFIGURATION EXHIBITNG MAXIMUM SYMMETRY

For Value of $\pi = 4 / \sqrt{\varphi}$ [= 3.14460551..]

Circumference of Circle [D = 40 $\cdot \sqrt{\varphi}$ =50.88078596..] = Square [Side 40] Perimeter, and Product 40*D= Area of this Circle = A Square area of Side 45.1135941..

Geometry Design and Vector Definition of Coordinates by P.Stefanides, http://www.stefanides.gr

AutoCad Computerized Drawing by Dr. J. Kandylas

Page_101_ from_JMM_2016_Cat_Full

Bridges Seoul Korea AUG 2014 Bridges Mathematical Art Galleries Bridges Washington Seattle Jan 2016

WASHINGTON SEATTLE JOINT MATHEMATICAL MEETING

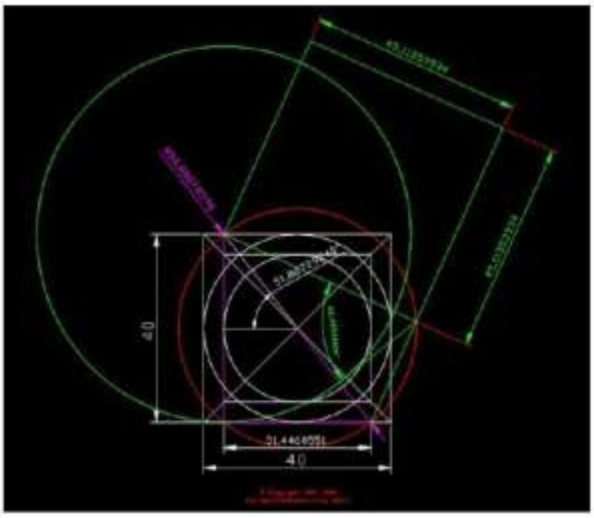
JMM * **AMERICAN MATHEMATICAL SOCIETY*MATHEMATICAL ASSOCIATION OF AMERICA JAN 2016**

Athens Energy 2015 Eoropean Cente

Panagiotis Stefanides

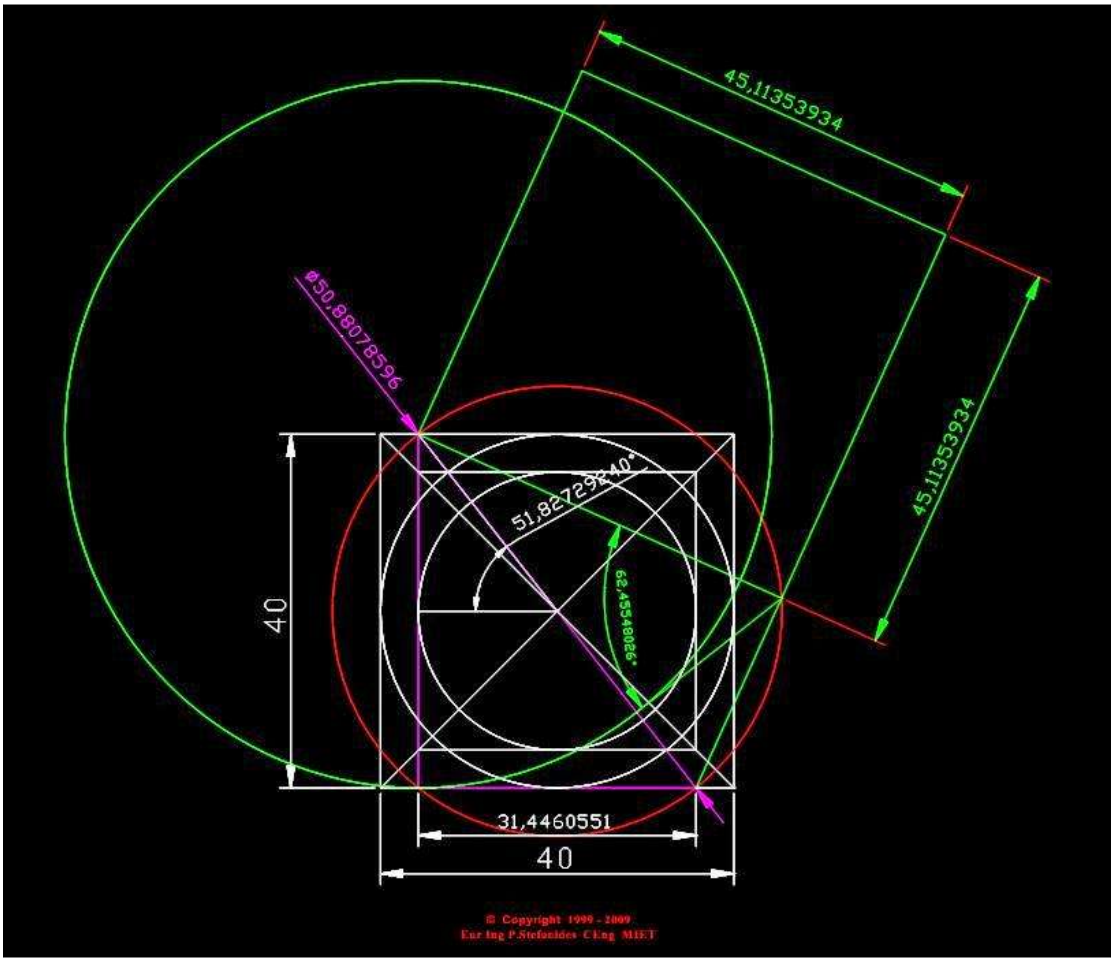
Chartered Engineer [UK]
Hellenic Aerospace Industry [ex]
Athens, Greece

"This work, presented to various conferences, is a proposed interpretation of Plato's Timaeus Scalene Orthogonal Triangle by Panagiotis Stefanides. It is noted here that, a similar, constituent part of this triangle but not the same, is the Kepler triangle discovered by Magirus. Quadrature of the circle by compass and ruler is achieved based on the special quality of this triangle [a quadrature triangle] and its relationship with circle, the parallelogramme and the square."



CIRCLE'S QUADRATURE
32 x 23 x 3 cm
AUTOCAD DRAWING FRAMED PHOTO, 2009

Autocad used: Geometry and Vector definition by Panagiotis Stefanides assisted for the Computerized AutoCad Drawing by Dr. Giannis Kandylas.
More information:
http://www.stefanides.gr/Html/GOLDEN_ROOT_SYMMETRIES.htm



CIRCLE'S QUADRATURE

By Panagiotis Stefanides

For: π = 4 / $\sqrt{\varphi}$ = 3.14460551..

Quadrature of the Circle, Compass and Ruler - NOVEL CONCEPT - via "The Quadrature Triangle"

D = 40*$\sqrt{\varphi}$=50.8807859.., π*D =4*40 = 160 = Square [Side 40] Perimeter =

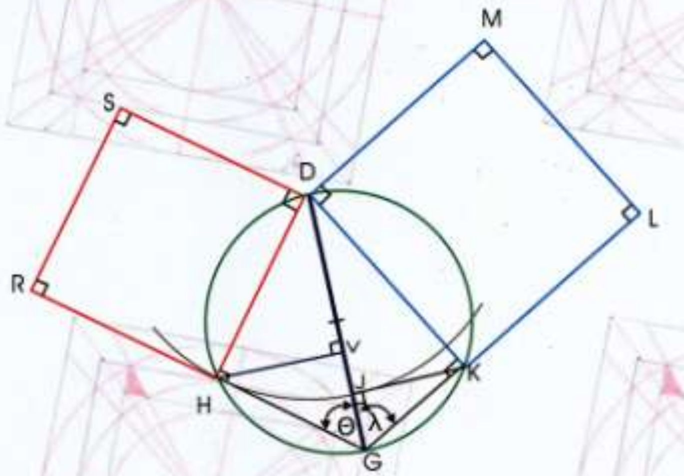
= Circle[Red] Circumference , [π/4]*D^2 = 1600*$\sqrt{\varphi}$= [45.1135394..]^2 = Circle[Red] Area =
= Square [Side 45.113539..] Area= 2035.2314..

Geometry Design and Vector Definition of Coordinates by P.Stefanides, http://www.stefanides.gr
AutoCad Computerized Drawing by Dr. J. Kandylas

Bridges 2016 Exhibit - Joint Mathematics Meetings
Jan 6-9 (WED-SAT),2016 - WASHINGTON STATE CONVENTION CENTER,SEATLE, WA
The Mathematical Association of America (MAA) and the American Mathematical Society (AMS).

QUADRATURE OF CIRCLE , THEORETICAL DEFINITION

For any circle , if a chord , such as (DH) is a quarter of the circles circumference, then the square , such as (DKLM) has an area equal to that of the circle, and perimeter of square (DHRS) equal to the circumference of the circle.



d=(DG)=Diameter

$\sin(\Theta) = \frac{\pi}{4}$

$(DH) = (\frac{\pi \cdot d}{4}) = (DJ)$

$\sin(\lambda) = \sqrt{\frac{\pi}{4}}$

$(DK)^2 = (\frac{\pi \cdot d}{4})(d) = (DJ)(DG)$ eucleid VI , 8 : $(DV)(DG) = (DH)^2$

$(DK)^2 = (\frac{\pi \cdot d^2}{4})$ i.e. Area of square = Area of circle

2.For one particular circle , in addition to the above theorem (1) , for
$\tan \Theta = T = \sqrt{\frac{\sqrt{5}+1}{2}}$.

$(DV) = (HG)$ and , $(HG) \cdot (GD) = (DH)^2 = (\frac{\pi \cdot d}{4})^2 = \pi \cdot d$, if
(HG) is π , then :

$(\frac{\pi \cdot d}{4})^2 = \frac{\pi^2 \cdot d^2}{16} = \pi \cdot d$, or $(\pi \cdot d) = 16$, $d = \frac{16}{\pi}$ and $(\frac{\pi \cdot d}{4}) = (\frac{\pi}{4})(\frac{16}{\pi}) = 4$

Using Pythagoras on triangle GHD , we get

$(\frac{16}{\pi})^2 = \pi^2 + 4^2$, or , $\pi^4 + 4^2\pi^2 - 4^4 = 0$, for which the positive, real root for π $= \frac{4}{T}$ and so $\sin(\Theta) = \frac{1}{T}$ and $\sin(\lambda) = \sqrt{\frac{1}{T}}$ for quadrature .

\

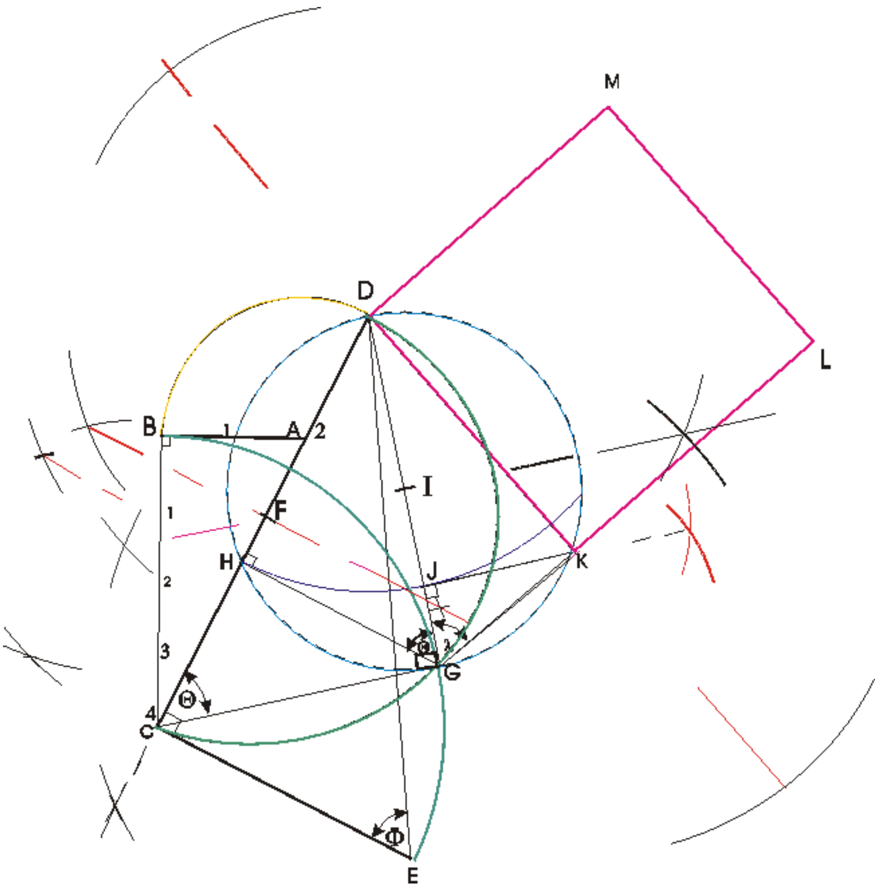
π, Irrational Positive Real Root of Fourth Order Equation

http://www.stefanides.gr/Html/piquad.html

For π = Πσχ =4/sqrt[{sqrt(5) + 1}/2] = 3.14460551.. Irrational ,

Ruler and Compass

Configuration for the Circle's Quadrature.



http://www.stefanides.gr/Html/piquad.html

CONCLUSIONS

Under conditions described above,

Values of Numbers and Ratios of Forms such as those within X-Y Axial plane of Conic Section, defined by extended Lines [EG] and [FH] and the whole set of Circles Squares Tiangles,

Expanding to Macroscopic Scales, in Powers of

[4/π] or

Smilarly, Contracting to Microscopic Ones, in Powers of

[π/4],

Remain Unchangeable Unlimitedly, on the Basis that,

$$\pi = 4/[\sqrt{\tfrac{1}{2}(\sqrt{5}+1)}]$$

Finally, constructing "*by compass and ruler*" a Unit Square of side [1] or, Perimeter [4], defines its inscribed Unit Circle of Diameter [1] and Circumference

$$[4/[\sqrt{\tfrac{1}{2}(\sqrt{5}+1)}]].$$

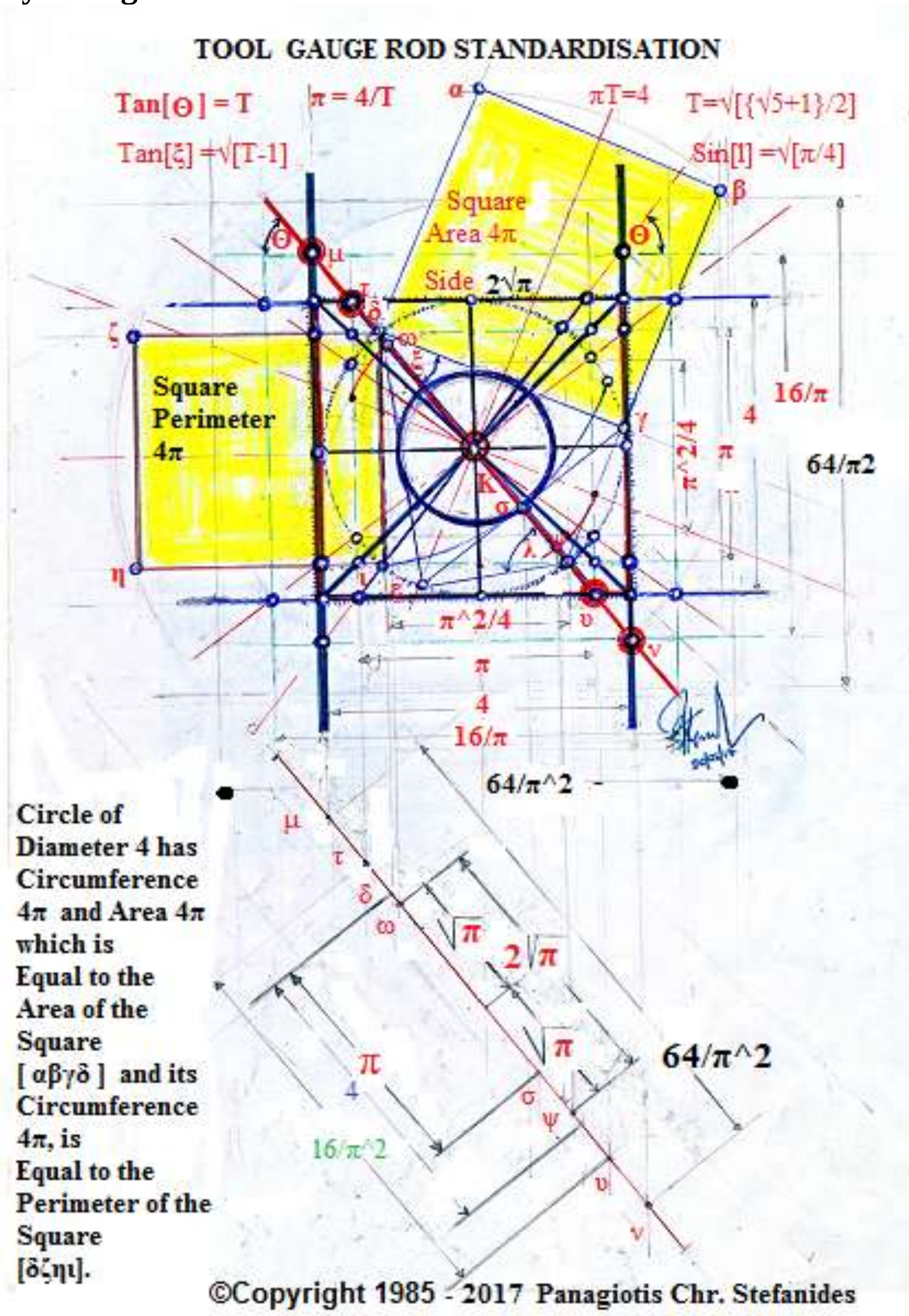
Discrepancies, or not, of the value of π indicate the

