The constant π , a transcendental number

 $\begin{array}{c} 141\ 592\ 6535\ 897\ 932\ 3846\ 264\ 338\ 3279\ 502\ 884\ 1971\ 693\ 993\ 7510\\ 582\ 097\ 4944\ 592\ 307\ 8164\ 662\ 680\ 898\ 862\ 803\ 4825\ 342\ 117\ 6679\\ 821\ 480\ 8651\ 328\ 230\ 6647\ 903\ 844\ 6095\ 505\ 822\ 3172\ 535\ 940\ 8128\\ 481\ 117\ 4502\ 841\ 027\ 0193\ 852\ 110\ 5559\ 644\ 622\ 9489\ 549\ 303\ 8196\\ 442\ 881\ 0975\ 665\ 933\ 4461\ 284\ 756\ 4823\ 378\ 678\ 3165\ 271\ 201\ 9091\\ 456\ 485\ 6692\ 346\ 034\ 8610\ 454\ 326\ 6482\ 133\ 936\ 0726\ 024\ 914\ 1273\\ 724\ 587\ 0066\ 063\ 155\ 8817\ 488\ 152\ 0920\ 962\ 829\ 2540\ 917\ 153\ 6436\\ 789\ 259\ 0360\ 011\ 330\ 5305\ 488\ 204\ 6652\ 138\ 414\ 6951\ 941\ 511\ 6094\\ 330\ 572\ 7036\ 575\ 959\ 1953\ 092\ 186\ 1173\ 819\ 326\ 1179\ 310\ 511\ 8548\\ 074\ 462\ 3799\ 627\ 495\ 6735\ 188\ 575\ 2724\ 891\ 227\ 9381\ 830\ 119\ 4912\\ \end{array}$

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The constant π , a transcendental number

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The number π is approximately 3: $\pi=3.141\ldots$ A good approximation is $\pi\approx22/7$, and an even better one is $\pi\approx355/113$. These are obtained by truncating the **continued fraction expansion** of π . The symbol is a letter from the Greek alphabet and is pronounced like "pie". Each year on the 14th of March, fans celebrate the international π day. Starting at the 762nd decimal place, six nines occur in the digits of π . The **circumference** of a circle with radius r is $2\pi r$. Its **area** is πr^2 . The **volume** of a sphere with radius r is $\frac{4}{3}\pi r^3$. The number π is **irrational**, so not equal to any quotient of integers; turthermore, it is **transcendent**, so not a solution of any polynomial equation. **Open question**: Do the ten digits occur equally often in the decimal expansion of π ?

$$\begin{split} 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \ldots &= \frac{\pi}{4} & 0 = e^{i\pi} + 1 & \pi = \int \limits_{-\infty}^{\infty} \frac{dx}{1 + x^2} \\ \frac{2}{1} \cdot \frac{2}{3} \cdot \frac{4}{3} \cdot \frac{4}{5} \cdot \frac{6}{5} \cdot \frac{6}{7} \cdot \frac{8}{7} \cdot \frac{8}{9} \cdot \ldots &= \frac{\pi}{2} \quad \chi(M) = \frac{1}{2\pi} \int_{M} K \, dA \quad f(z) = \frac{1}{2\pi i} \oint \frac{f(\zeta)}{\zeta - z} \, d\zeta \end{split}$$

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$$\frac{2}{1} \cdot \frac{2}{3} \cdot \frac{4}{3} \cdot \frac{4}{5} \cdot \frac{6}{5} \cdot \frac{6}{7} \cdot \frac{8}{7} \cdot \frac{8}{9} \cdot \dots = \frac{\pi}{2} \quad \chi(M) = \frac{1}{2\pi} \int\limits_{M} K \, dA \quad f(z) = \frac{1}{2\pi i} \oint\limits_{C} \frac{f(\zeta)}{\zeta - z} \, d\zeta$$

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