



Math for the people, by the people.

Wallis formulae

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Wallis' formula expresses π as an infinite product:

$$\frac{\pi}{2} = \prod_{n=1}^{\infty} \frac{4n^2}{4n^2 - 1} = \frac{2}{1} \frac{2}{3} \frac{4}{3} \frac{4}{5} \cdots$$

It may be derived by taking the limit as $n \rightarrow \infty$ of the ratio of the following two integrals.

$$\int_0^{\frac{\pi}{2}} \sin^{2n} x dx = \frac{1 \cdot 3 \cdots (2n-1)}{2 \cdot 4 \cdots 2n} \frac{\pi}{2}$$

$$\int_0^{\frac{\pi}{2}} \sin^{2n+1} x dx = \frac{2 \cdot 4 \cdots 2n}{3 \cdot 5 \cdots (2n+1)}$$