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CAVAN McLAUGHLIN & COSMIC PI FIND 4 AS CIRCLE AREA OF SQUARE

(179th Method on Cosmic Pi)

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Abstract

The geometrical constant Pi, is wrongly considered as transcendental number. No doubt 3.14159265358…. is transcendental but it is not Pi number. Thus squaring a circle or circling a square are unfortunately have been said as unsolved geometrical problems. With the discovery of true Pi, called Cosmic Pi equal to 3.14644660941… both squaring a circle and circling a square have become no more unsolved geometrical problems.

Keywords: Circle, Square, Pi

Introduction

The concept **squaring a circle** means constructing a square whose area is equal to the area of a given circle. Here, we have to **find out a side** of the square using a straight edge and compass only. The second concept **circling a square** means constructing a circle whose area is equal to the area of a given square. Here we have **to find out a radius** of circle.

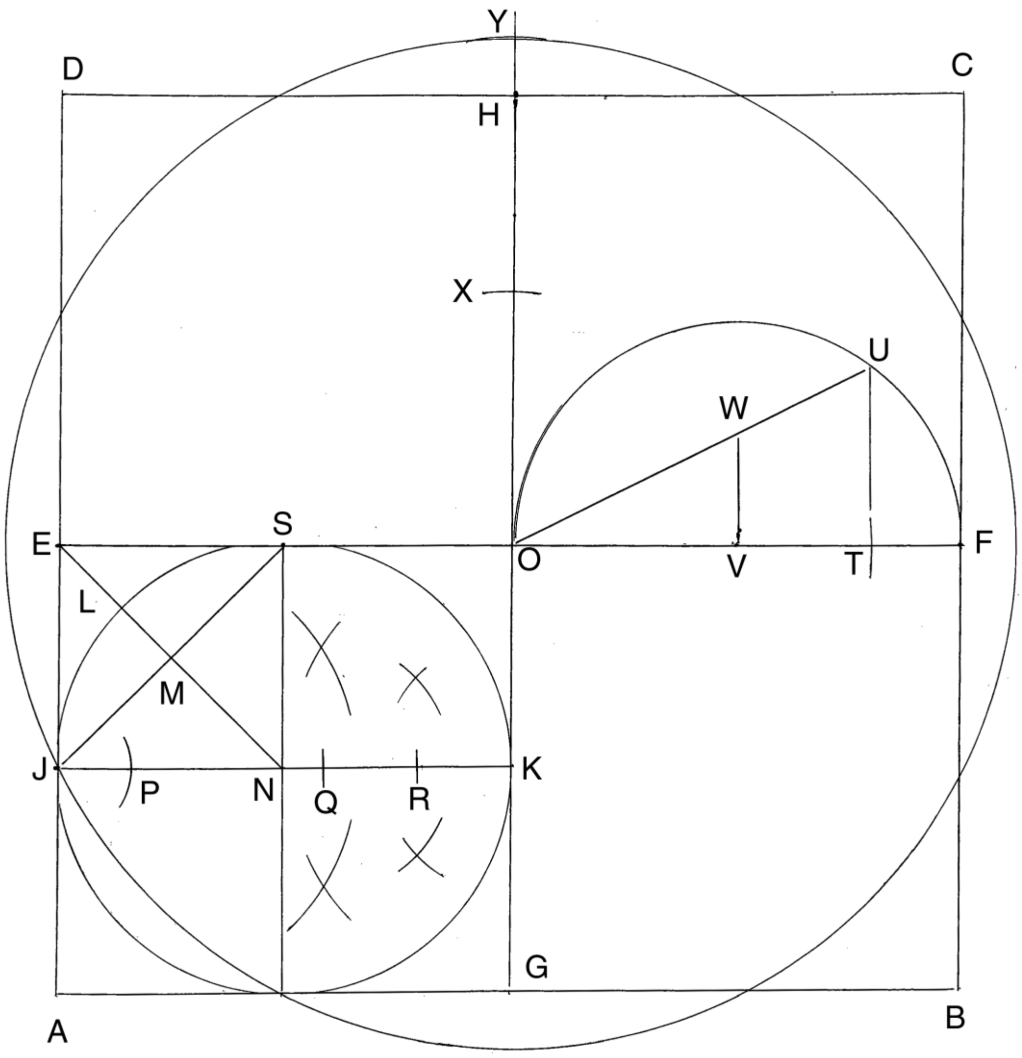
In this paper we construct a **square first** and whose side (a) is 2. So, its area is equal to $a^2 = 2 \times 2 = 4$. In other words, we have to find out a radius. Secondly, we must know the true π value. The true π value is also the exact π value. From the earlier 178 methods spanning 19 years of study, the true π value is found and confirmed. It is Cosmic π and is equal to $\frac{14-\sqrt{2}}{4} = 3.14644660941....$ So, we have to finally construct with straight edge and compass a circle whose area is equal to the area of the square ABCD i.e., 4 square units. The formula for finding area of the circle is πr^2. We know the true $\pi = \frac{14-\sqrt{2}}{4}$. The unknown one is radius and we have to find out. This paper has seen the day of light because of the **idea** of Dr. Cavan McLaughlin (The mushroom.net, Quadrature of Circle). Hence, this author is grateful to him.