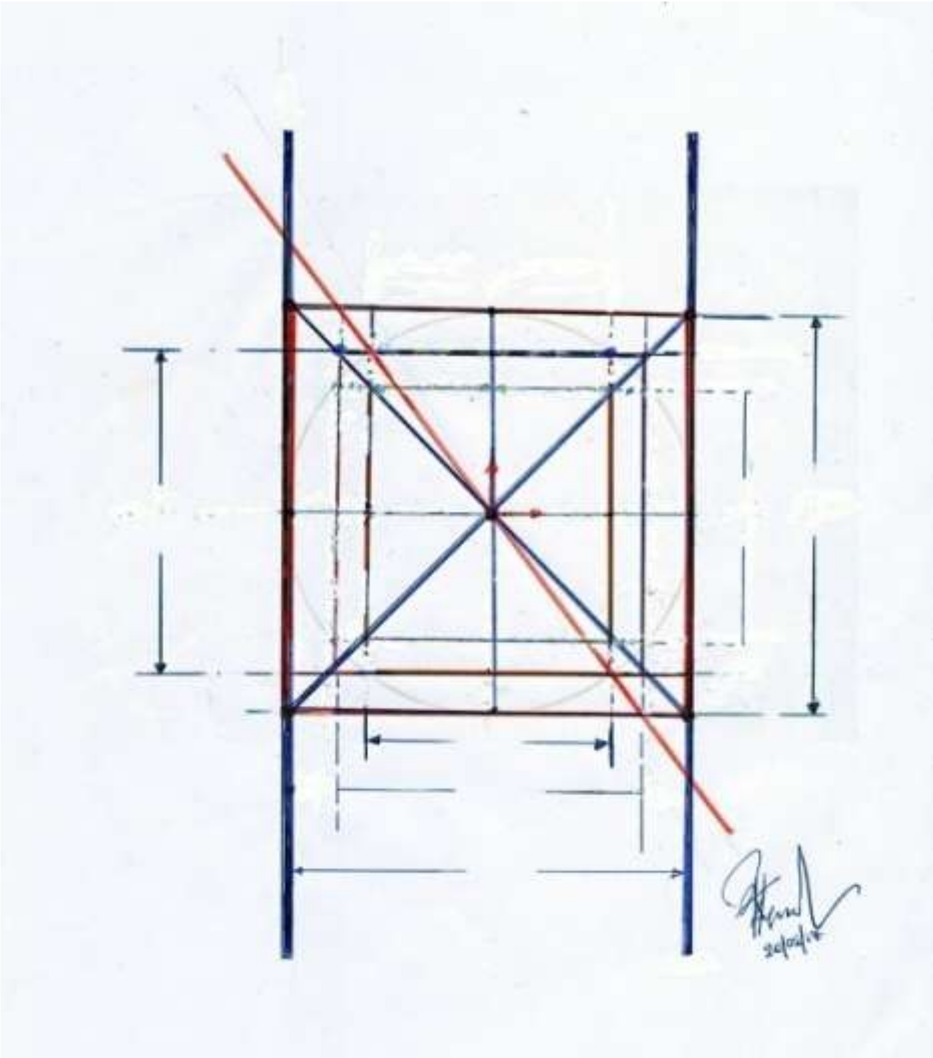
relevance of the title

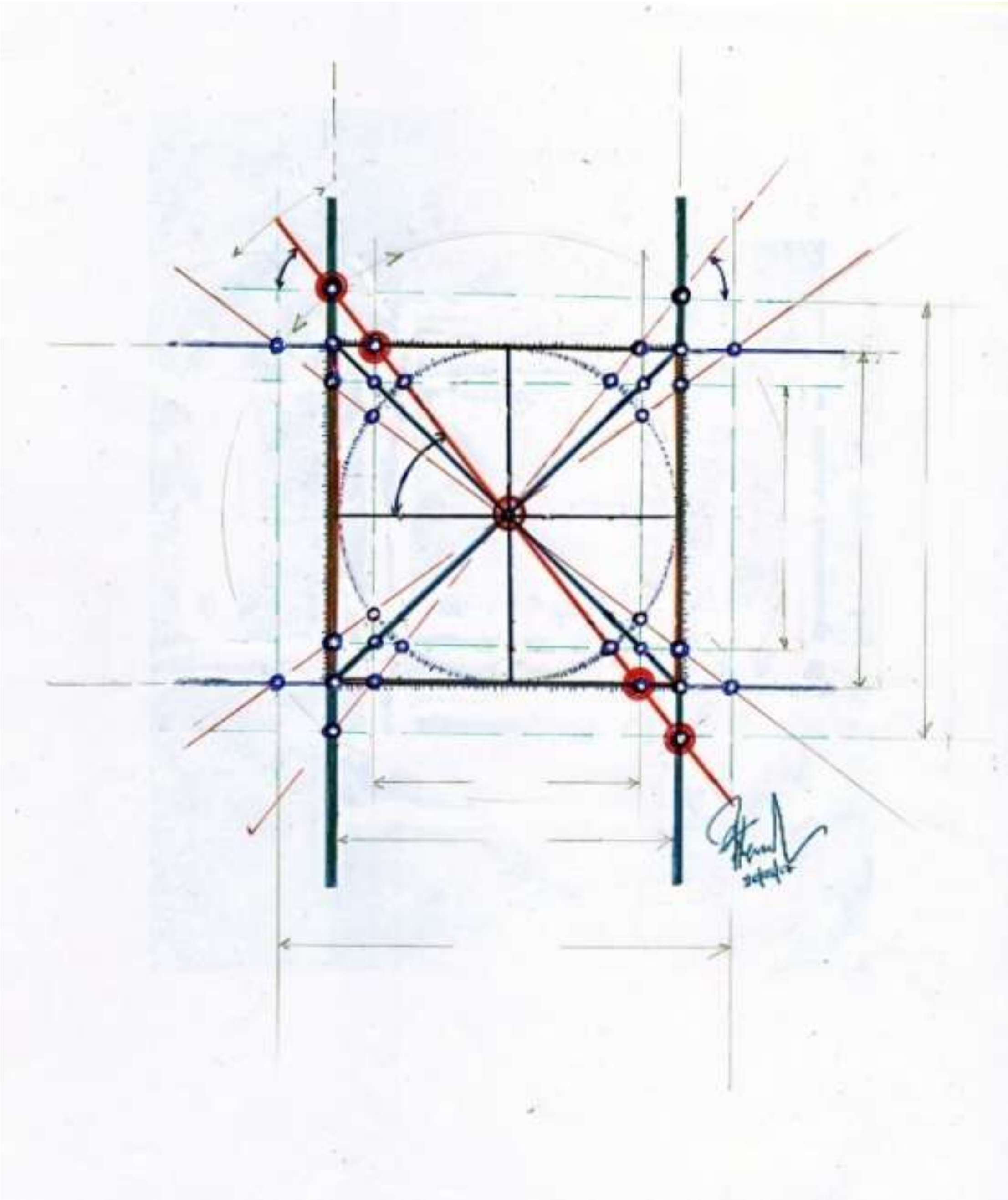
"HARMONY AND DISHARMONY"

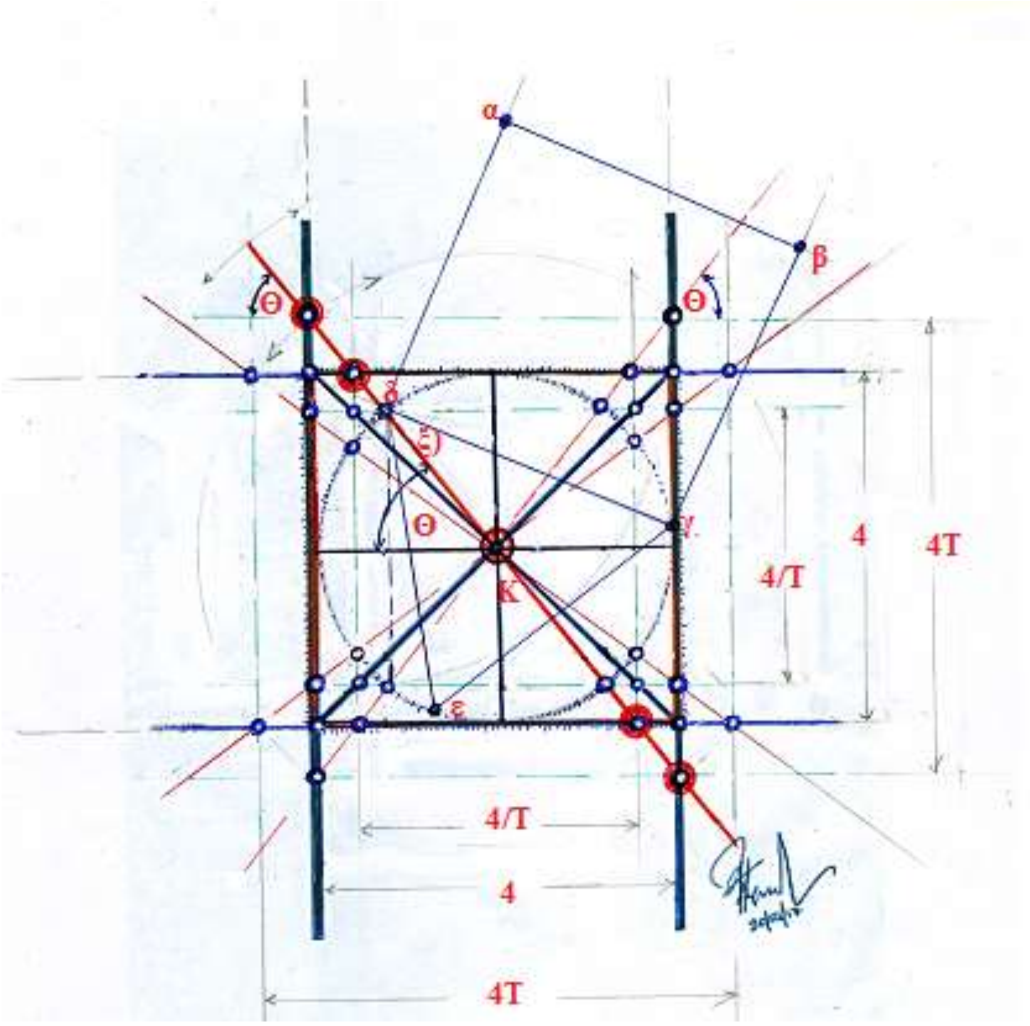
ADDENDUM 1

A TOOL TO DEMONSTRATE RELATIONSHIPS BETWEEN CIRCLE, SQUARE, TRIANGLE AND PARALLELOGRAMME
By Panagiotis Stefanides





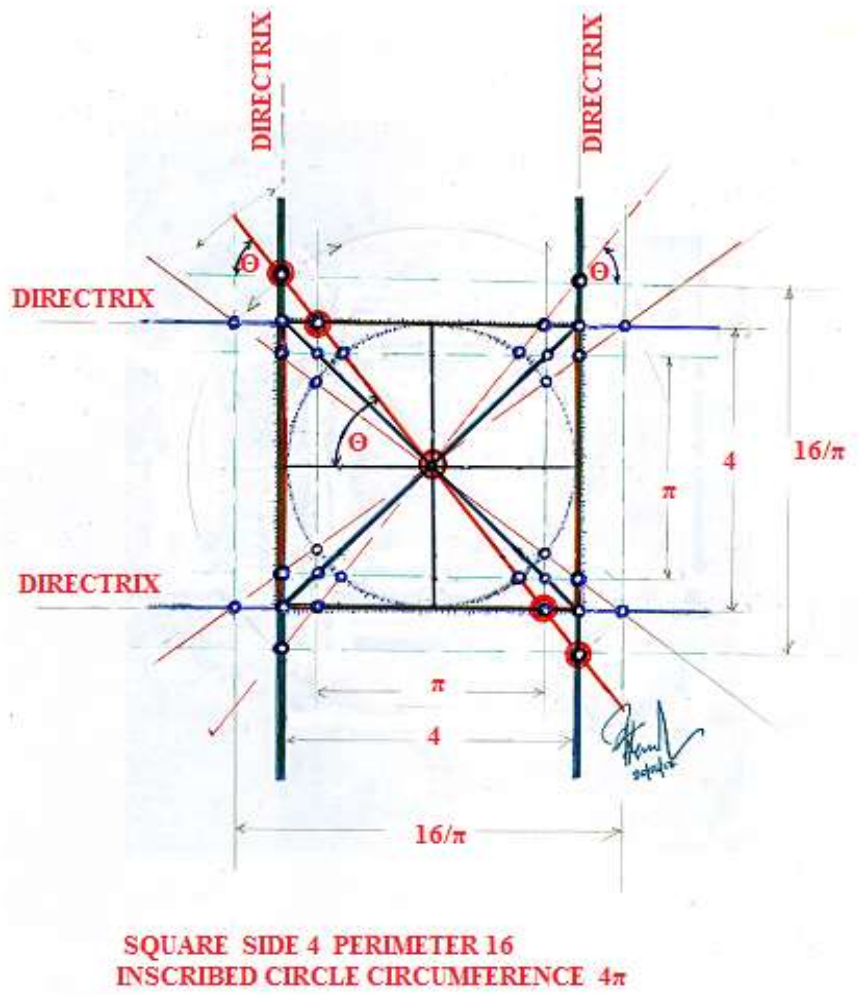




INSCRIBED CIRCLE IN SQUARE OF SIDE LENGTH 4 AND PERIMETER 16.

