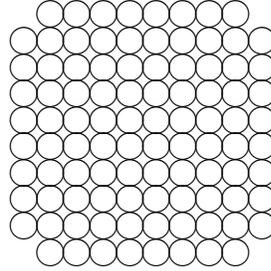


# 96 Ninety-Six XCVI



Corresponding ordinal: ninety-sixth.

The number 96 is the forty-ninth even number and the seventy-first composite number. It is the last number in the first block of seven consecutive composite numbers: 90, 91, 92, 93, 94, 95, 96.

As a product of primes:  $96 = 2^5 \cdot 3$ .

The number 96 has twelve divisors: 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96.

The number 96 is the twenty-first abundant number:  $s(96) = 1 + 2 + 3 + 4 + 6 + 8 + 12 + 16 + 24 + 32 + 48 = 156 > 96$ . It must be abundant because it is a proper multiple of the perfect number 6.

As a sum of four or fewer squares:  $96 = 4^2 + 4^2 + 8^2$ .

As a sum of nine or fewer cubes:  $96 = 5 \cdot 1^3 + 3^3 + 4^3 = 2 \cdot 1^3 + 5 \cdot 2^3 + 2 \cdot 3^3 = 4 \cdot 2^3 + 4^3$ .

As the difference of two squares:  $96 = 10^2 - 2^2 = 11^2 - 5^2 = 14^2 - 10^2 = 25^2 - 23^2$ .

The number 96 appears in thirteen Pythagorean triples:

[28, 96, 100]   [40, 96, 104]   [72, 96, 120]   [96, 110, 146]   [96, 128, 160]  
[96, 180, 204]   [96, 247, 265]   [96, 280, 296]   [96, 378, 390]   [96, 572, 580]  
[96, 765, 771]   [96, 1150, 1154]   [96, 2303, 2305]

The seventh and the last are primitive.

As a sum of two odd primes:  $96 = 7 + 89 = 13 + 83 = 17 + 79 = 23 + 73 = 29 + 67 = 37 + 59 = 43 + 53$ .

If we write  $p_n$  for the  $n^{\text{th}}$  prime, and  $q_n$  for  $p_{p_n}$ , then 96 is the greatest number that cannot be written as a sum of distinct numbers of the form  $q_n$ . Here are  $p_n$  and  $q_n$  for

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$n = 1, 2, \dots, 10$ :

$p_n$	2	3	5	7	11	13	17	19	23	29
$q_n$	3	5	11	17	31	41	59	67	83	109

You can easily check that 96 cannot be so written. That every number bigger than 96 can be so written is a result of R. E. Dressler and C. T. Parker, “Primes with a prime subscript”, *J. Assoc. Comp. Mach.* **22** (1975) 380–81.

The number 96 is the smallest number that can be written as the difference of two squares in four ways. From *What’s special about this number*, <http://www2.stetson.edu/~efriedma/numbers.html>.

The number 96 is an *untouchable number*, that is, it is not the sum of the proper divisors of any number.

Number 96 was a popular Australian TV series in the 1970’s.

There are 96 spokes on a daisy wheel printer.

The Courier game is an old variant of chess played on a board with 96 squares. The set is available at [courierchess.com](http://courierchess.com).

