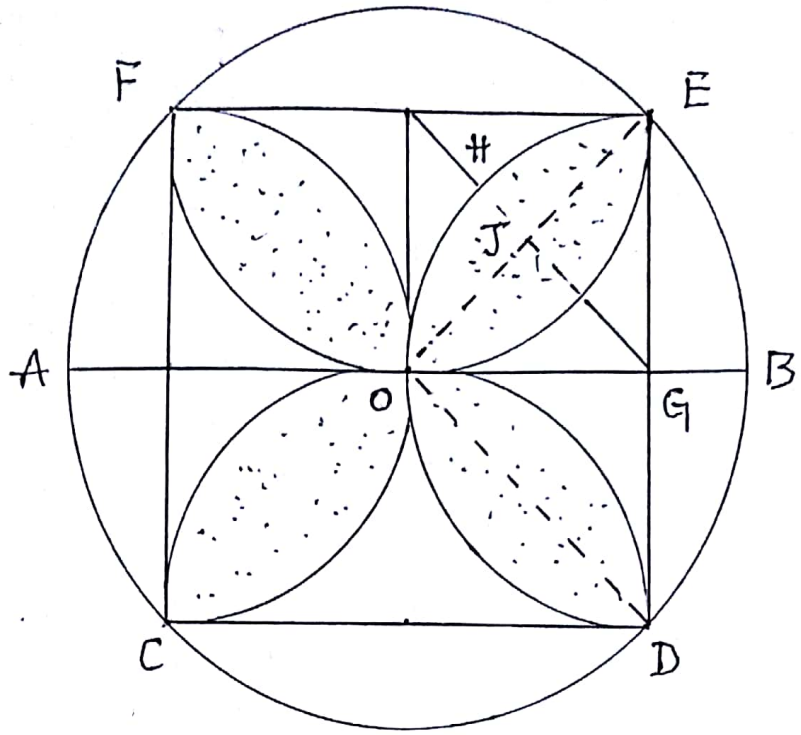
Shiva Shivaa

LEONARDO DA VINCI SQUARED A CIRCLE



1. Circle
2. Diameter = AB = a
3. Radius = OB = $\frac{a}{2}$
4. Triangle = EOD
5. Base = DE = $\frac{\sqrt{2}a}{2}$
6. Altitude = GD = $\frac{\sqrt{2}a}{4}$
7. Area of Triangle = $\frac{1}{2}ab = \frac{1}{2} \times \frac{\sqrt{2}a}{4} \times \frac{\sqrt{2}a}{2}$