For π=4/T

Parallelogramme Base 4/T and Height 4, has Area 4[4/T] Equal to 16/T, Equal to Circle's Area which is Equal to Circle's Circumference 4[4/T]



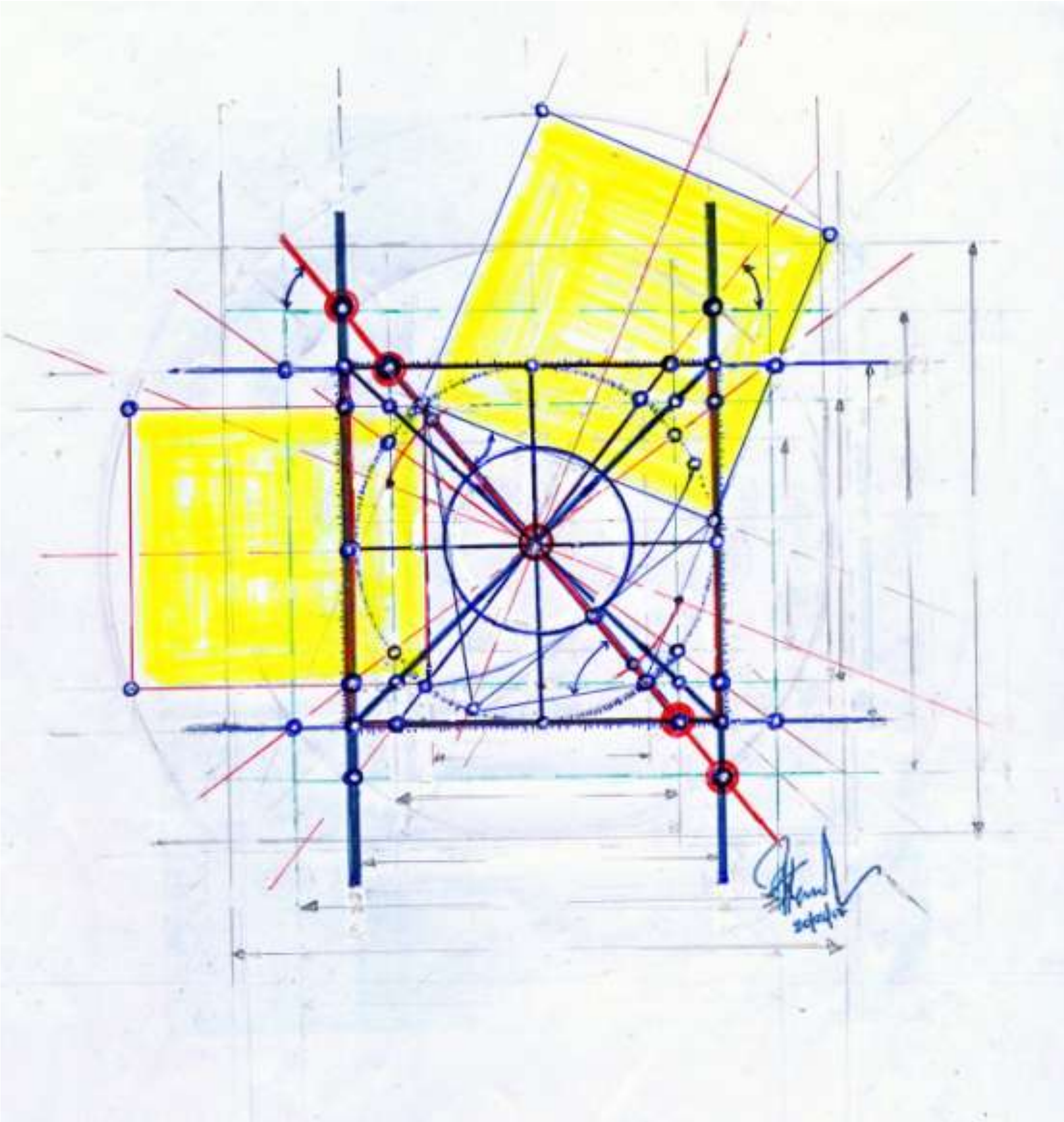
INSCRIBED CIRCLE IN SQUARE OF SIDE LENGTH 4 AND PERIMETER 16.

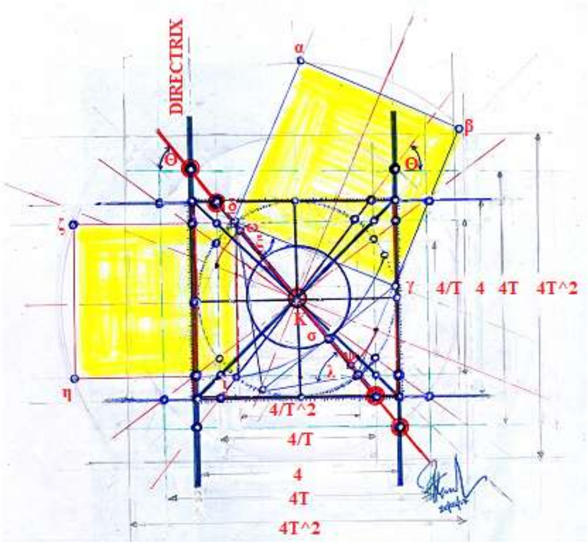
SQUARE'S PERIMETER TO CIRCLE'S CIRCUMFERENCE RATIO = $4/\pi$

Circle Area Equal 4π = Equal Circle's Circumference 4π.

SQUARE'S AREA TO CIRCLE'S AREA RATIO = $4/\pi$

Parallelogramme Base π and Height 4, has Area 4π Equal to Circle's Area 4π , which is Equal to Circle's Circumference 4π.





Angle Θ Drawn by Ruler and Compass According to:

http://www.stefanides.gr/Html/gmr.html
By Panagiotis Stefanides

Equation for π [Real, Irrational Roots of π^4 +16π^2 -256=0

For Condition that πT = 4 [T^4 -T^2 -1 =0]

Square Perimeter [δζηι] = 4π = 4[4/T] = 16/T]

Inscribed Circle[to square side 4] has Circumference Equal to 4π =4[4/T]=16/T

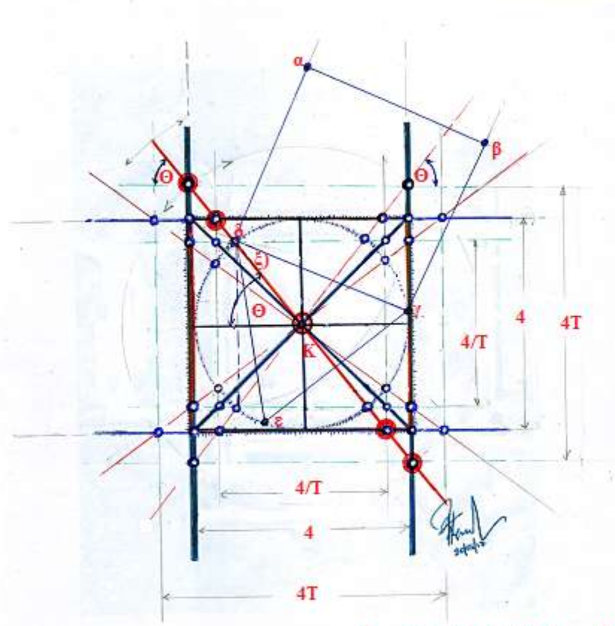
Square [αβγδ] Area = 4π [Applcation of Eucleidean Theorem]= = 4[4/T] = 16/T
Side Length [γδ] =[αβ] =[βγ] =[αδ] = SQRT[16/T] = = 2{SQRT[4/T]} = 2{SQRT[π]} shown on Red ROD as [ψω] and π =[ωσ].

RED ROD ALLOWED TO ROTATE ABOUR K, IN ORDER TO ACCOMPLISH PROGRAMMED TASKS WITH RESPECT TO THIS CONFIGURATION.
3D FLAT PRINTING IS ENVISAGED , WITH PIN HOLES, APPROPRIATELY LOCATING FOR MATCHING WITH ROD CORRESPONDING PINNING HOLES.
PINS MAY BE USED AS CONNECTING LINKS.
ROD, ACCORDINGLY PROVIDES CODIFIED INFORMATION WITH RESPECT TO LINEAR AND CIRCULAR LINEARITIES OBTAINED FROM THIS COMPOUND TOOL PACKAGE, WITH POSSIBLE USE IN EDUCATION.

SQUARES ARE IN RATIOS OF 4/π = 4[4/T] = T

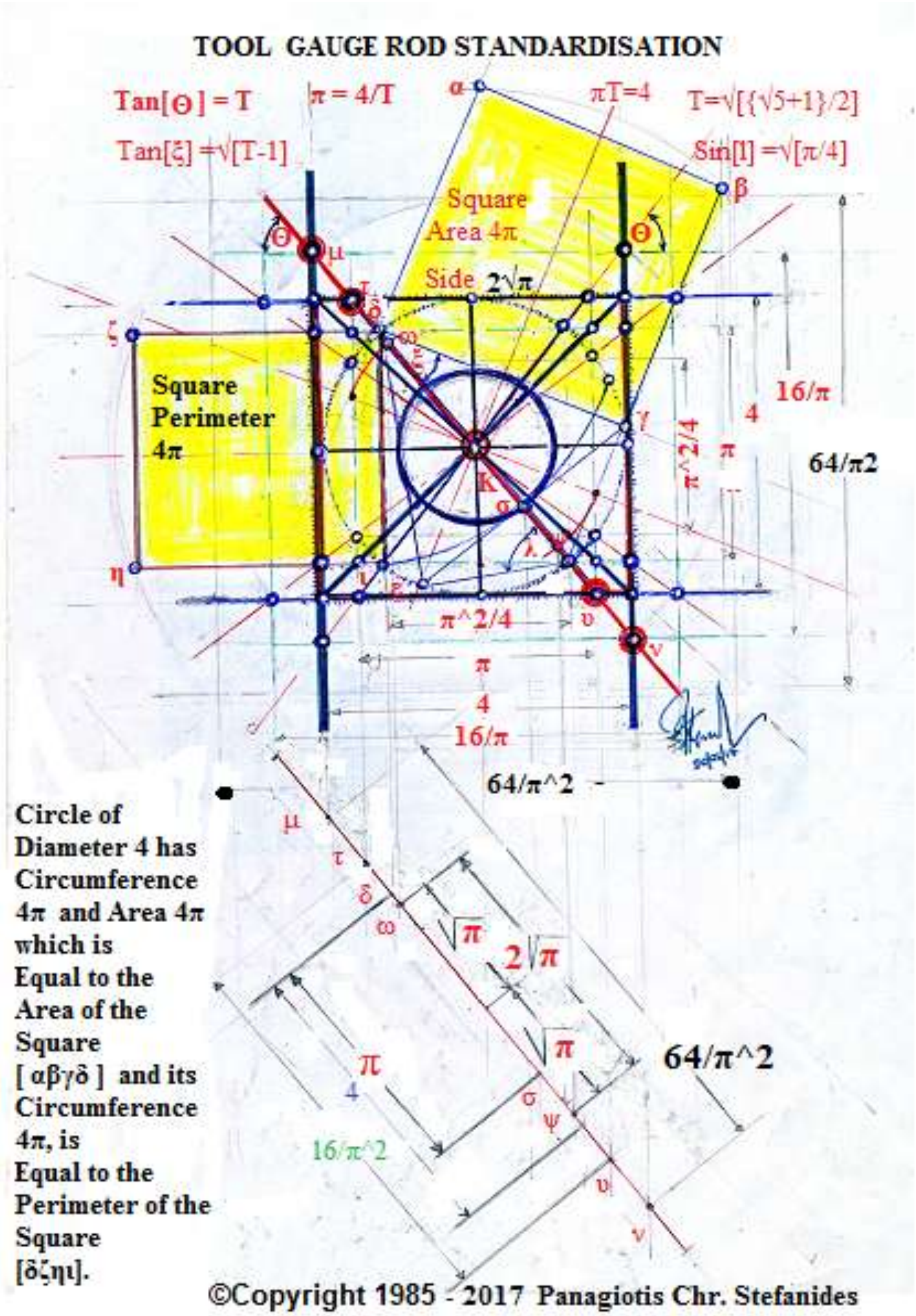
CONDITIONS OF GEOMETRIC CONFIGURATION

T = SQRT[Φ] = SQRT [{ SQRT(5) +1}/2], Tan[Θ]= T
4/T = π , 4/T^2 = [π^2]/4
4T =16/π, 4T^2 = 64/π^2
ξ+λ = 90 , Tan(ξ) = SQRT[T-1], ξ = 27.54451977 deg, , λ =62.45548023



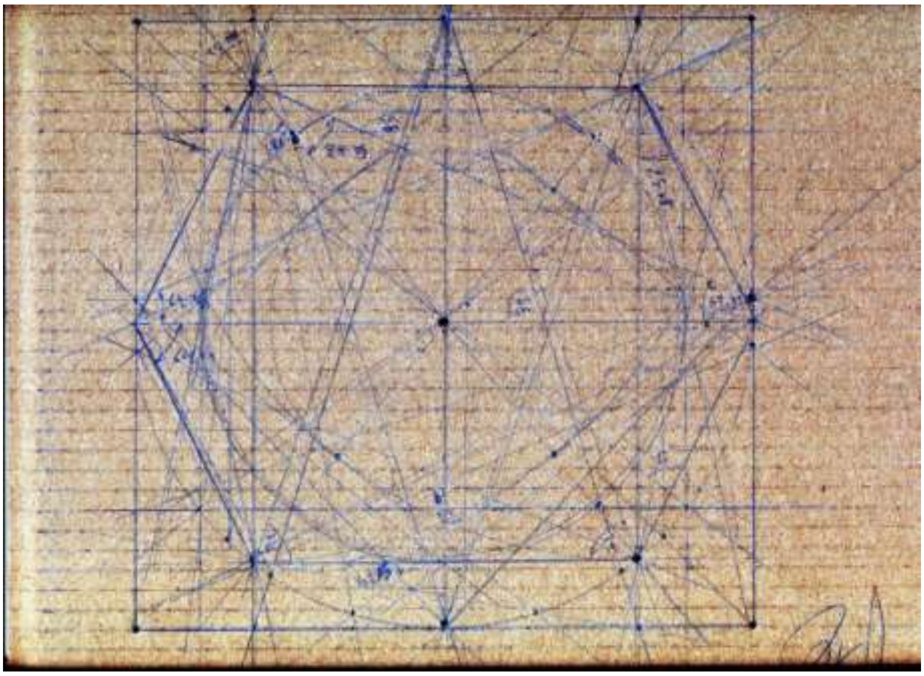
Tan(Θ) = T , Tan (ξ) = SQRT [T-1] Θ = 51.82729237 Deg. , ξ = 27.54451975 Deg.

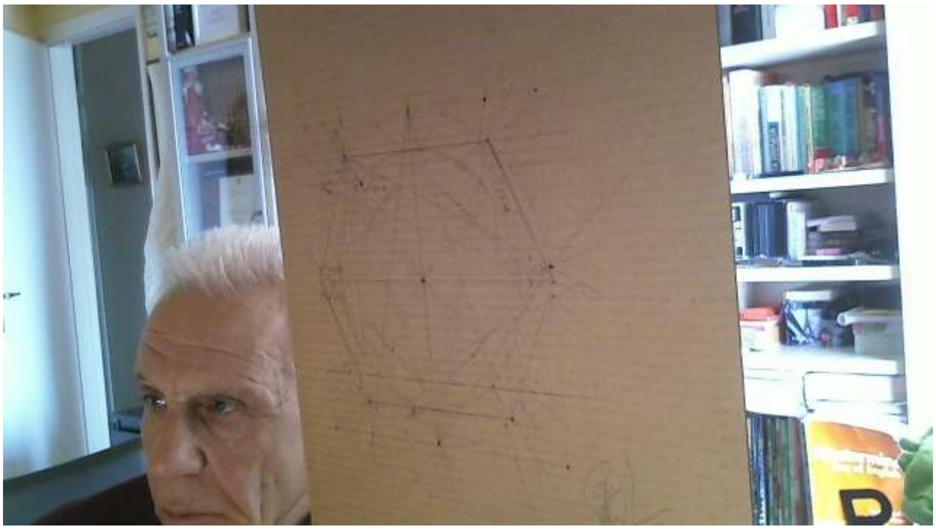
CIRCLE CIRCUMFERENCE = πD = 4π = 4[4/T] = 16/T
for π = 4/T
AREA OF CIRCLE = 4π = 16/T = AREA OF SQUARE [αβγδ] = [δγ]*[γβ] = 4π = 4[4/T] =16/T , = [δγ]=[γβ] = SQRT[16/T]


TOOL GAUGE ROD STANDARDISATION
Tan[Θ] = T
π = 4/T
πT=4
T=√[{√5+1}/2]
Tan[ξ] =√[T-1]
Sin[l] =√[π/4]
Square
Area 4π
Side 2√π
Square
Perimeter
4π
16/π
4
π
π^2/4
64/π2
π^2/4
π
4
16/π
64/π^2
Circle of
Diameter 4 has
Circumference
4π and Area 4π
which is
Equal to the
Area of the
Square
[αβγδ] and its
Circumference
4π, is
Equal to the
Perimeter of the
Square
[δζηι].
√π
2√π
√π
64/π^2
π
4
16/π^2
©Copyright 1985 - 2017 Panagiotis Chr. Stefanides

