

**Title:** Redefining simple arithmetic expressions

**Abstract:** This article aims to redefine undefined arithmetic expressions that have been left by great scientists, to solve misunderstanding these expressions cause in physics.

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**Article:**

we have problems in physics that involve simple arithmetic such as division of two numbers, for example the speed  $v$  of an object at stationary equals zero, the time it elapses  $t$  is zero and the distance it travels is also zero, however  $0/0$  is not defined and although its speed has a defined value which is zero.

Gravity at infinity equals zero, and that is according to the equation:

$F = GMm/r^2$ , although the value infinity for  $r$  can't be added to the equation, but as  $r$  approaches infinity  $F$  approaches zero.

Even though gravity at infinity equals zero but the expression :  $F = GMm/(\text{infinity})$  is not defined.

**Redefining simple arithmetic expressions:**

It acceptable that:

$1+1=2$ , that is if we have one apple and we put another apple beside it then we will have a total of 2 apples.

$4/2=2$ , that is if we have 4 apples and we want to divide them between two people, then we will give each person 2 apples.

Let's define other expressions with the same logic, these expressions are the subject of speaking:

$4/0=0$ , we have 4 apples and we want to divide them but we don't have anybody, then we won't divide at all, the process won't occur, in such case the number of apples we divide is zero. The result is zero apples have been divided.

$0/0=0$ , we have nothing to divide and we have no people to divide between, then again the process won't occur at all and while we have nothing, we will divide nothing, and while we have no people then we have no-one to give them

anything. The result is zero apples have been divided.

$$4/(\text{infinity})=0$$

The same idea we have 4 apples but the number of people is not fixed they change and increases without bound then we can't do the process of dividing, and we can't give any apple to anyone. The process didn't occur and the result is 0 apples have been divided.

Infinity here is not a point or a very large number, infinity is increment in the value of some variable continuously and without bound.

According to these definition of simple arithmetic expression we can redefine some equations so that they have meaning:

$$v=x/t=0/0=0, \text{ and that is at the origin when } t=0 \text{ and } x=0$$

$$F=GMm/r^2=GMm/(\text{infinity})=0$$

Refer to my point of view of gravity in which I defined gravity has a limited range extendable with the speed of light  $c$ , beyond that its value is zero, so indeed at infinity it will be zero, since it is enough to find a big number that is beyond its range.

See my point of view here:

<http://vixra.org/abs/1904.0013>

Relativistic kinetic energy:

$$K.E=mc^2/\sqrt{(1-v^2/c^2)}-mc^2$$

At the speed  $v=c$  for a mass, the expression  $\sqrt{(1-v^2/c^2)}$  will equal zero:

$$K.E=mc^2/0 - mc^2, \quad K.E = 0-mc^2$$

$$K.E=-mc^2$$

But energy of mass  $m$  equals:

$$E=mc^2$$

$$m = E/c^2$$

$$K.E = (E/c^2) * c^2 = K.E = E$$

The kinetic energy of a mass  $m$  moving at the speed of light  $c$  equals the energy of its mass, and that what is the kinetic energy of a photon is, the kinetic energy of a photon is its contained energy, the kinetic energy of a mass  $m$  moving at  $v=c$  is its contained energy  $E$ , i.e. the energy of its mass