Procedure

1. Large square = ABCD, side = 2, Area = 2×2 = 4
2. Small square = 1/4th of ABCD.

   = AGOE, Side = 1

3. Inscribe a circle in AGOE square.



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4. Center = N, Radius = $JN = \frac{1}{2}$

5. $JS = Chord = \frac{\sqrt{2}}{2}$

6. $NL = Radius = \frac{1}{2}$

7. $NE = Diagonal = \frac{\sqrt{2}}{2}, NM = ME = \frac{\sqrt{2}}{4}$

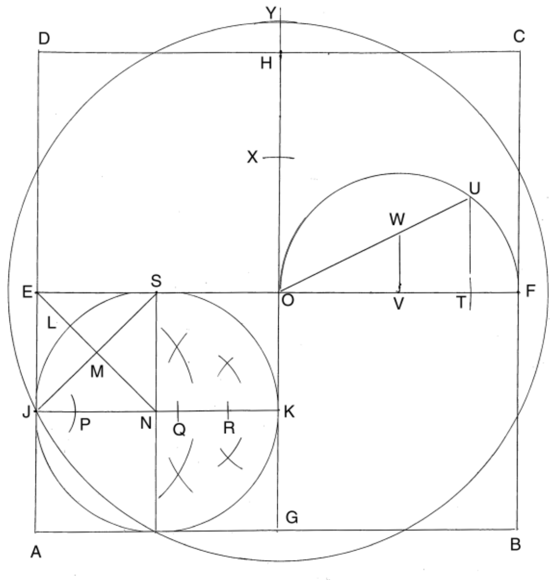
8. $LM = Radius - NM = \frac{1}{2} - \frac{\sqrt{2}}{4} = \frac{2-\sqrt{2}}{4}$ So, $LM = \frac{2-\sqrt{2}}{4}$

9. Mark JP which is equal to LM. So, $JP = LM = \frac{2-\sqrt{2}}{4}$

10. JK = Diameter = 1

11. KP = Diameter – JP = 1 – JP $= 1 - \frac{2-\sqrt{2}}{4} = \frac{2+\sqrt{2}}{4}$

So, $KP = \frac{2+\sqrt{2}}{4}$



12. Bisect KP twice

$= KP \rightarrow PQ + QK \rightarrow QR + RK$

$= \frac{2+\sqrt{2}}{4} \rightarrow \frac{2+\sqrt{2}}{8} \rightarrow \frac{2+\sqrt{2}}{16}$

So, $RK = \frac{2+\sqrt{2}}{16}$

13. JR = Diameter – RK

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$$=1-\frac{2+\sqrt{2}}{16}=\frac{14-\sqrt{2}}{16}$$

So, $JR=\dfrac{14-\sqrt{2}}{16}$

Part – II : How to find out the required radius?

14. In this step we try to find out a line segment which is a radius equal to $\sqrt{\dfrac{4}{\pi}}$. Why?

Area of Circle = πr^2= Area of ABCD square = 4

$\pi r^2 = 4$

$r^2 = \dfrac{4}{\pi}$, then $r = \sqrt{\dfrac{4}{\pi}}$

We know the true π value $=\dfrac{14-\sqrt{2}}{4}$

Then required radius $=\sqrt{\dfrac{4}{\dfrac{14-\sqrt{2}}{4}}}=\sqrt{\dfrac{16}{14-\sqrt{2}}}=\dfrac{4}{\sqrt{14-\sqrt{2}}}$

15. OF = 1

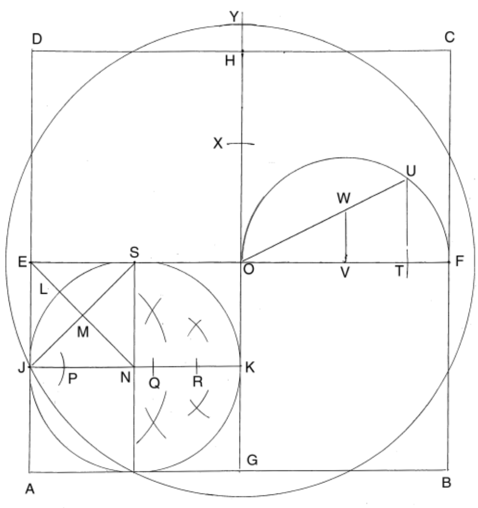
JR of Small square AGOE = OT of small square OFCH

16. $OT=JR=\dfrac{14-\sqrt{2}}{16}$

17. $TF=OF-OT=1-\dfrac{14-\sqrt{2}}{16}=\dfrac{2+\sqrt{2}}{16}$

18. V = mid point of OF = 1

With center V draw a semic circle on OF.



