

0 Zero

The number 0 is the first number in the collection that we call whole numbers. The whole numbers are the numbers 0, 1, 2, 3, The first whole number is 0 and each number after that is one more than the number preceding it. Generally speaking, by “number” we will mean whole number.

The Roman numeral system does not include zero.

The number 0 is the boundary between positive numbers and negative numbers. A number is *positive* if it is greater than 0 and *negative* if it is less than 0. The number 0 is neither positive nor negative.

If you add 0 to any number the result is that number again. For example, $0 + 17 = 17 + 0 = 17$.

If you multiply 0 by any number, the result is 0. Thus, $0 + 0 = 0$ and $0 \times 0 = 0$.

If the product of two numbers is 0, then one or both of them must be 0. So if $a \times b = 0$, then $a = 0$ or $b = 0$, or both.

The number 0 is its own negative, that is to say, $0 = -0$. No other number has this property.

A number is called *even* if it can be written as a number plus itself. The number 0 is even because $0 = 0 + 0$. So 0 is the first even number.

Since $a + a = 2a$ for any number a , even numbers are exactly the multiples of 2. So any multiple of an even number is even.

If you subtract any number from itself, you get the number 0. For example, $23 - 23 = 0$.

Every positive power of 0 is 0. That is to say, $0^n = 0$ for $n > 0$. The notation 0^0 seems to make no sense, but everyone agrees that it is 1, partly because if x is a very small positive number, then x^x is very close to 1. For example, $0.01^{0.01} \approx 0.95499$ and $0.0001^{0.0001} \approx 0.99908$.

An ordinary fraction is composed of two numbers, a numerator and a denominator. The number 0 plays a special role because it can never be a denominator, although it can be

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a numerator.

A number multiplied by itself is called a *square number* or simply a *square*. The number 0 is its own square, that is, $0^2 = 0$, so 0 is the first square.

Lagrange's four-square theorem states that every number is the sum of four or fewer nonzero squares. We can write 0 as the sum of zero nonzero squares. Do you think that seems weird? You are not alone.

"Much ado about nothing." That's what this chapter is.

Nothing is better than eternal happiness. A ham sandwich is better than nothing. So a ham sandwich is better than eternal happiness.

Zero Mostel was an American actor.

Private Zero is a character in the comic strip *Beetle Bailey*.

Ground zero is the point on the ground closest to an exploding bomb.

In scoring tennis, love is zero.