IMPORTANT DISCOVER

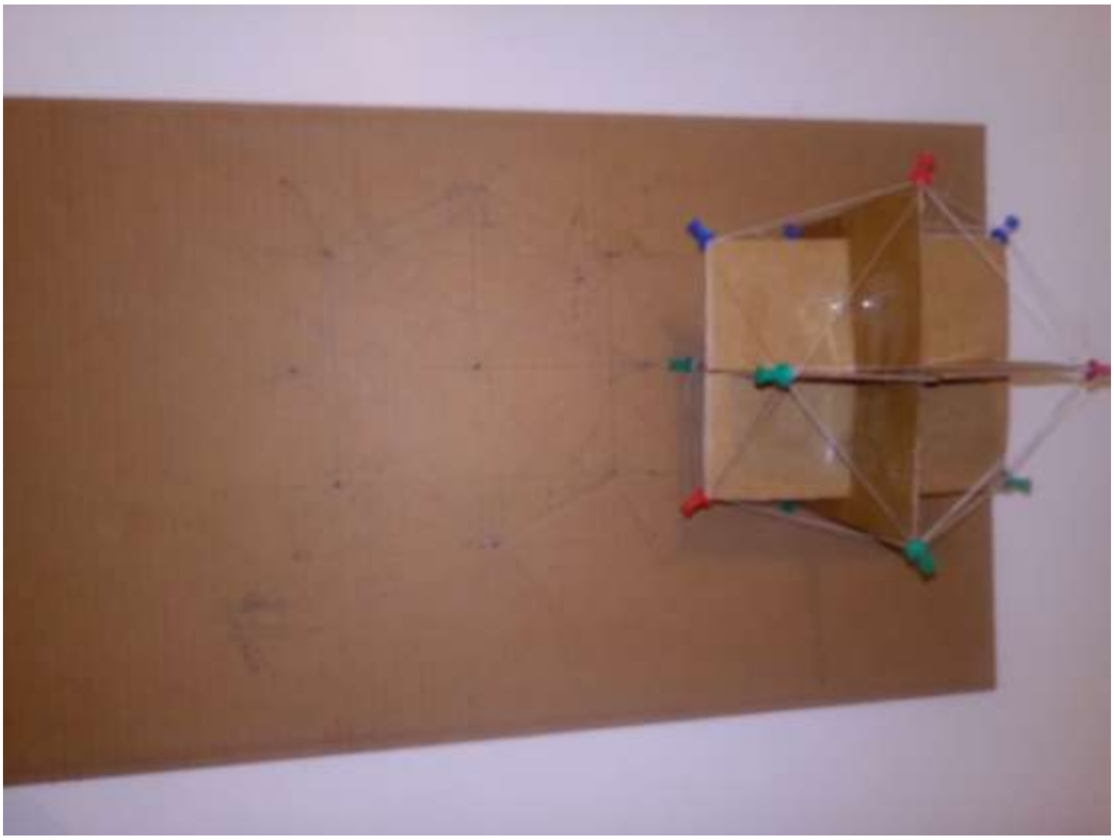
RESULTING RULER AND COMPASS CONFIGURATION, OF A VERY SPECIAL FORM, BASED ON THE SQUARE ROOT OF THE GOLDEN SECTION By Panagiotis Stefanides:





A NEW SOLID FORM CONSTRUCTED ON THE BASIS OF THE SQUARE ROOT OF THE GOLDEN SECTION By Panagiotis Stefanides

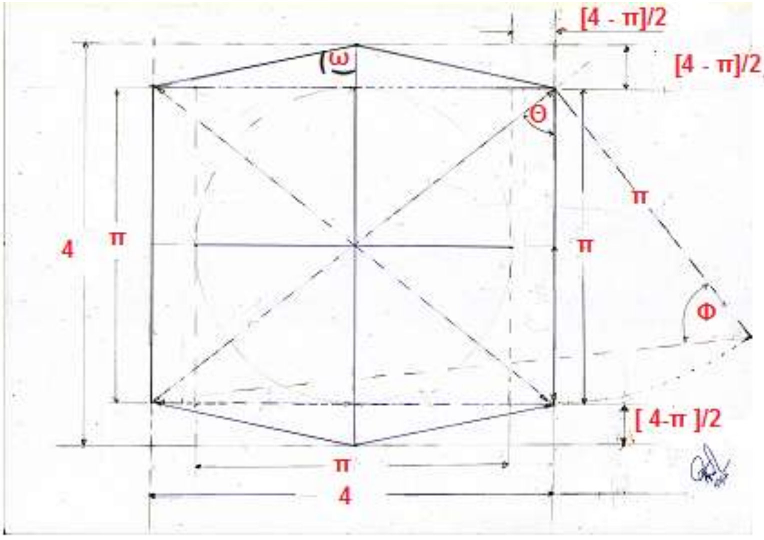
IMPORTANT INVENTION




FTE

GENERATOR POLYHEDRON OF PLATONIC- EUCLEIDEAN SOLIDS

By
Eur Ing Panagiotis Stefanides BSc(Eng)Lon(Hons)
MSc(Eng)NTUA CEng MIET
Chartered Engineer[UK]



INSCRIBED TO SQUARE OF PERIMETER 4π,
CIRCLE WITH CIRCUMFERENCE π^2

TAN[Θ] = 4/π, [for π= 4/T] , T = SQRT{[(SQRT(5) + 1]/2

TAN[Φ] = SQRT[4^2 + π^2]/π , [for π= 4/T]

T = 1.27201965.., Θ=51.82729237.. deg.

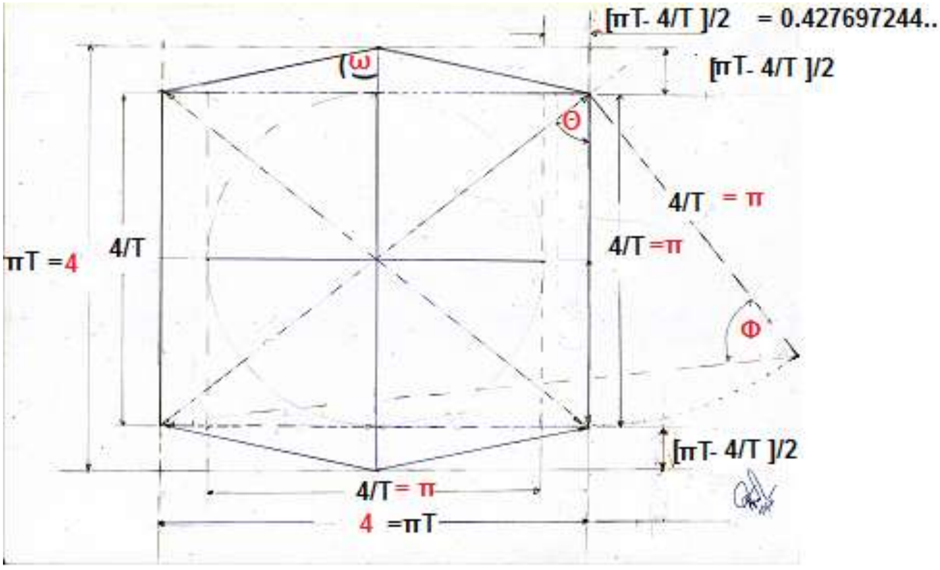
π = 3.14460551.. Φ = 58.28252559.. deg.

[4 - π]/2 = 0.427697244.. for π = 4/T

TAN [ω] = (4/2) / [4 - π] /2 = 4/ [4 - π] = 4.676205016..

ω = 77.92918912..deg., 90 - ω =12.07081088.. deg.

CONDITION THAT $\pi = 4/ [\sqrt{\frac{1}{2}(\sqrt{5}+1)}] = 3.14460551$



INSCRIBED TO SQUARE OF PERIMETER 4π, =4[4/T] =16/T
CIRCLE WITH CIRCUMFERENCE π^2

TAN[Θ] = 4/π, [for π= 4/T] , T = SQRT{[(SQRT(5) + 1]/2

TAN[Φ] = SQRT[4^2 + π^2]/π , [for π= 4/T]

T = 1.27201965.. , Θ=51.82729237.. deg.

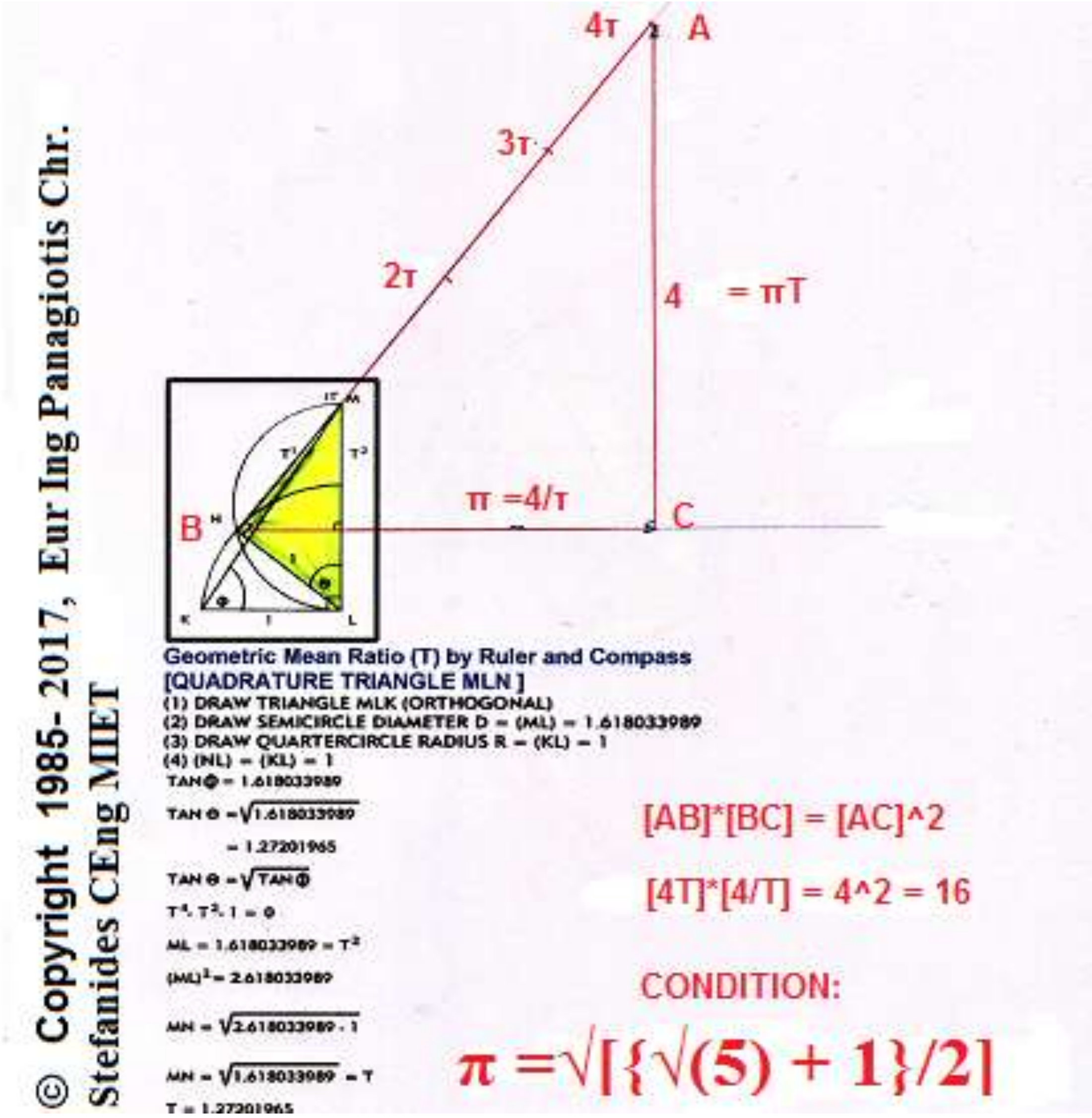
π = 3.14460551.. Φ = 58.28252559.. deg.

[4 - π]/2 = 0.427697244.. for π = 4/T 3.14460551..

TAN [ω] = (4/2) / [4 - π] /2 = 4/ [4 - π] = 4.676205016..

ω = 77.92918912..deg. , 90 - ω =12.07081088.. deg.

CONDITION THAT π =4/ [$\sqrt{\frac{1}{2}(\sqrt{5}+1)}$] = 3.14460551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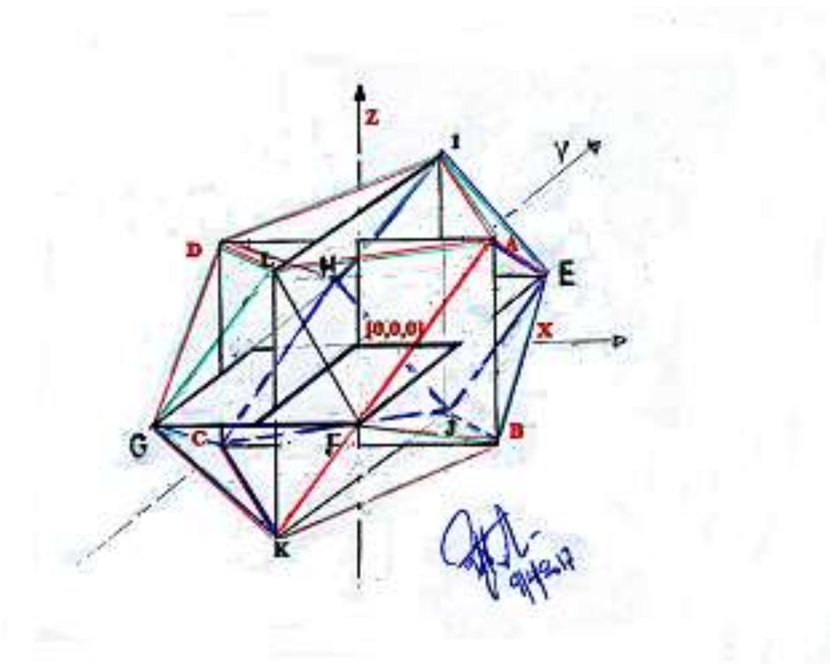
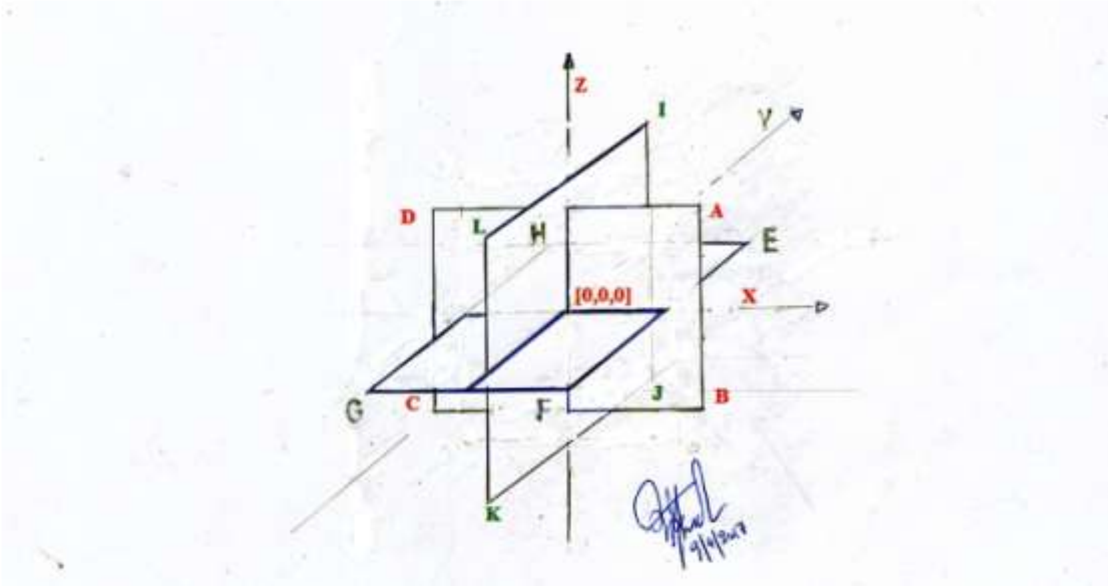
4τ
A
3τ
2τ
4
= πT
B
π =4/τ
C
K
L
Geometric Mean Ratio (T) by Ruler and Compass
[QUADRATURE TRIANGLE MLN]
(1) DRAW TRIANGLE MLK (ORTHOGONAL)
(2) DRAW SEMICIRCLE DIAMETER D = (ML) = 1.618033989
(3) DRAW QUARTERCIRCLE RADIUS R = (KL) = 1
(4) (NL) = (KL) = 1
TANΦ = 1.618033989
TAN Θ = √1.618033989
= 1.27201965
TAN Θ = √TANΦ
T⁴- T²- 1 = 0
ML = 1.618033989 = T²
(ML)² = 2.618033989
MN = √2.618033989 - 1
MN = √1.618033989 = T
T = 1.27201965
[AB]*[BC] = [AC]^2
[4T]*[4/T] = 4^2 = 16
CONDITION:
π =√[{√(5) + 1}/2]

