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Formulas for π

This list is selected from the *Wikipedia* article, [“List of Formulas involving \$\pi\$ ”](#).
See also Peter Borwein, [“The Amazing Number \$\Pi\$ ”](#) (2000).

$$\pi = \frac{C}{d} \quad (\text{where } C \text{ is the circumference and } d \text{ is the diameter of a circle.}) \quad (1)$$

$$\pi = \frac{C}{2r} \quad (\text{where } C \text{ is the circumference and } r \text{ is the radius of a circle.}) \quad (2)$$

$$\pi = \frac{A}{r^2} \quad (\text{where } A \text{ is the area and } r \text{ is the radius of a circle.}) \quad (3)$$

$$\pi = \frac{A}{\frac{major}{2} \cdot \frac{minor}{2}}, \quad (4)$$

where A is the area of an ellipse, *major* is its major axis, and *minor* is its minor axis.

$$\pi = \frac{3}{4} \cdot \frac{V}{r^3} \quad (\text{where } V \text{ is the volume of a sphere and } r \text{ is its radius.}) \quad (5)$$

$$\pi = \frac{A}{4r^2} \quad (\text{where } A \text{ is a sphere's surface area and } r \text{ is its radius.}) \quad (6)$$

$$\pi = 4 \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \cdots \right) \quad (\text{Madhava, Gregory, Leibniz formula for } \pi) \quad (7)$$

$$\pi = \sqrt{6} \cdot \sqrt{1 + \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \cdots} \quad (\text{Euler first formula for } \pi) \quad (8)$$

$$\pi = \sum_{k=1}^{\infty} k \frac{2^k k!^2}{(2k)!} - 3 \quad (\text{Euler second formula for } \pi) \quad (9)$$