

FORMULAS FOR π

π = area of circle of radius 1

$$\pi = \frac{1}{2} (\text{length of circumference of circle of radius } 1)$$

$$\frac{\pi}{2} = \frac{2}{1} \frac{2}{3} \frac{4}{3} \frac{4}{5} \frac{6}{5} \frac{6}{7} \frac{8}{7} \frac{8}{9} \dots \quad [1655]$$

$$\pi = \frac{3\sqrt{3}}{4} + 24 \int_0^{1/4} \sqrt{x - x^2} dx \quad [1666]$$

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \dots \quad [1673]$$

$$\pi = 2\sqrt{3} \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)3^n} \quad [1717]$$

$$\pi = \sqrt{6 \sum_{n=1}^{\infty} \frac{1}{n^2}} \quad [1750]$$

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{n=0}^{\infty} \frac{(4n)!(1103 + 26390n)}{(n!)^4 396^n}. \quad [1910]$$

$$\pi = \frac{22}{7} - \int_0^1 \frac{x^4(1-x)^4}{1+x^2} dx \quad [1944]$$

$$\frac{1}{\pi} = 12 \sum_{n=0}^{\infty} (-1)^n \frac{(6n)!}{(n!)^3 (3n)!} \frac{13591409 + 545140134n}{640320^{3n+\frac{3}{2}}} \quad [1987]$$

$$\pi = \sum_{n=0}^{\infty} \frac{1}{16^n} \left(\frac{4}{8n+1} - \frac{2}{8n+4} - \frac{1}{8n+5} - \frac{1}{8n+6} \right) \quad [1997]$$

$$\pi = \frac{355}{113} - \frac{1}{3164} \int_0^1 \frac{x^8(1-x)^8(25+816x^2)}{1+x^2} dx \quad [2005]$$

$$\pi = \frac{\sqrt{3}}{8} \sum_{n=0}^{\infty} \frac{1}{64^n} \left(\frac{8}{6n+1} + \frac{12}{6n+2} + \frac{2}{6n+3} - \frac{1}{6n+5} \right) \quad [2006]$$

Prepared by Rod Nillsen for Mathematics Teachers' Day at the University of Wollongong, June 26th 2007. This table may be downloaded from the website www.uow.edu.au/~nillsen