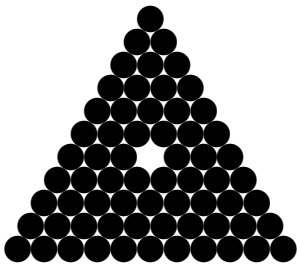
65 Sixty-Five LXV



Corresponding ordinal: sixty-fifth.

The number 65 is the thirty-third odd number and the forty-sixth composite number.

As a product of primes: $65 = 5 \cdot 13$.

The number 65 has four divisors: 1, 5, 13, 65.

The number 65 is the fifty-first deficient number: $s(65) = 1 + 5 + 13 < 65$.

As a sum of four or fewer squares: $65 = 1^2 + 8^2 = 4^2 + 7^2 = 2^2 + 5^2 + 6^2 = 2^2 + 3^2 + 4^2 + 6^2$. It is the smallest number that can be written as the sum of two distinct squares in two different ways.

As a sum of nine or fewer cubes: $65 = 1^3 + 4^3 = 3 \cdot 1^3 + 2^3 + 2 \cdot 3^3 = 1^3 + 8 \cdot 2^3$.

As a difference of two squares: $65 = 9^2 - 4^2 = 33^2 - 32^2$.

As a sum of three odd primes: $65 = 3 + 3 + 59 = 3 + 19 + 43 = 3 + 31 + 31 = 5 + 7 + 53 = 5 + 13 + 47 = 5 + 17 + 43 = 5 + 19 + 41 = 5 + 23 + 37 = 5 + 29 + 31 = 7 + 11 + 47 = 7 + 17 + 41 = 7 + 29 + 29 = 11 + 11 + 43 = 11 + 13 + 41 = 11 + 17 + 37 = 11 + 23 + 31 = 13 + 23 + 29 = 17 + 17 + 31 = 17 + 19 + 29 = 19 + 23 + 23$.

The number 65 appears in eight Pythagorean triples:

$[16, 63, 65]$	$[25, 60, 65]$	$[33, 56, 65]$	$[39, 52, 65]$
$[65, 72, 97]$	$[65, 156, 169]$	$[65, 420, 425]$	$[65, 2112, 2113]$

The number 65 is the smallest number that is the hypotenuse of two different primitive Pythagorean triples (the first and third above). (Number Gossip) The next such number is 85.

The rows, columns, and diagonals of a (normal) 5-by-5 magic square add up to 65. Here

is an example

$$\begin{array}{ccccc} 17 & 24 & 1 & 8 & 15 \\ 23 & 5 & 7 & 14 & 16 \\ 4 & 6 & 13 & 20 & 22 \\ 10 & 12 & 19 & 21 & 3 \\ 11 & 18 & 25 & 2 & 9 \end{array}$$

There are $275,305,224$ essentially different 5-by-5 magic squares.

The numbers $65+56$ and $65-56$ are both squares. The number 65 is the smallest number for which you get a square when you add its reversal and also when you subtract its reversal. The next such number is 621770, the only other less than forty million. Gupta, on Prime Curios, claims that 65 is the only number you can do this to and get two squares of primes.

At age 65 James Buchanan was inaugurated as President of the United States.