Die Zahl Pi   **Ergänzungen**

Fun and interesting facts about Pi

71 facts, take your time!

p
1) Pi is the number of times a circle's diameter will fit around its circumference.

2) Most people would say that a circle has no corners, but it is more accurate to say that it has an infinite number of corners.

3) The sequence of digits in Pi so far passed all known tests for randomness.

4) Here are the first 100 decimal places of Pi

3.14159265358979323846264338327950288419716939937510582097494459230781640628620899862
80348253421170679

5) The fraction (22 / 7) is a well used number for Pi. It is accurate to 0.04025%.

6) Another fraction used as an approximation to Pi is (355 / 113) which is accurate to 0.00000849%

7) A more accurate fraction of Pi is(104348 / 33215). This is accurate to 0.00000001056%.

8) Pi occurs in hundreds of equations in many sciences including those describing the DNA double helix, a rainbow, ripples spreading from where a raindrop fellinto water, superstrings, general relativity, normal distribution, distribution of primes, geometry problems, waves, navigation....

9) There is no zero in the first 31 digits of Pi.

10) Pi is irrational. An irrational number is a number that cannot be expressed in the form (a / b) where a and b are integers.

11) It is not known if Pi is normal. No one has proved that Pi isn't normal, so people generally assume that it is.

12) Pi is a transcendental number. (Transcendental means= Not capable of being determined by any combination of a finite number of equations with rationalintegral coefficients.)

13)In 1991, the Chudnovsky brothers in New York, using their computer, m zero, calculated pi to two billion two hundred sixty million three hundred twenty onethousand three hundred sixty three digits (2, 260, 321, 363). They halted the program that summer.

14) The Babylonians found the first known value for Pi in around 2000BC -They used (25/8).

15) The Bible uses a value of Pi of 3. Here is a verse from I Kings 7,23: And he made a molten sea, ten cubits from one brim to the other: it was round all about,and his height was five cubits: and a line of thirty cubits did compass it about.

16) The first person to use the Greek letter Piwas Welshman William Jones in 1706. He used it as an abbreviation for the periphery of a circle with unit diameter.Euler adopted the symbol and it quickly became a standard notation.

17) The old memory champion was Hideaki Tomoyori, born Sep. 30, 1932. In Yokohama, Japan, Hideaki recited pi from memoryto 40,000 places in 17 hrs. 21min. including breaks totaling 4 hrs. 15min. on 9-10 of March in 1987 at the Tsukuba University Club House.

18) The Pi memory champion is Hiroyoki Gotu, who memorised an amasing 42,000 digits.

19) The area of a circle is *r2. 19a) The circumference is *d

20) Pi is the 16th letter of the Greek alphabet.

21) Definition of Pi- A transcendental number, approximately 3.14159, represented by the symbol 3, that expresses the ratio of the circumference to the diameterof a circle and appears as a constant in many mathematical expressions.

22) Satan doesn't appear in Pi to quick, the first time 666 appears is at position 2440.

23) Pi is of course the ratio of a circle's circumference to its diameter. If you bring everything up one dimension to get a 3D value for Pi. The ratio of a sphere'ssurface area to the area of the circle seen if you cut the sphere in half is exactly 4.

24) If you take 10 million random digits, statistically on average you would expect 200 cases where you get 5 digits in a row the same. If you take 10 million digitsof Pi, you get exactly 200.

25) In 1931 a Cleveland buisnessman published a book annoucing that Pi is exactly 256/81.

26) If a billion decimals of pi were printed in ordinary type, they would stretch from New York City, to the middle of Kansas. 27) The square root of 9.869604401is Pi.

28) For a circle to equal pi the diameter must be 1. 29) A long time ago people thought there was an illness attached to trying to 'square a cirle' called MorbusCyclometricus.

30) Pi in fraction form is - 837393900/266550757. 31) After saying (correctly) that pi/2 is the value of x between 1 and 2 for which cos x vanishes EdmundLandau was dismissed from his position in 1934 for teaching in an 'un-German' style.

32) In the following series of natural numbers, constructed by taking successively larger strings of digits from the beginning of the decimal expansion of thenumber pi: 3, 31, 314, 31415, 314159, 3141592, etc. the first thousand numbers of the series include only 4 primes.

33) If one were to find the circumference of a circle the size of the known universe, requiring that the circumference be accurate to within the radius of one protononly 39 decimal places of Pi would be necessary.

34) The earliest known reference to Pi is on a Middle Kingdom papyrus scroll, written around 1650 BC by Ahmes the scribe.

35) The old world record for computation of the most digits of pi was achieved in September/October 1995 by Yasumasa Kanada at the University of Tokyo. Ittook 116 hours for him to compute 6,442,450,000 decimal places of Pi on a computer.

36) A rapidly converging formula for calculation of Pi found by Machin in 1706 was pi/4 = 4 * arctan (1/5) - arctan (1/239).

37) In 1949 it took ENIAC (Electronic Numerical Intergrator and Computer) 70 hours to calculate 2,037 decimal places of Pi.

38) Another name for Pi in Germany is 'die Ludolphsche Zahl' after Ludolph van Ceulen, the German mathematician who devoted his life to calculating 35decimals of pi.