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19. Draw a perpendicular line on OF at T which meets the semicircle at U.

20. Length of perpendicular line TU

$$= \sqrt{OT \times TF} \text{ (Altitude theorem)}$$

$$= \sqrt{\left(\frac{14-\sqrt{2}}{16}\right) \times \left(\frac{2+\sqrt{2}}{16}\right)} = \frac{\sqrt{26+12\sqrt{2}}}{16}$$

21. Join U and O

22. To get UO apply Pythagorean theorem.

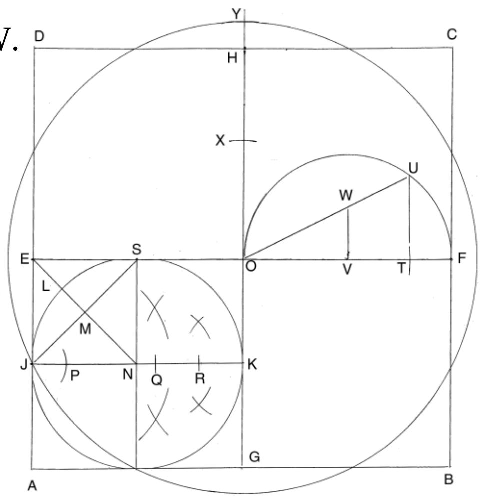
$$OT = \frac{14-\sqrt{2}}{16}, \quad TU = \frac{\sqrt{26+12\sqrt{2}}}{16}$$

$$OU = \sqrt{(OT)^2 + (TU)^2} = \sqrt{\left(\frac{14-\sqrt{2}}{16}\right)^2 + \left(\frac{\sqrt{26+12\sqrt{2}}}{16}\right)^2} = \frac{\sqrt{14-\sqrt{2}}}{4}$$

23. V = mid point of OF = 1, OV = VF = $\frac{1}{2}$

24. Draw a perpendicular line on OF at mid point V which meets UO at W.

25. Apply the concept of **similar triangles** to get OW.



$$OW = \frac{OV \times OU}{OT} = \frac{\frac{1}{2} \times \frac{\sqrt{14-\sqrt{2}}}{4}}{\frac{14-\sqrt{2}}{16}} = \frac{2}{\sqrt{14-\sqrt{2}}}$$

26. Mark OW length on OH = OX

So, $OX = \frac{2}{\sqrt{14-\sqrt{2}}}$ and add OX again = XY

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$$XY = \frac{2}{\sqrt{14-\sqrt{2}}}$$

2 times of OW = OY

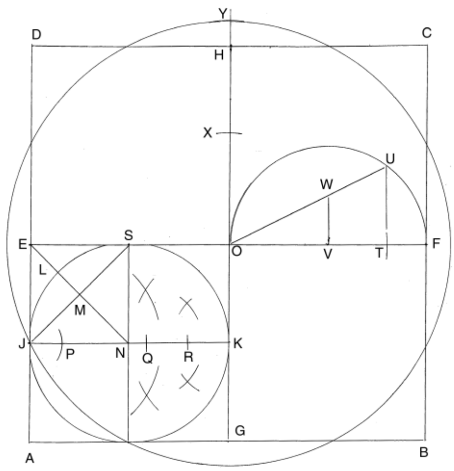
Finally, $OX + XY = \frac{4}{\sqrt{14-\sqrt{2}}} = OY$

Part III : Large circle of its area equal to ABCD square = 4

27. Area of large circle = πr^2

Where Radius $= r = OY = \frac{4}{\sqrt{14-\sqrt{2}}}$ and

$$\pi = \frac{14-\sqrt{2}}{4}$$



28. Area of ABCD square = side × side = 2 ×2 = 4

Area of large circle

$$\square r^2 = \frac{14-\sqrt{2}}{4} \times \left(\frac{4}{\sqrt{14-\sqrt{2}}} \right)^2 = 4$$

Finally, we obtain now the area of the circle equal to 4 which is the same area of ABCD square. It means the **circling a square is done**.

Conclusion

In this paper the area of the circle equal to 4 is obtained finally which is the area of square whose side is 2.