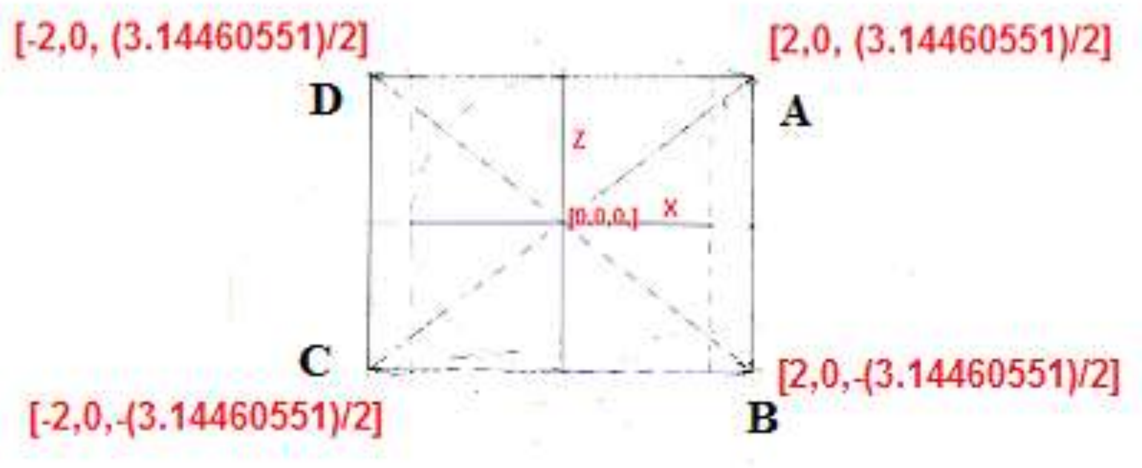
X-Y-Z COORDINATES' DEFINITION OF PLATONIC- EUCLEIDEAN SOLIDS' GENERATOR POLYHEDRON

By
Eur Ing Panagiotis Stefanides BSc(Eng)Lon(Hons)
MSc(Eng)NTUA CEng MIET
Chartered Engineer[UK]

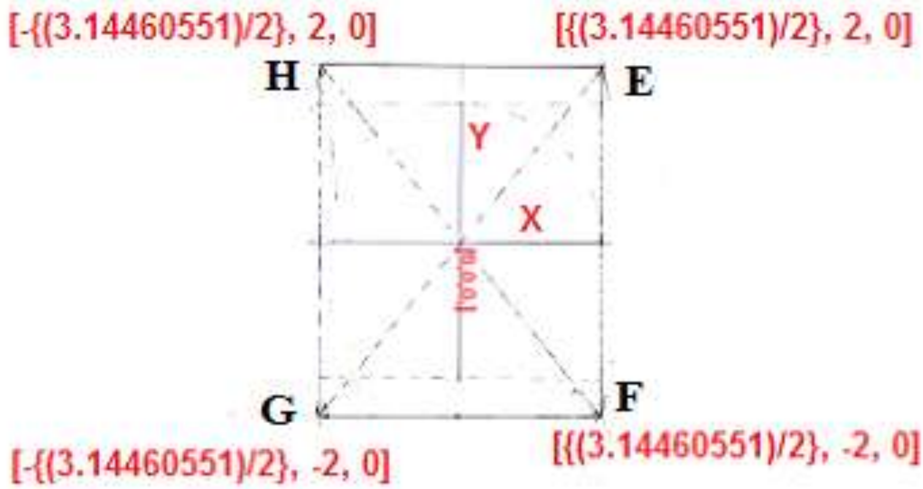




CONDITION THAT $\pi = 4/\left[\sqrt{\frac{1}{2}(\sqrt{5}+1)}\right] = 3.14460551$

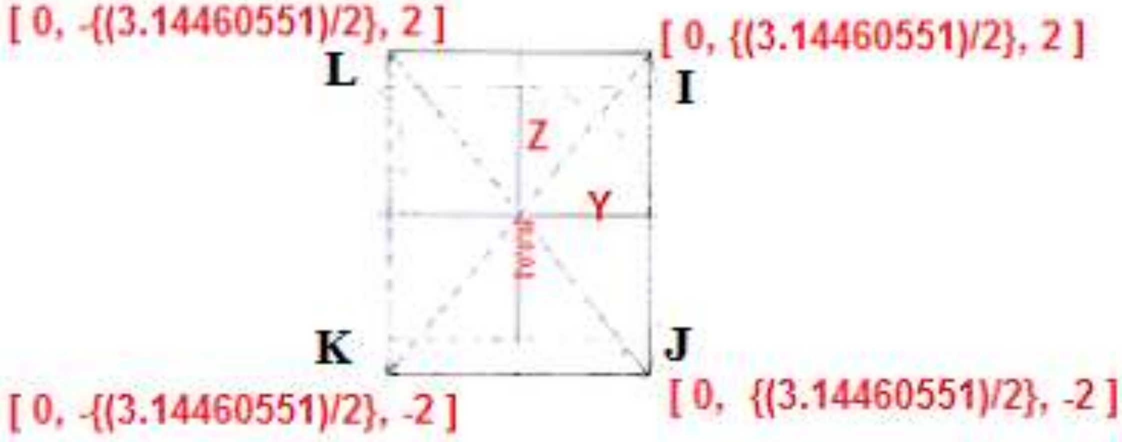


X-Z PLANE
GENERATOR POLYHEDRON



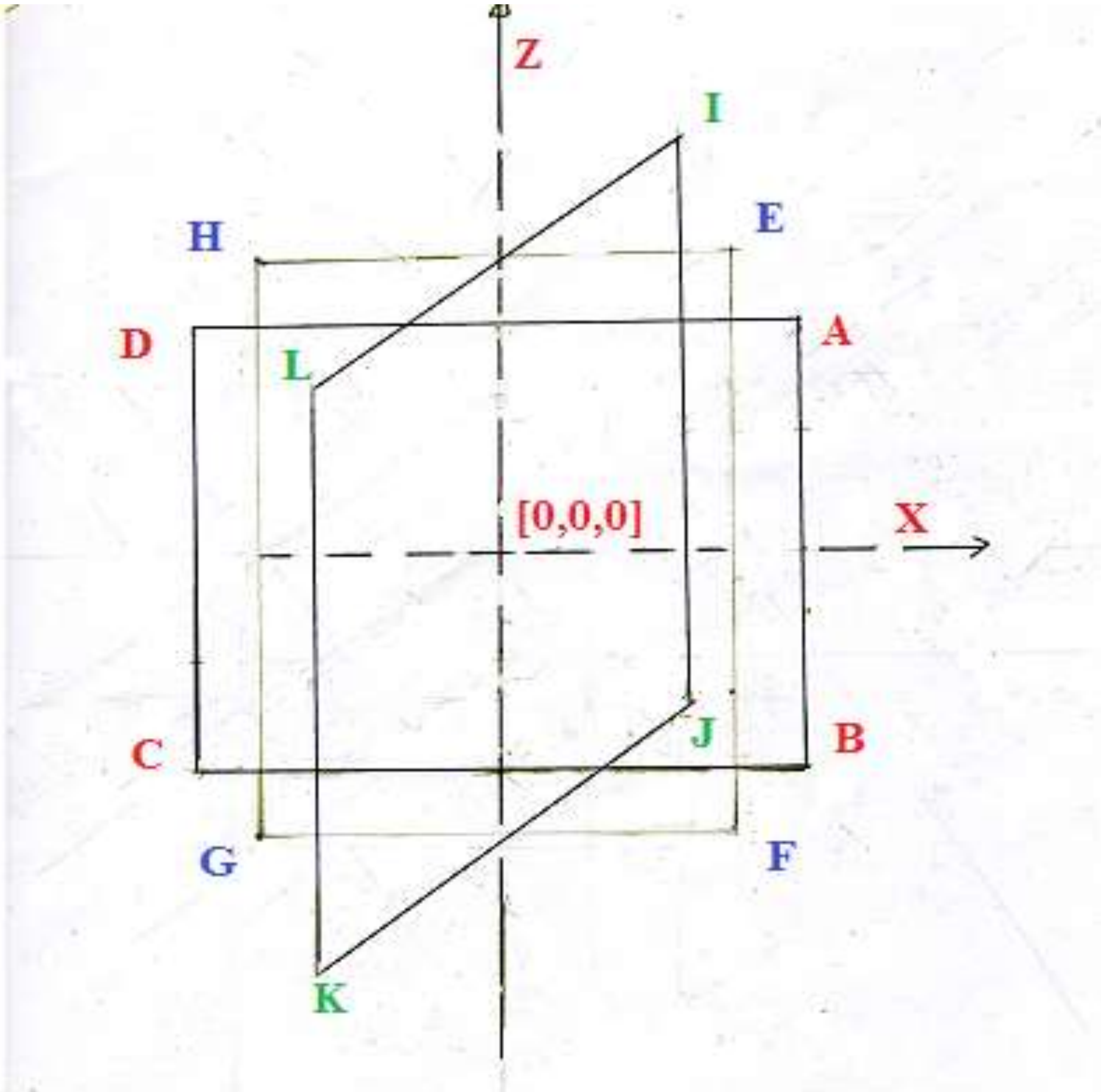
X - Y PLANE

GENERATOR POLYHEDRON



Y - Z PLANE

GENERATOR POLYHEDRON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[0,0,0]
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C
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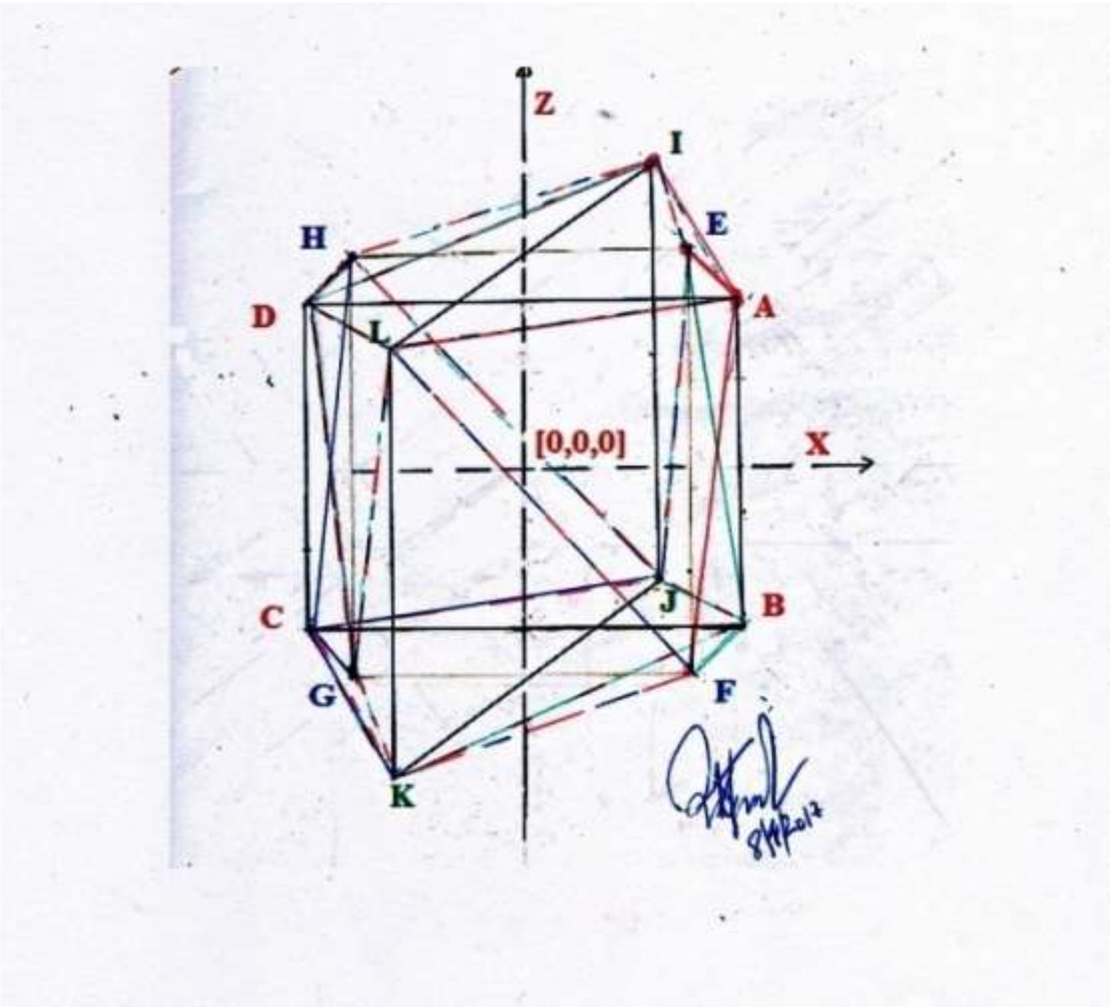
F
K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L
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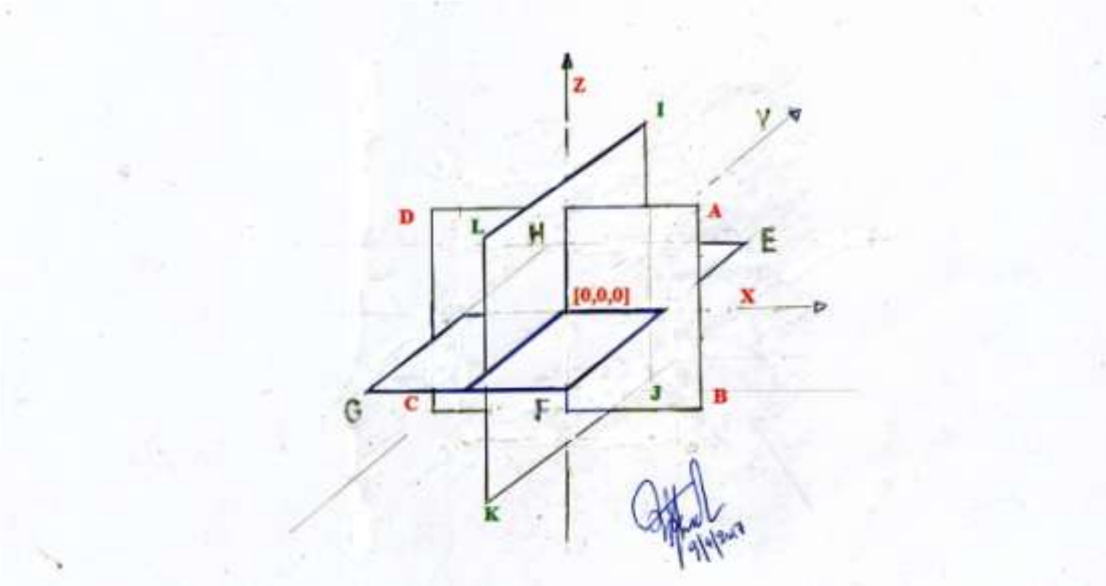
K