39) In 1882 Ferdinand Lindemann, proved the transcendence of Pi.

40) By the year 1701 the first 100 digits of pi had been calculated.

41) In 1706 William Jones first gave the Greek letter "*" its current mathematical definition.

42) In 1768 Johann Lambert proved Pi is irrational.

43) Simon Plouffe was listed in the 1975 Guinness Book of World Records for reciting 4096 digits of Pi from memory.

44) In 1897 the State House of Representatives of Indiana unanimously passed a bill setting pi equal to 16/(sqrt 3), which approximately equals 9.2376!

45) In ancient Greece the symbol for Pi denoted the number 80.

46) Taking the first 6,000,000,000 decimal places of Pi, this is the distribution:

0 occurs 599,963,005 times,

1 occurs 600,033,260 times,

2 occurs 599,999,169 times,

3 occurs 600,000,243 times,

4 occurs 599,957,439 times,

5 occurs 600,017,176 times,

6 occurs 600,016,588 times,

7 occurs 600,009,044 times,

8 occurs 599,987,038 times,

9 occurs 600,017,038 times.

This shows NO unusual deviation from expected 'random' behaviour.

47) It is easy to prove that if you have a circle that fits exactly inside a square, then

* = 4 x (Area of circle) / (Area of square)

48) Pi does not have to be written in decimal (base 10) notation (3.14159265....). Here it is in binary (base 2) notation:11.0010010000111111011010101000100010000101101000110000100011010011

You can do lots more stuff with Pi when it is in binary format - like drawing weird pictures of it, or even listening to it. As Pi has an infinite number of places, it is quite possible that any message you liked could be heard somewhere in Pi. It has even been suggested it contains the VOICE OF GOD. In Carl Sagan's book 'Contact' the places of Pi are found to contain a message from the beings that built the universe.

49) Half the circumference of a circle with radius 1 is exactly Pi. The area inside that circle is also exactly Pi !

50) It is impossible to 'square the circle'. i.e: You can't draw a square with the same area as a circle using standard / Euclidean straight-edge and compassconstruction in a finite number of steps. The Greeks were obsessed with trying to do this.

51) Pi is a 'transcendental' number. This means that it is not the solution to any finite polynomial (eg: lots of numbers added in a series) with whole numbercoefficients. This is why it is impossible to square the circle.
52) In around 200 BC Archimedes found that Pi was between (223/71) and (22/7). His error was nomore than 0.008227 %. He did this by approximating a circle as a 96 sided polygon.

53) The volume of a sphere is 4/3*r3 and its surface area is 4/*r2.

54) The circle is the shape with the least perimeter length to area ratio (for a given shape area). Centuries ago mathematicians were also philosophers. Theyconsidered the circle to be the 'perfect' shape because of this. The sphere is the 3D shape with the least surface area to volume ratio (for a given volume)

55) Pi is of course the ratio of a circle's circumference to its diameter. If we bring everything up one dimension to get a '3D value for Pi'... The ratio of a sphere'ssurface area to the area of the circle seen if you cut the sphere in half is EXACTLY 4

56) The following are all NEARLY Pi: 101/2 Cube root of 31 666/212 10/* (97 + 9/22)1/4 9/5 + (9/5)1/2 (19 (7)1/2) / 16 1.1 x 1.2 x 1.4 x 1.7 (296/167) 2

57) Kochansky found that Pi is NEARLY a root of the equation 9x4 - 240x2 + 1492

58) Ludolph Van Ceulen (1540 - 1610) spent most of his life working out Pi to 35 decimal places. Pi is sometimes known as Ludolph's Constant

59) If you approximate the circle with a radius of 1 as a 100 sided polygon, then its area is only accurate to 1 decimal place or 0.0658%

60) At position 763 there are six nines in a row. This is known as the Feynman Point

61) Pi in base Pi is 10

62) All permutations of 3 arbitrary digits appear somewhere in Pi

63) In 1931 a Cleveland businessman published a book announcing that Pi is exactly 256/81

64) Starting with the conventional 5-by-5 magic square, and then substituting the nth digit of pi for each number n in the square, we obtain a new array of numbers. The sum of the numbers in every column is duplicated by a sum of numbers in every row.

65) Write the letters of the English alphabet, in capitals, clockwise around a circle, and cross-out the letters that have right-left symmetry, A, H, I, M, etc. The letters that remain group themselves in sets of 3, 1, 4, 1, 6"

66) The sequence 314159 re-appears in the decimal expansion of Pi at place 176451. This sequence appears 7 times in the first 10 million places (not including right at the start)

67) If you approximate the circle as a square then the value you get for Pi is about 10% out. It just goes to show that you shouldn't approximate the circle as a square. Well you wouldn't make square wheels would you?

68) 2 Pi in radians form is 360 degrees. Therefore Pi radians is 180 degrees and 1/2 Pi radians is 90 degrees.

69) Pi day is celebrated on March 14 at the Exploratorium in San Francisco (March 14 is 3/14) at 1:59 PST which is 3.14159.

70) All the digits of Pi can never be fully known.

71) Here's a Pi limerick:

Three point one four one five nine two
Its been around forever - its not new
It appears everywhere In here and in there
Its irrational I know but its true !