A simple Approximation of Pi

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To approximate pi, the area of a circle segment is extrapolated to the full circle area and divided by the square radius.

1. Introduction

A paper [Oben24] claimed by mathematics and an experiment that **π** (used to calculate the area) has a value of **$\pi = 3$**. So it deviates ca. 5% from the known value of **$\pi = 3.14$**.

Own experiments and manual integrations with graph paper resulted in 1% errors and were rejected as too imprecise.

Shy attempts to criticize the mathematics of the paper were rejected.

Classical derivations of **π** are accurate. But not simple enough to really convince.

A rough but convincing derivation of **π** is required.

I would like to thank Dr. Sigrid Obenland for the very friendly discussion and inspiration.

2. Simple approximation of π

The area **A** of a triangle with the ancathete **r** and the orthogonal anticathete **h** is:

$$\mathbf{A = h\ r / 2} \qquad (1)$$

The tangent is **$\tan(\varphi) = h / r$** or:

$$\mathbf{h = \tan(\varphi)\ r} \qquad (2)$$

Substitution of (2) into (1) results in:

$$\mathbf{A = \tan(\varphi)\ r^2 / 2} \qquad (3)$$

If **$\varphi = 0.1°$**, 3600 triangular areas approximate the area **Ao** of the full circle:

$$\mathbf{Ao = 3600\ \tan(0.1)\ r^2 / 2} \qquad (4)$$

To calculate **π** it applies **$Ao = \pi r^2$** or:

$$\mathbf{\pi = Ao / r^2} \qquad (5)$$

The square radius **r^2** is eliminated by the substitution of (4) into (5) and results in:

$$\mathbf{\pi = 1800\ \tan(0.1) = 3.14159...} \qquad (6)$$

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[Oben24] Sigrid Obenland, 2024, “Quadrature of the Circle with Compass and Straightedge and a Surprising Result for the Value of π in π R^2“, https://vixra.org/abs/2405.0068