PLANES' VERTICES COMBINATIONS OF CONNECTIONS

AE, AF, AI, AL

BF, BK, BE, BJ

CK, CG, CH, CJ

DI, DL, DG, DH

IA, IE, ID, IH

JE, JH, JB, JC

KB, KC, KF, KG

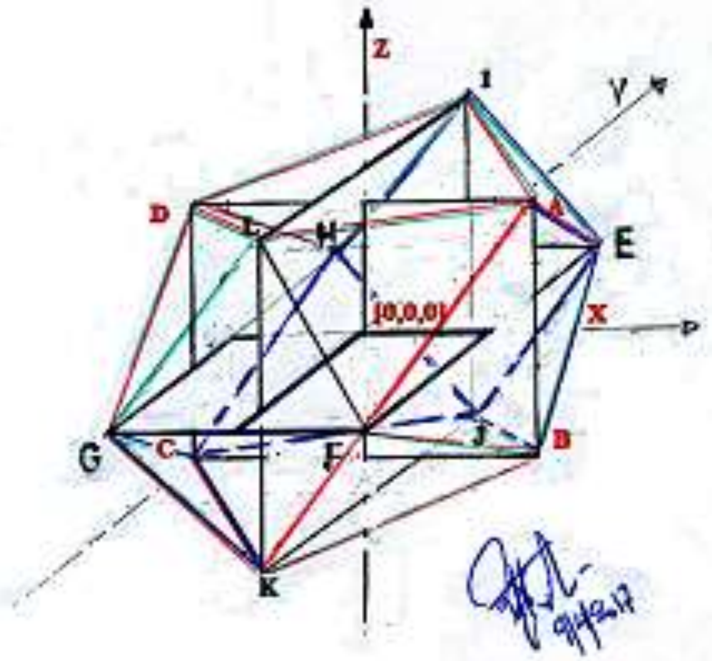
LA, LD, LF, LG

EA, EB, EI, EJ

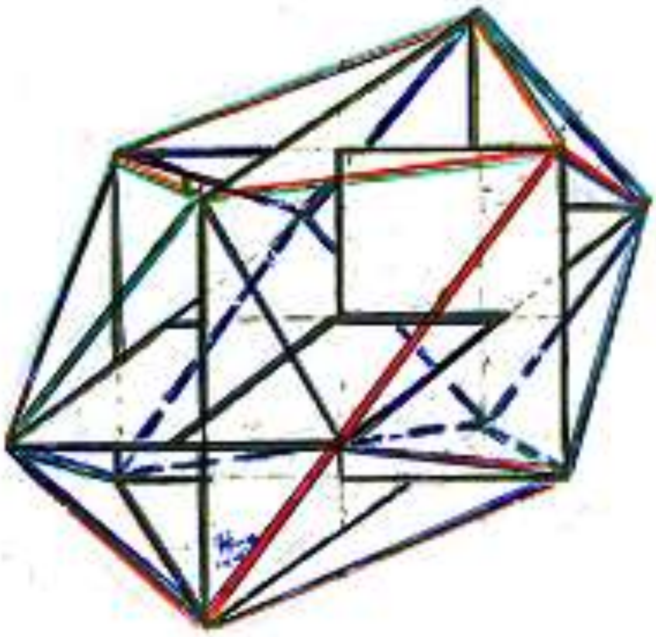
FA, FB, FK, FL

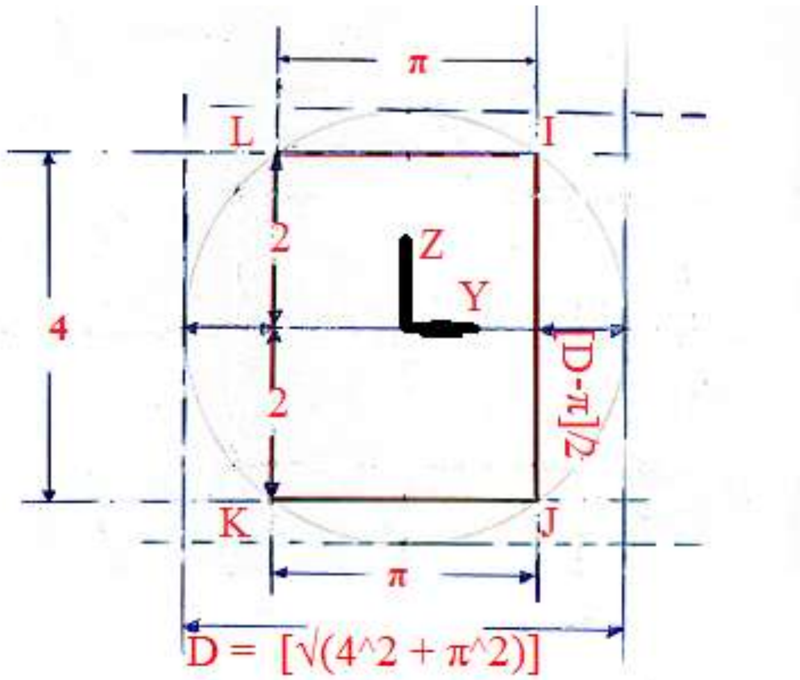
GK, GL, GC, GD

HC, HD, HI, HJ



https://www.researchgate.net/publication/315801180_GENERATOR_POLYHEDRON_OF_PLATONIC-EUCLEIDEAN_SOLIDS_By_Panagiotis_Stefanides_1A





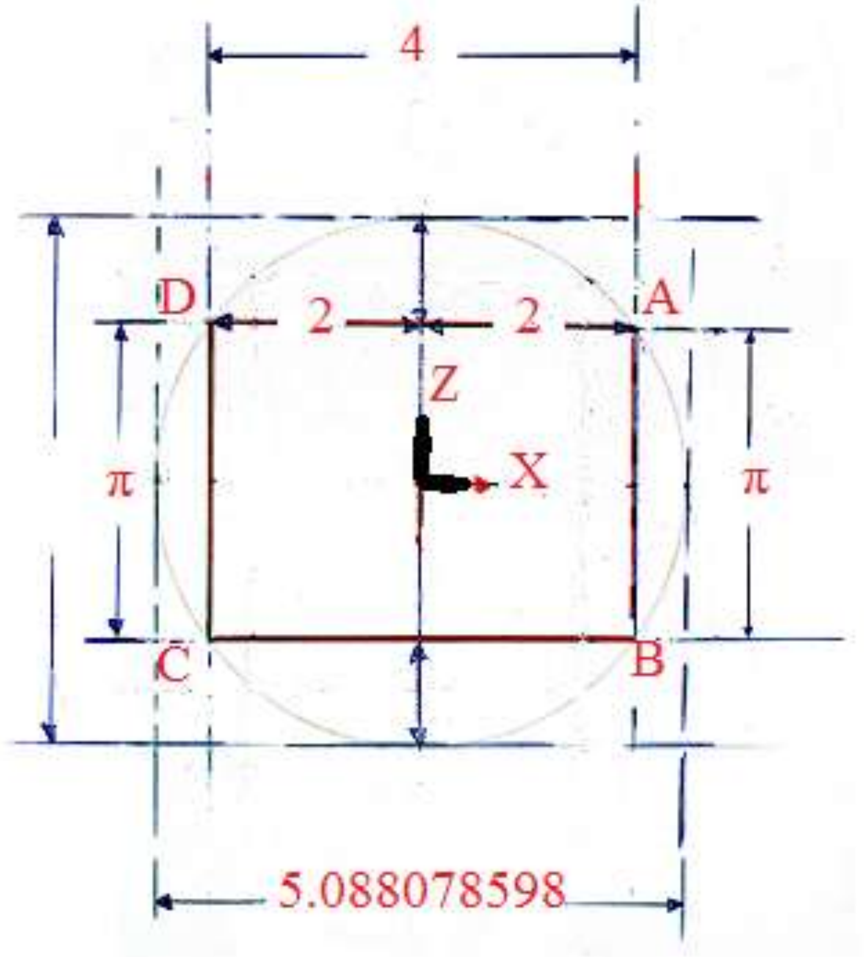
Y- Z PLANE

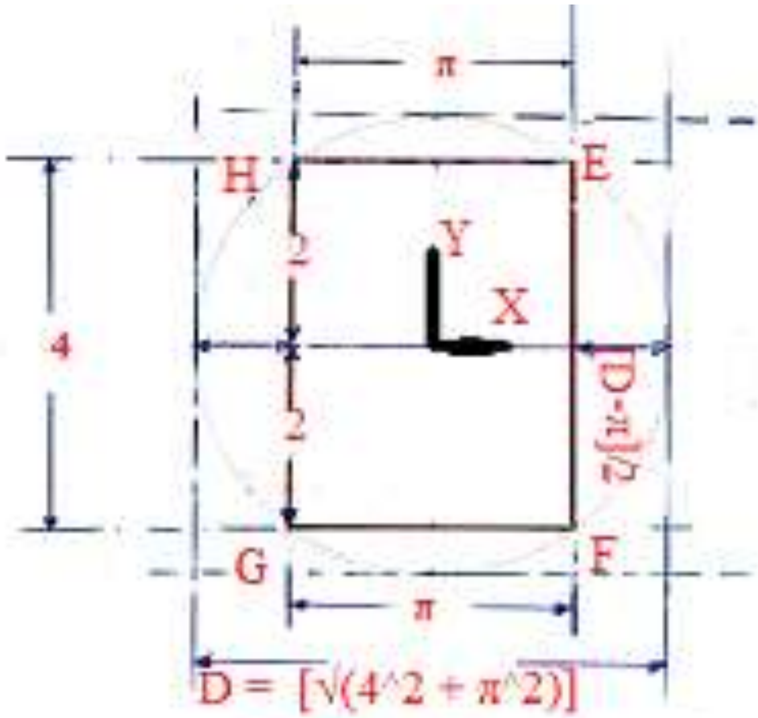
CONDITION THAT CIRCLE'S DIAMETER

$D = [\sqrt{(4^2 + \pi^2)}] = 5.088078598$, for $\pi =$

$\pi = 4/ [\sqrt{[\{\sqrt{(5)} + 1\}/2]} = 3.14460551$

$\{[D-\pi]/2\}*[\pi + \{[D-\pi]/2\}] = 2^2 = 4$


4
D
2
2
A
Z
X
π
π
C
B
5.088078598



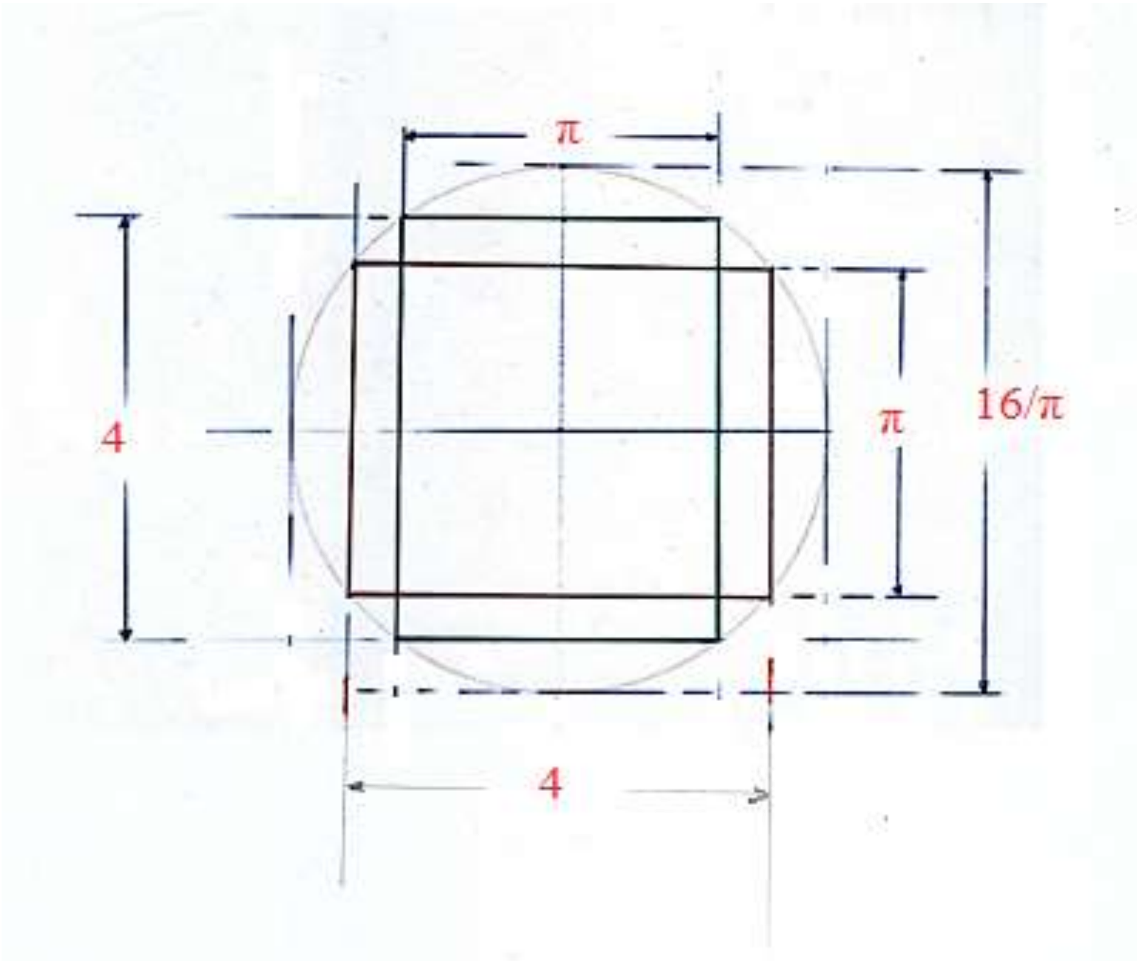
X-Y PLANE

CONDITION THAT CIRCLE'S DIAMETER

$D = [\sqrt{(4^2 + \pi^2)}] = 5.088078598$, for $\pi =$

$\pi = 4/ [\sqrt{[\{\sqrt{(5)} + 1\}/2]} = 3.14460551$

$\{[D-\pi]/2\}*[\pi + \{[D-\pi]/2\}] = 2^2 = 4$



CONDITION THAT $\pi = 4/\left[\sqrt{\frac{1}{2}(\sqrt{5}+1)}\right] = 3.14460551$

$\alpha = \sqrt{ \{ [(4-\pi)/2]^2 + 2^2 \} } = 2.045220021$

$\beta = [4-\pi]/2 = 0.427697244$

$\gamma = \sqrt{[\alpha^2 + (\pi/2)^2]} =$

$= 2.579740469$

CONDITION

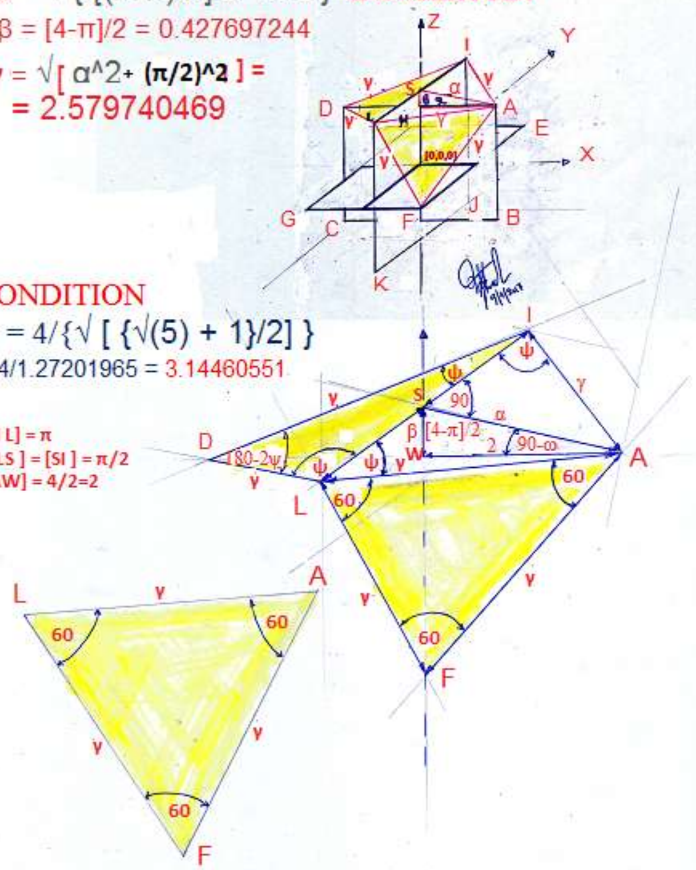
$\pi = 4/\{\sqrt{[\{\sqrt{(5)} + 1\}/2]} \}$

$= 4/1.27201965 = 3.14460551$

[I L] = π

[LS] = [SI] = π/2

[AW] = 4/2=2



$\alpha = \sqrt{ \{ [(4-\pi)/2]^2 + 2^2 \} } = 2.045220021$

$\text{Tan}[\psi] = \alpha/(\pi/2) = (2.045220021)/(1.572302757) = 1.300780027$

$\Psi = \text{ArcTan}[1.300780027] = 52.44801593$ deg.

