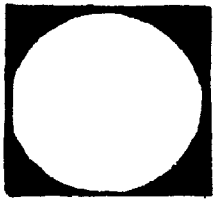
NEWS

A NON-CONVENTIONAL FORMULA TO CALCULATE THE AREA OF A CIRCLE

A traditional formula to calculate the area of a circle is πr^2 where π is 22/7, r is the radius of a circle.

It has been thought for some time to find out a different formula with the relationship between the area of square and the area of a circle.

It is a fact that there is one similarity between a square and the inscribed circle. The sides of a square and the diameter of a circle are same. Hence, a relationship constant, K is calculated between the two. (**)



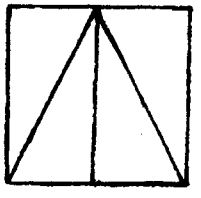
The area of a square - Q (quadrilateral)

The area of a circle - C

Q/C = K which is constant

The areas of a square and a circle can be calculated using the conventional formulae a^2 and $\prod r^2$ respectively. The value thus obtained for K is 1.272727 .....

To arrive at the value of K the author has adopted two different methods - a physical method and a mathematical method. In the first method the part of the paper that is square and the part of the paper that is circle are weighed in a chemical balance. By this method the value for K is 1. 2712921 (accurate weighing and selection of paper made of uniform density may give K value much more nearer to 1. 272727 .....)



(**) It is presumed by the author that such a relationship between the inscribed triangle in the square and square might have helped the early mathematicians in the arrival of the formula to calculate the area of a triangle as 1/2 ab

Two kinds of paper are chosen for weighing and the values are given below.

TABLE I

Sl. No.	Paper used	Weight of the area of square (Q) grams	Weight of the area of circle (C) grams	Q/C=K	Average K value
A. Cardboard					
1. □	17.1 Cms.	3.101	2.435	1.2735112	
2. □	24.7 Cms.	6.531	5.105	1.2793339	
B. White Paper					
3. □	21.6 Cms.	2.759	2.154	1.2808727	
4. □	10.6 Cms.	0.647	0.517	1.2514506	1.2712921

In the second method, to calculate the value of K four caps of containers of different sizes are chosen. The caps are encircled with a thread touching the rim/base of them. Such threads are straightened and measured of their lengths. It is repeated three times and average taken. The K values are calculated and are detailed in the table below. The average K value thus obtained is 1.2727253 whichy may be much more nearer to 1.272727 ..... if correct measurements of the circumference are taken.

TABLE II

Sl. No.	Sides of a Square/ diameter of a Circle Cms.	Circumference of the circle Cms. (Ccf)				Perimeter of the Square Cms (Scf)	$K=\frac{Scf}{Ccf}$
		1.	2.	3.	Average		
1.	12.6	38.7	38.7	38.7	38.733	50.4	1.3012160
2.	9.7	30.8	30.8	30.7	30.766	38.8	1.2611324
3.	7.0	22.1	21.9	22.1	22.033	28.0	1.2708210
4.	6.1	19.3	19.4	19.5	19.400	24.4	1.2577319
					Average K Value =		1.2727253

Scf = Square Perimeter, Ccf = Circle Circumference.

Using the value of K one can calculate the area of a circle.

The sides of a square	(a)
the area of a square	(Q)
the diameter of circle	(d)
the radius of a circle	(r)
the area of a circle	(C)
the relative constancy between Q and C}	(K)

When a is equal to d

the formula proposed for calculation of the area of a circle is

$$C = \frac{d^2}{K}$$

When d = 2r

the formula can be rewritten us

$$C = \frac{4}{K} \times r^2$$

Similarly, the formula proposed for the calculation of circumference of a circle is

$$\frac{8}{K} \times r \text{ or } \frac{4d}{K}$$

on verification it has been found that

$$\frac{4}{K} = \pi \text{ and } 1.272727..... = \frac{14}{11}$$

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The relationship constant is 1.909090 ..... when the volumes and surface areas of a cube and a sphere are taken into consideration.