$= \frac{a^2}{8}$

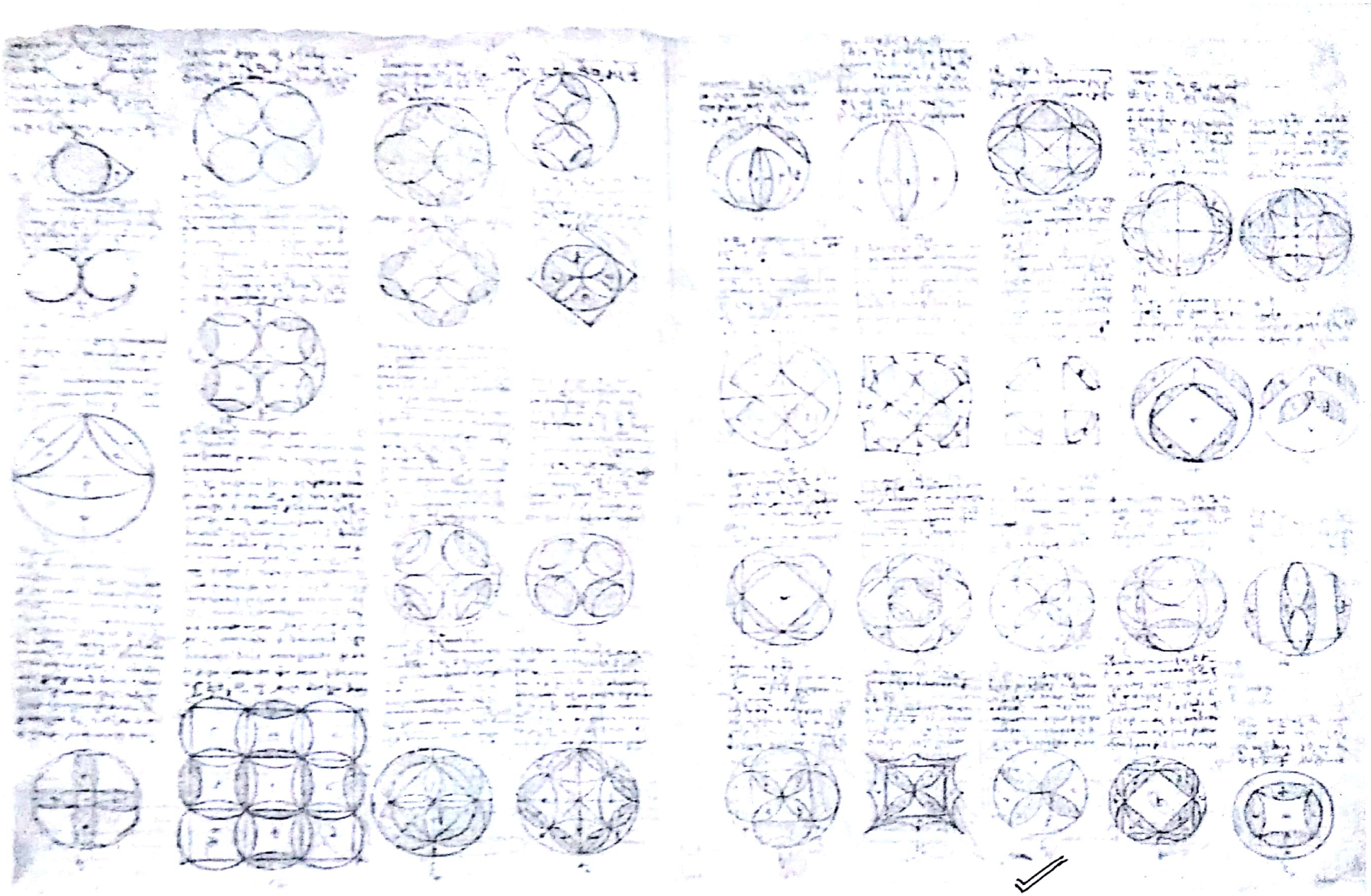


Fig. 9. Leonardo da Vinci, *Codex Atlanticus,* folio 471. Squaring the circle, graphic research

8. Sector = EODB = $\frac{1}{4}$ th Circle = Quadrant

9. Area of Circle = $\frac{\pi a^2}{4}$

10. Area of quadrant = $\frac{\pi a^2}{16}$

11. Segment = EGDB

12. Area of Segment = Quadrant − Triangle

$= \frac{\pi a^2}{16} - \frac{a^2}{8} = \left(\frac{\pi - 2}{16}\right) a^2$

13. Area of 4 Segments = $4\left(\frac{\pi-2}{16}\right)a^2 = \left(\frac{\pi-2}{4}\right)a^2$

14. In the Circle there are 4 Petals.
Petals are shaded with dots.

15. We have smaller quadrant OGEH.

16. And also smaller triangle = EOG

17. Base = $OE = \frac{a}{2}$

18. Altitude = $JG = \frac{a}{4}$

19. Area of small Triangle $\Delta EOG = \frac{1}{2}ab = \frac{1}{2} \times \frac{a}{4} \times \frac{a}{2}$

$= \frac{a^2}{16}$

20. Area of Smaller quadrant.

21. Radius = $GH = \frac{\sqrt{2}a}{4}$ = Diameter = $\frac{\sqrt{2}a}{2}$

22. Area of Circle = $\frac{\pi a^2}{4} = \frac{\pi}{4} \times \frac{\sqrt{2}a}{2} \times \frac{\sqrt{2}a}{2}$

= Where diameter = $\frac{\sqrt{2}a}{2}$

Q # 4

23. Area of Circle $= \frac{\pi}{4} \times \frac{\sqrt{2}a}{2} \times \frac{\sqrt{2}a}{2}$

$= \frac{\pi}{4} \times \frac{2a^2}{4_2} = \frac{\pi a^2}{8}$

24. Area of quadrant = 1/4th of Circle

$= \frac{\pi a^2}{8} \times \frac{1}{4} = \left(\frac{\pi}{32}\right) a^2$

25. Area of the Small Segment = HOJE

Small Quadrant — Small triangle

26. $= \frac{\pi a^2}{32} - \frac{a^2}{16} = \left(\frac{\pi - 2}{32}\right) a^2$

27. In each petal there are two small segments

28. Area of each Petal $= \left(\frac{\pi - 2}{32}\right) a^2 \times 2$

$= \left(\frac{\pi - 2}{16}\right) a^2$

29. There are 4 petals $= \left(\frac{\pi - 2}{16}\right) a^2 \times 4$

$= \left(\frac{\pi - 2}{4}\right) a^2$

30. Area of 4 Segments $= \left(\frac{\pi - 2}{4}\right) a^2$

Refer S.No. 13

So, Area of 4 Petals (S.No. 29) = Area of 4 Segments (S.No. 30 or S.No. 13)

The areas of the 4 segments is equal to the areas of the 4 petals.

"It follows that the unshaded area within the circle is equal to that of the square CDEF."

~~~

Conclusion:

1. C.L.F. Lindemann (1882) has said π is a transcendental number.
2. It implies that Squaring of circle is impossible.
3. In this paper we see that Leonardo da Vinci has squared a circle.
4. Who is Right and Who is Wrong?
5. Hippocrates of Chios (450 BC) has squared a circle, semicircle and lunes.
6. Leonardo da Vinci also has squared a circle.
~~~

7. On what basis C.L.F. has said π is a transcendental number ?

The answer is : it is based on Euler's formula = $e^{i\pi} + 1 = 0$

8. Let us analyse it :

In the above formula π refers to π radians 180°.

If π constant 3.14 is involved the Euler's formula becomes wrong. In other words, the Euler's formula $e^{i\pi} + 1 = 0$ rejects the π constant.

9. The question is :

How can we or Lindemann say the rejected π constant as a transcendental number based on Euler's formula.

10. Prof. Underwood Dudley has questioned Lindemann's proof based on the approximate values of e, i and π.

Acknowledgements : I thank Prof. Jerzy K. Kulski for sending the work of Leonardo da Vinci

Sarva Jagannadha Reddy

5, October 2016