$2\psi = 104.8960319$ deg.

$[180 - 2\psi] = 75.10396814$ deg.

$\text{Tan}[\omega] = 2/[(4-\pi)/2] = 4.676205016$

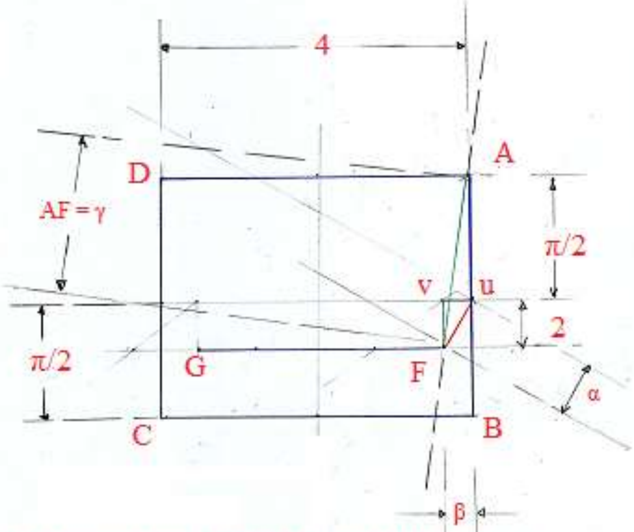
$\omega = \text{ArcTan}[4.676205016] = 77.92918912$ deg.

$[90-\omega] = [90 - 77.92918912] = 12.07081088$ deg.

$2\omega = 155.8583782$ deg.

$[180 - 2\omega] = 24.14162176$ deg.

β= [4-π]/2 = 0.427697244 = uv, vF = 2 , uF = a =2.045220021, Au = π/2 , AF =2.579740469 = γ



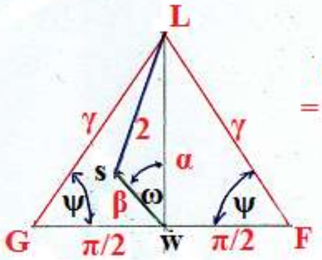
a^2 = [uF]^2 = [vu]^2 +2^2 = β^2 + 2^2 = [(4-π)/2]^2 +4
α = 2.045220021

[AF] ^2 = [Au]^2 + [uF]^2
= [π/2]^2 + [a]^2 = 2.579740469

[vF]/[vu] = 2/β = 2/ 0.427697244= 4.676205021 = Tan [ω], ω =77.92918914 deg.

[Fu]/[Au] = α/ [π/2] = 2.045220021 / 1.572302756 = 1.300780027 =Tan[ψ] , ψ =52.44801593 deg.

CONDITION THAT $\pi = 4/[1.27201965] = 3.14460551$



$Gw = wF = \pi/2 =$
$= 1.572302756$

$Tan[\psi] = \alpha/[\pi/2] = 1.300780027$

$\psi = 52.44801593$ deg.

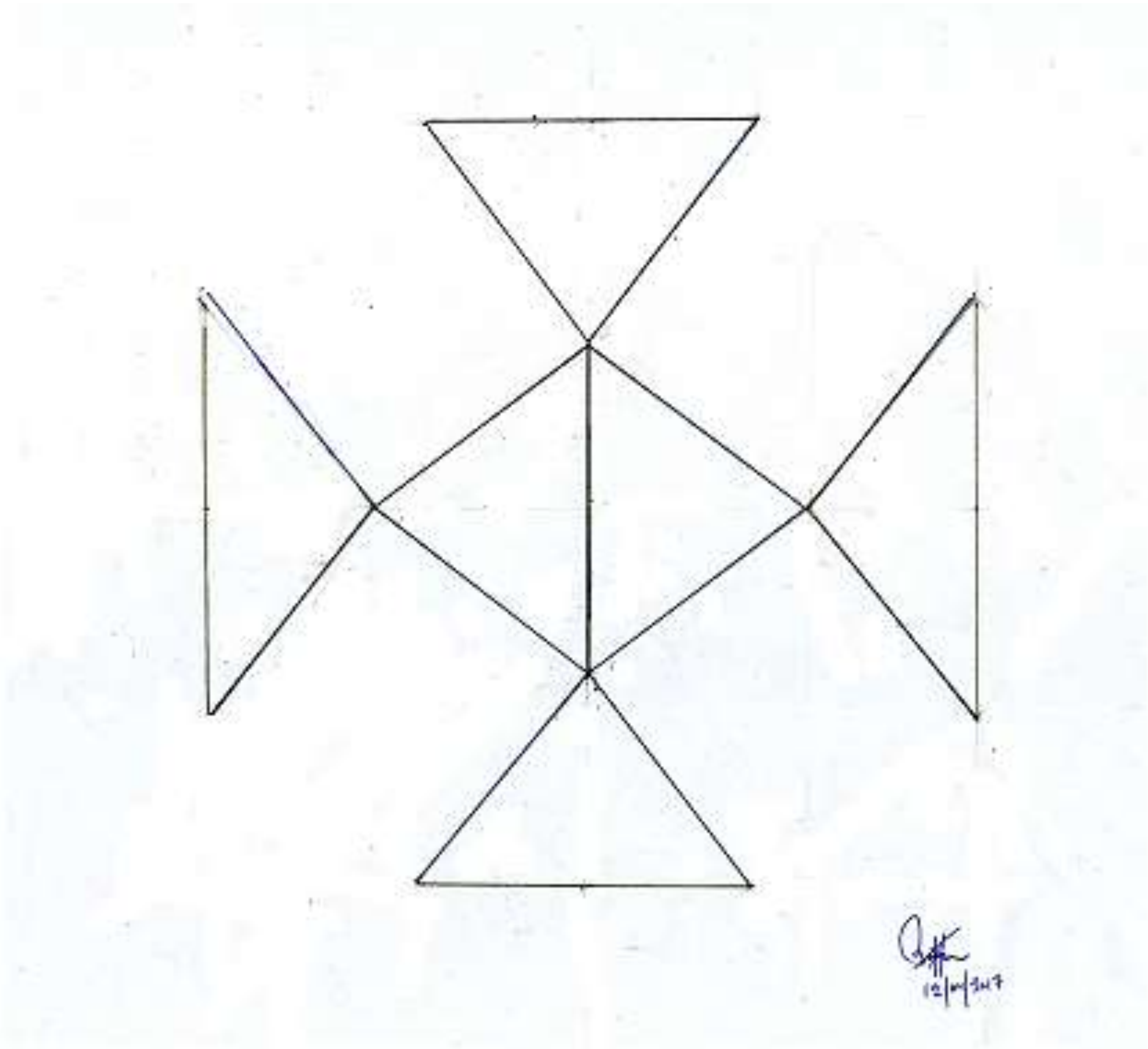
$Tan[\omega] = 2/\beta = 2/0.427697244 =$
$= 4.676205016$

$\omega = 77.92918914$ deg.

$\beta = [4-\pi]/2 = 0.427697244$

$Lw = 2.045220021 = \alpha$

$GL = 2.579740469 = \gamma$



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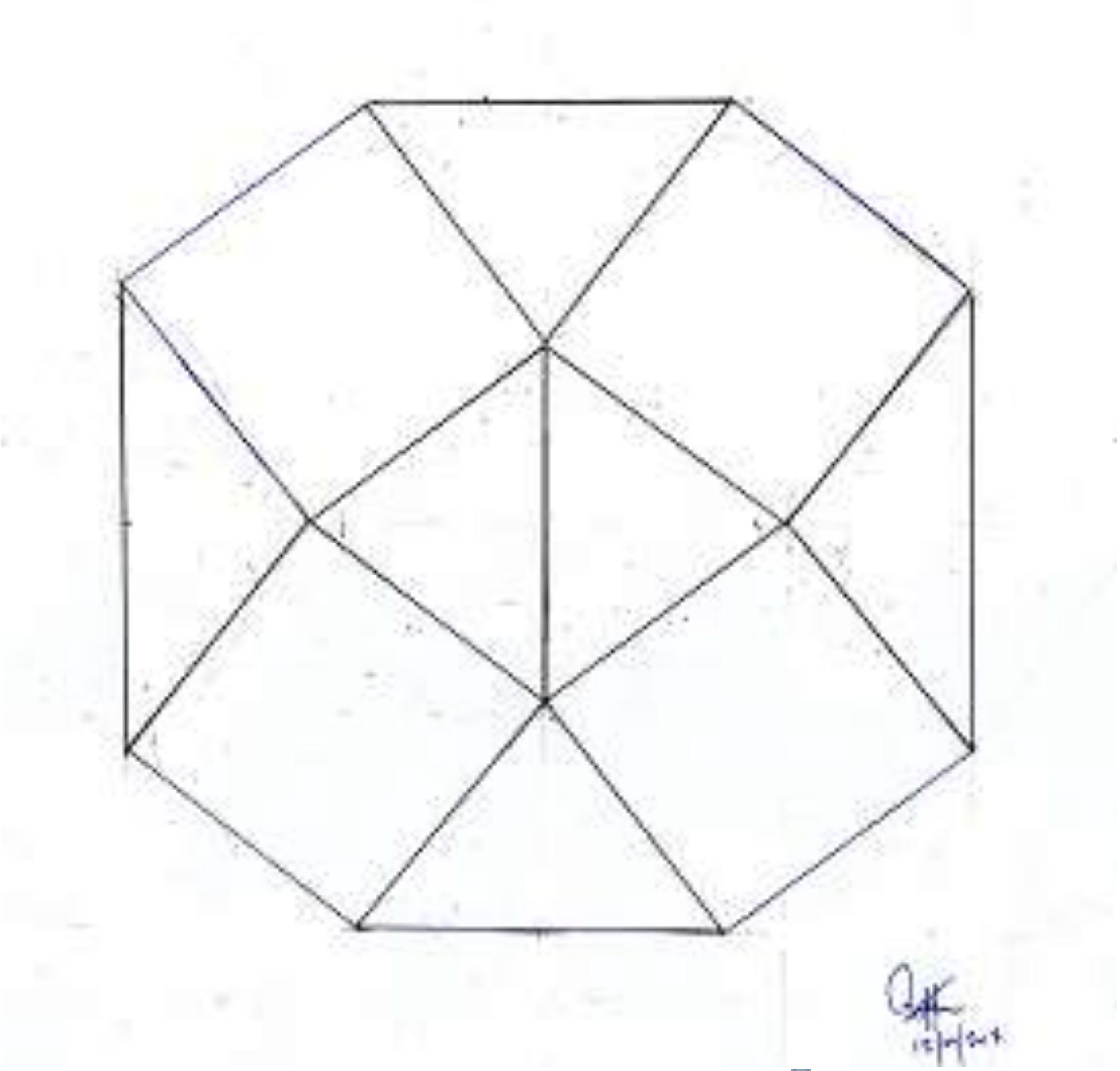

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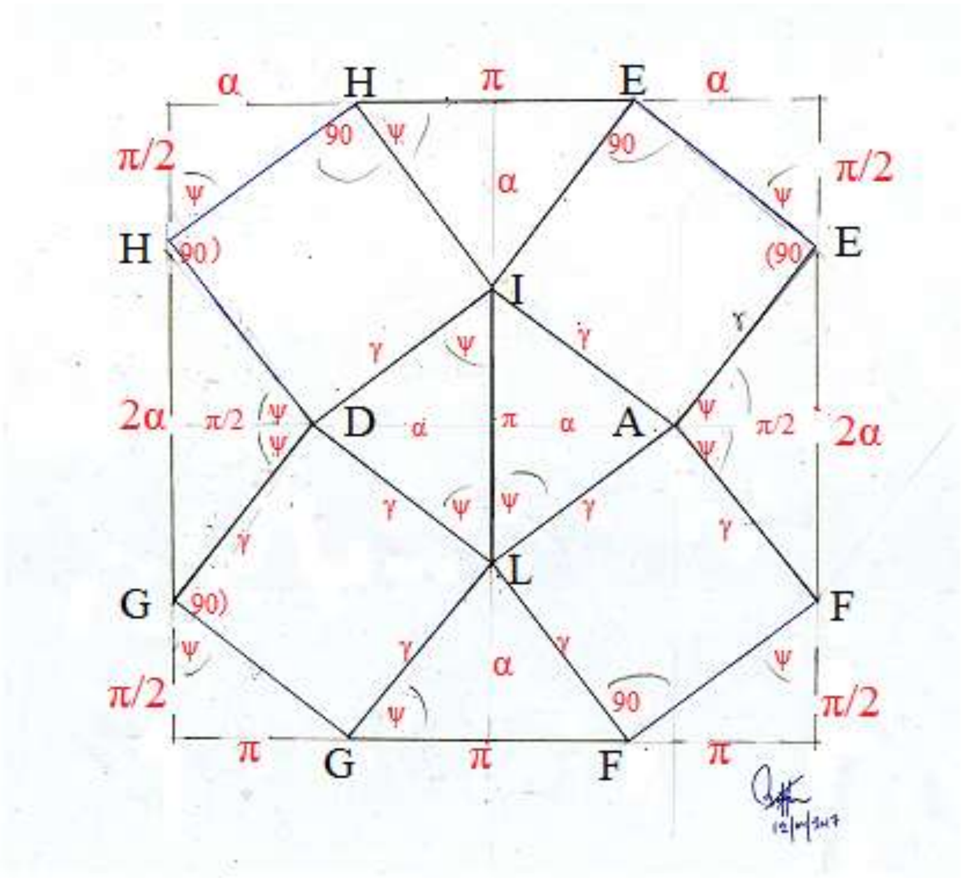
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G
90
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π

ADDENDUM 2

Important Discovery

RULER AND COMPASS STRUCTURING OF DODECAHEDRON
PENTAGON By Panagiotis Stefanides

For π = **4/ SQRT(Golden Ratio)**

From the geometry of the "GENERATOR POLYHEDRON", we find relationships:

3 parallelegrammes vertical to each-other. Sides' lengths, of each parallelogramme, are in ratio

of 4/π = 1.27201965 [for π = 3.14460551 i.e. 4/ SQRT(Golden Ratio)].

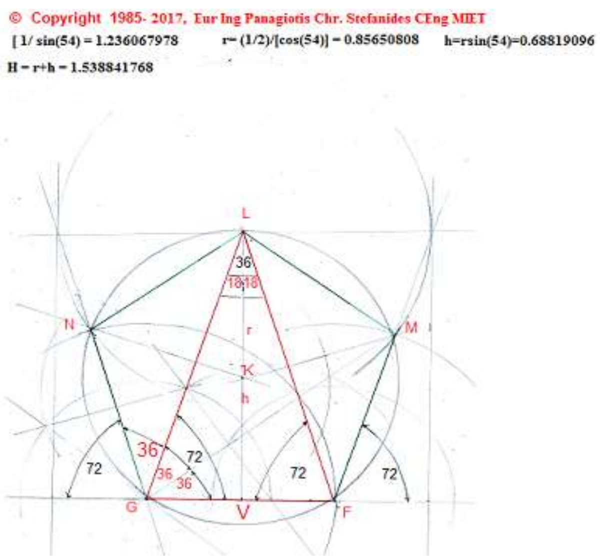
[4/2]/ [π/2] =[π/2]/ x, x = {[π/2]^2}/[4/2] = 2.472135953/2 = 1.236067977 = 1/ [Sin (54)] = x

This is directly Related to the Pentagon Angle of 54 Deg:

1/Sin(54) = 1.236067978

r/h = { [½]/Cos(54)}/ rSin(54) = 0.850650808 / 0.68819096 = 1.236067977

1/Sin(54) = 1.236067978



Sum of
angles : 36+36+36+72 = 180 Deg.
Angle VGN = 3*36 = 108 Deg. 108/2= 54 Deg
r = [½]/Cos(54) = 0.850650808 , h = rSin(54) = 0.68819096
r/h = r/rSin(54) =1/Sin(54) =1.236067978

r/h = { [½]/Cos(54)}/ rSin(54) = 0.850650808 / 0.68819096 = 1.236067977

1/Sin(54) = 1.236067978

From the geometry of the "GENERATOR POLYHEDRON", we find relationships:

3 parallelegrammes vertical to each-other. Sides' lengths, of each parallelogramme, are in ratio of 4/π = 1.27201965   [for π = 3.14460551   i.e. 4/ SQRT(Golden Ratio)].

