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 \(\pi\) (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 \(\pi\) are accurate. But not simple enough to really convince.

A rough but convincing derivation of \(\pi\) is required.

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2. Simple approximation of \(\pi\)

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

\[ A = \frac{h \cdot r}{2} \quad (1) \]

The tangent is \(\tan(\phi) = \frac{h}{r}\) or:

\[ h = \tan(\phi) \cdot r \quad (2) \]

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

\[ A = \tan(\phi) \cdot r^2 / 2 \quad (3) \]

If \(\phi = 0.1^\circ\), 3600 triangular areas approximate the area \(A_0\) of the full circle:

\[ A_0 = 3600 \tan(0.1) \cdot r^2 / 2 \quad (4) \]

To calculate \(\pi\) it applies \(A_0 = \pi \cdot r^2\) or:

\[ \pi = \frac{A_0}{r^2} \quad (5) \]

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

\[ \pi = 1800 \tan(0.1) = 3.14159... \quad (6) \]

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Oben24 Sigrid Obenland, 2024, "Quadrature of the Circle with Compass and Straightedge and a Surprising Result for the Value of \(\pi\) in \(\pi \cdot R^2\)." https://vixra.org/abs/2405.0068

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