

Uncovering the True Value of Euler's Famous Identity

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Abstract

It is shown that the great claims made for the importance and beauty of Euler's Identity are only misconceptions based on apparent and superficial view on the subject which don't look at the core of the identity which comes into view by the analysis of the its elements.

" This formula of Leonhard Euler unites the five most important symbols of mathematics : 1 , 0 , e , π , and i." So often written and said in popular science books and lectures and usually followed by some poetic quotes and chattering about the beauty and uniqueness of the identity : $e^{i\pi} + 1 = 0$.

But if we analyze this identity and look at its components we will find nothing new or special about them separately or about the product of mixing them up into one formula. In fact one can always make infinite number of formulas like Euler's identity by mixing elementary mathematical identities:

For Example: $(i(e^{\cos \pi}))^2 + 1 = 0$. Is also correct mathematical identity contains the symbols: 1 , 0 , e , π , and i. But this of course is not a significant relation between these quantities , it is only a product of mixing up of three independent elementary identities which are:

$$i^2 = -1, \cos \pi = -1, \text{ and } e^0 = 1.$$

$(i(e^{\cos \pi}))^2 + 1 = 0$ doesn't tell anything about the relation between any pair of these symbols.

In the same way: $e^{i\pi} + 1 = 0$. is only a product of adding up De Moivre's formula: $(\cos x + i \sin x)^n = \cos nx + i \sin nx$, and the mathematical fact that: $\cos \pi = -1$ and $\sin \pi = 0$.

Euler's identity tells nothing about the relation between π and e . They are independent of each other(you cannot use Euler's Identity and the value of Euler's number 2.71828.. to find that value of π is 3.14159...).