[4/2]/ [π/2] =[π/2]/ x,   x = {[π/2]^2}/[4/2] = 2.472135953/2 = 1.236067977 = 1/ [Sin (54)] = x

[1/Cos 72] =1/ 0.09016994 = 3.236067978 ,   [1/Cos 72]+ 1 = 4.236067978 = CUBE of

1.618033989 [structuring the ICOSAHEDRON and DODECAHEDRON].

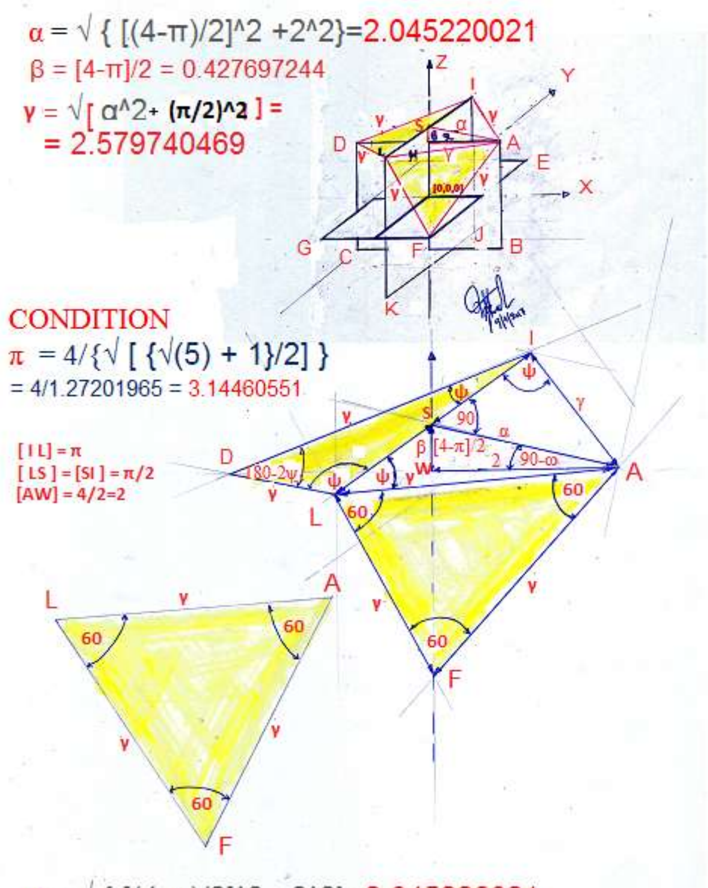
1.618033989 = SQRT[2.618033989 structurin the DODECAHEDRON] and its ROOT = 1.27201965 [structuring the GENERATOR POLYHEDRON].

The relationships, above, demonstrate "Roots Structuring the Platonic-Eucleidean Polyhedra"

https://www.linkedin.com/pulse/generator-polyhedron-platonic-eucleidean-solids-panagiotis-stefanides

GENERATOR POLYHEDRON OF PLATONIC-EUCLEIDEAN SOLIDS By Panagiotis Stefanides 1A

https://www.researchgate.net/publication/315801180_GENERATOR_POLYHEDRON_OF_PLATONIC-EUCLEIDEAN_SOLIDS_By_Panagiotis_Stefanides_1A



$\alpha = \sqrt{ [(4-\pi)/2]^2 + 2^2} = 2.045220021$

$\tan[\psi] = \alpha/(\pi/2) = (2.045220021)/(1.572302757) = 1.300780027$

$\Psi = \text{ArcTan}[1.300780027] = 52.44801593$ deg.

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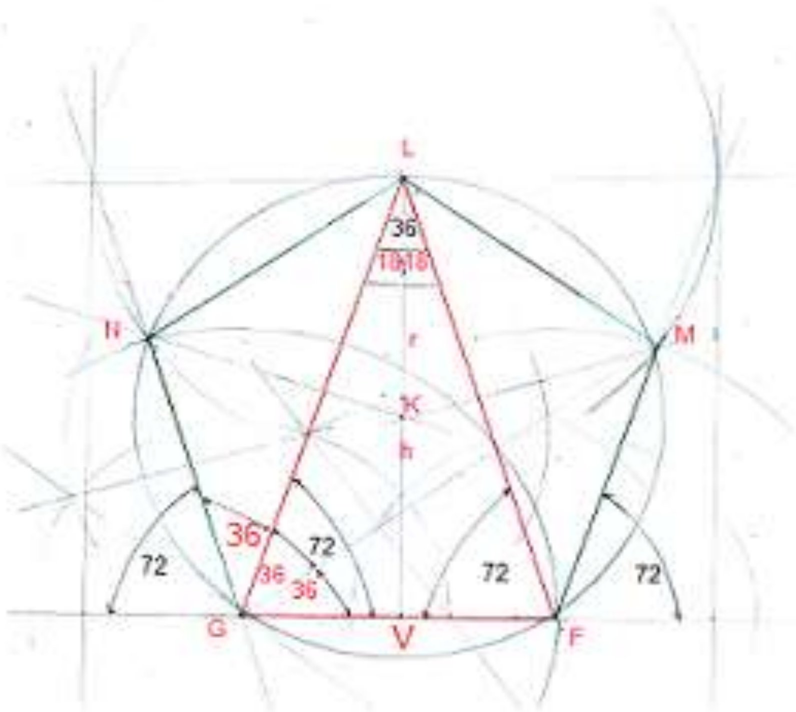
$[90-\omega] = [90 - 77.92918912] = 12.07081088$ deg.

$2\omega = 155.8583782$ deg.

$[180 - 2\omega] = 24.14162176$ deg.

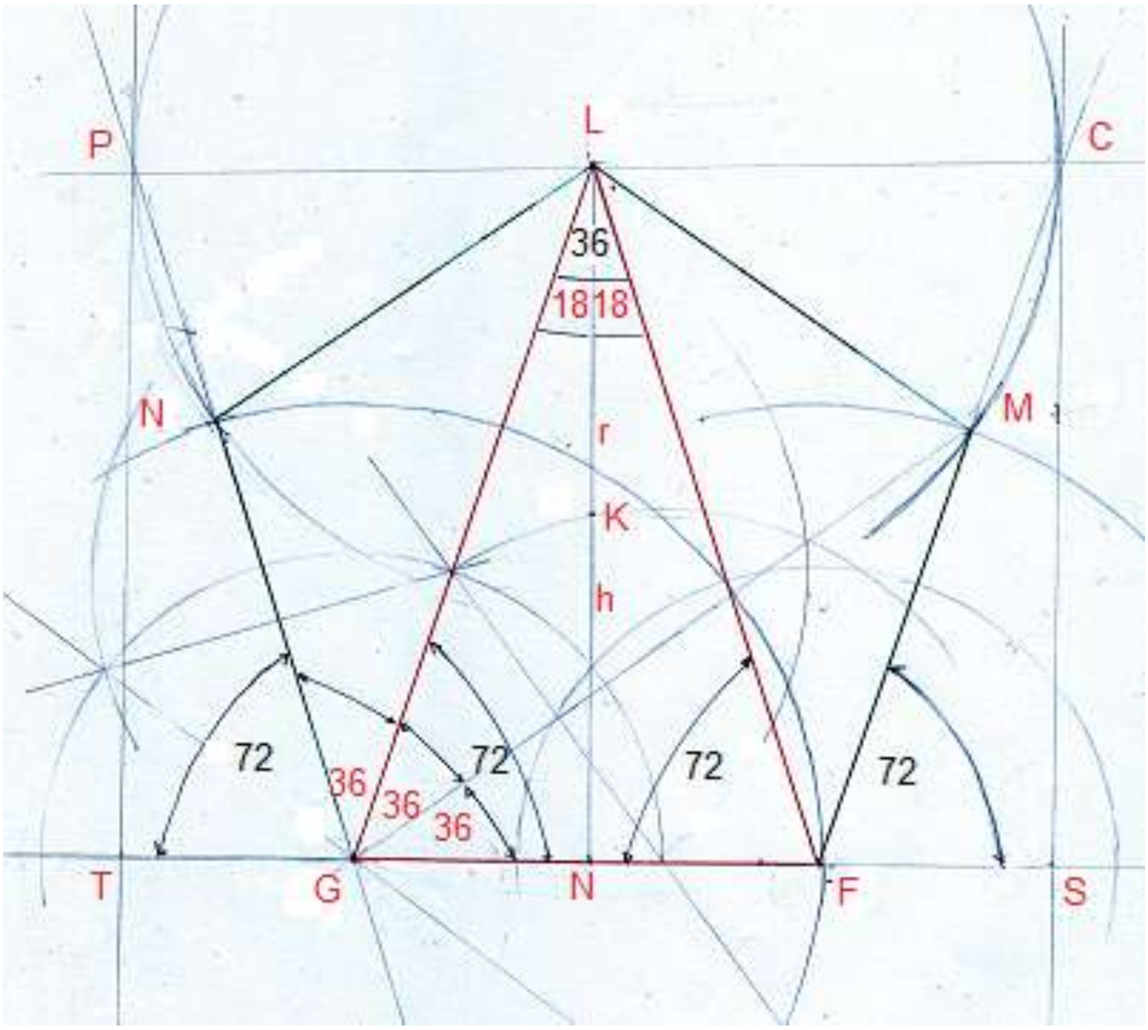
[1/ sin(54) = 1.236067978   r= (1/2)/[cos(54)] = 0.85650808   h=rsin(54)=0.68819096

H = r+h = 1.538841768



FG =1, = GL = Φ = 1.618033989 , ANGLE FGN = 108 Deg.
108/2 = 54 , [GL] Sin(72) = 1.538841768 = r+h
[GL]Cos(72) = 0.5 = [FG] / 2

https://www.linkedin.com/pulse/patterns-structured-matter-panagiotis-stefanides-stefanides



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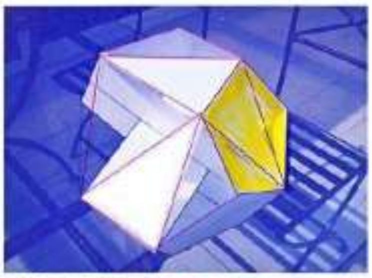
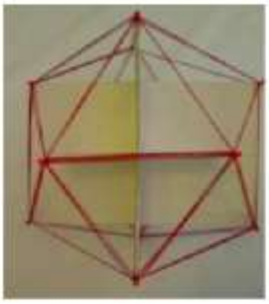
FUNDAMENTALTETRAHEDRON
Building Polyhedra By Panagiotis Stefanides

GENERATOR POLYHEDRON
STRUCTURE
Discovery - Invention
By
Panagiotis Stefanides



DODECAHEDRON STRUCTURE By Panagiotis Stefanides



ICOSAHEDRON Structure By Panagiotis Stefanides

Important Discovery

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of $4/\pi = 1.27201965$ [for $\pi = 3.14460551$ i.e. 4/ SQRT(Golden Ratio)].

$[4/2]/[\pi/2] = [\pi/2]/x$, $x = \{[\pi/2]^2\}/[4/2] = 2.472135953/2 =$

$= 1.236067977 = 1/[\sin(54)] = x$

This is directly Related to the Pentagon Angle of 54 Deg:

$1/\sin(54) = 1.236067978$

$r/h = \{[½]/\cos(54)\}/r\sin(54) = 0.850650808 / 0.68819096 = 1.236067977$

1/Sin(54) = 1.236067978

Wolfram Alpha Checking Solutions

1/Sin(54) = 1.236067977499789696409173668731276235440618359611525724270

4/[sqrt{ [sqrt(5) +1]/2}] =

= 3.144605511029693144278234343371835718092488231350892950659

{[3.144605511029693144278234343371835718092488231350892950659]^2}/8 =

= 1.236067977499789696409173668731276235440618359611525724270

[1/8]*{4/[sqrt{ [sqrt(5) +1]/2}]}^2 = [1/sin(54)]

https://www.wolframalpha.com/input/?i=%5B1%2F8%5D*%7B4%2F%5Bsqrt%7B+%5Bsqrt(5)+%2B1%5D%2F2%7D%5D%7D%5E2+%3D+%5B+1%2Fsin(54)%5D

[1/8]*{4/[sqrt{ [sqrt(5) +1]/2}]}^2 = [3+sqrt(5)] / [2+ sqrt(5)]

https://www.wolframalpha.com/input/?i=%5B1%2F8%5D*%7B4%2F%5Bsqrt%7B+%5Bsqrt(5)+%2B1%5D%2F2%7D%5D%7D%5E2+%3D+%5B3%2Bsqrt(5)%5D+%2F+%5B+2%2B+sqrt(5)%5D

Link References

http://www.stefanides.gr

https://communities.theiet.org/files/13919

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https://www.youtube.com/watch?v=N_sIR0SrG-I

https://www.youtube.com/watch?v=XeOjPmKSsOI&feature=em-upload_owner

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C.V. RESUME

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Ref Conference: http://www.stefanides.gr/Html/GOLDEN_ROOT_SYMMETRIES.htm
Publication: "Golden Root Symmetries of Geometric Forms" The journal of the Symmetry: Culture and Science,Volume 1q7,Numbers 1-2, 2006, pp 97-111
Award: Archimedes Silver Medal for the Invention of a Solar Locating and Tracking System, by the Hellenic Society of Research and Inventions, Athens Hilton 4 Feb 1983.
["Heliotropio Stefanides" Competed in Create the Future Design Contest 2011, of the NASA Tech Briefs http://contest.techbriefs.com/sustainable-technologies-2011/1179].
Latet paper issued in EMC to :
MEDPOWER 2008 [IET] in Thessaloniki [2-5 Nov. 2008] under the title:
"Compliance of Equipment in Accordance with an Adequate Level of Electromagnetic Compatibility", Eur Ing Panagiotis Chr. Stefanides, Head of Standards and Certification EMC Hellas sa,Affiliate of Hellenic Aerospace Industry sa [HAI] 2-4, Messsogion Ave[Athens Tower], 11527 Athens, Greece.

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GENERATOR POLYHEDRON OF PLATONIC- EUCLEIDEAN SOLIDS

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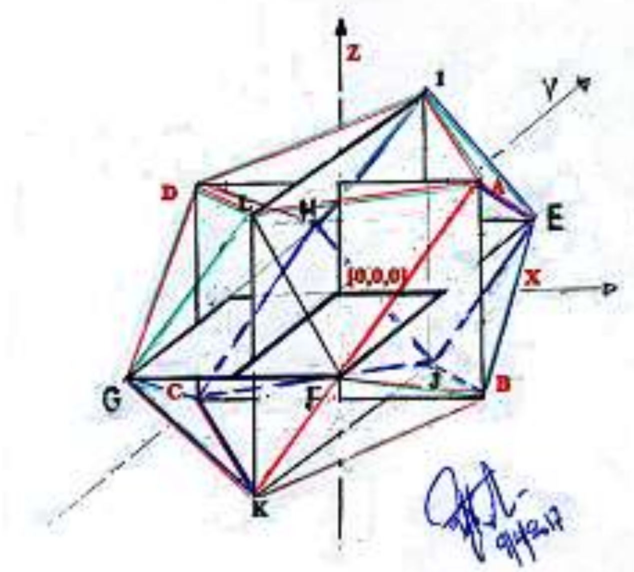
[1/8]*{4/[sqrt{ [sqrt(5) +1]/2}]}^2 = [1/sin(54)]



[1/8]*{4/[sqrt{ [sqrt(5) +1]/2}]}^2 = [3+sqrt(5)] / [2+ sqrt(5)]

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