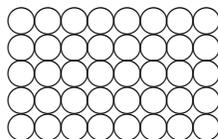


40 Forty XL



Corresponding ordinal: fortieth.

The number 40 is the twenty-first even number and the twenty-seventh composite number.

As a product of primes: $40 = 2^3 \cdot 5$.

The number 40 has eight divisors: 1, 2, 4, 5, 8, 10, 20, 40.

The number 40 is the seventh abundant number: $s(40) = 1 + 2 + 4 + 5 + 8 + 10 + 20 = 50 > 40$. Because 40 is a multiple of 20, which is an abundant number, it has be abundant.

As a sum of four or fewer squares: $40 = 2^2 + 6^2 = 2^2 + 2^2 + 4^2 + 4^2$.

As the sum of nine or fewer cubes: $40 = 5 \cdot 2^3 = 5 \cdot 1^3 + 2^3 + 3^3$.

As a difference of two squares: $40 = 7^2 - 3^2 = 11^2 - 9^2$.

The number 40 appears in eight Pythagorean triples:

$$\begin{array}{cccc} [9, 40, 41] & [24, 32, 40] & [30, 40, 50] & [40, 42, 58] \\ [40, 75, 85] & [40, 96, 104] & [40, 198, 202] & [40, 399, 401] \end{array}$$

The first and the last are primitive.

As a sum of two odd primes: $40 = 3 + 37 = 11 + 29 = 17 + 23$.

The number $40 = 1 + 5 + 12 + 22$ is the sum of the first four pentagonal numbers.

The *golden ratio*, $(1 + \sqrt{5})/2$, was considered by the ancient Greeks to give the most pleasing rectangle, and was used in the design of the Parthenon. It is related to the Fibonacci series, 1, 1, 2, 3, 5, 8, 13, 21, ..., where each number is the sum of the preceding two numbers. The ratios of consecutive terms of the Fibonacci series, 1, 2, 3/2, 5/3, 8/5, ..., approximate the golden ratio. Our diagram for the number 40 is the 5-by-8 rectangle above, corresponding to the approximation 8/5. Do you find it pleasing?

There are 40 seventeen-bit palindromic primes in base two.

2 Chapter 40 Forty XL

"Forty" is the only name of a number in which the letters appear in alphabetical order.
(Penguin dictionary)

The fortieth President of the United States was Ronald Wilson Reagan.

The fortieth state to enter the Union was South Dakota.

The fortieth largest state in the United States is South Carolina.

The only temperature that is the same on the Fahrenheit and Celsius scales is -40° .

Rain fell for 40 days and 40 nights during the Biblical flood. This was also how long Jesus fasted in the desert.

The number 40 achieved prominence in medieval Arabic literature in a story about a woodcutter named Ali Baba who used the command "open sesame" to enter the cave where a group of 40 thieves stored their treasure.

A short nap is 40 winks.