A Mathematical Proof that $0^0 \neq 1$

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I. Prologue

The great Indian mathematician Brahmagupta was the first we know of to state in writing that zero divided by any number equals zero. To this day, entering 0^0 on most standard modern calculators will output a result of 1. Although this may seem to be mathematically correct, due to the well-established law that any number raised to the power of 0 is 1, we have found a flaw in this law after careful analysis. We will be proving why it is not so, using the same logic that proves the Zero Exponent Rule.

II. Proving the Quotient Rule for Exponents

Before we delve into our refutation, we must first go back to the reason why the Zero Exponent Rule is true. The Zero Exponent Rule is a specific case for the Quotient Rule for Exponents. The most basic way to prove it is as follows:

Take the following simple true equation. We can simply solve it by crossing out the 2's
(2*2*2*2*2*2*2)÷(2*2*2*2)=2*2*2

Now, let's rewrite the equation simply using exponents
(2^7)÷(2^4)=2^3

If we test this on different numbers using the same base, we notice the following pattern:
(x^a)÷(x^b)=x^(a-b)

This is how we can prove the Quotient Rule for Exponents. Now we can use this rule to arrive at the Zero Exponent Rule.

III. Proving the Zero Exponent Rule

The Zero Exponent rule uses the Quotient Rule for Exponents to show how when an exponent is 0, the result should be 1. Here's how:

First, let's use the Quotient Rule to arrive at a number raised to the power of 0
(2^3)÷(2^3)=2^(3-3)=2^0

Now, let's expand the initial expression and try to simplify it traditionally
(2^3)÷(2^3)=(2*2*2)÷(2*2*2)=8÷8=1

Therefore, we have 2 solutions, which can be set equal to each other using Transitive Property
$2^0=1$

Testing this method with different numbers will result in a pattern that can be summed up as:
$x^0=1$

Thus, we have arrived at the Zero Exponent Rule. However, the rule does not take into account the exception: 0.

IV. Refutation

Although we have proved the Zero Exponent Rule, it is a general rule that applies for every number except 0. Let us take the following steps to illustrate why:

Let us use the Quotient Rule for Exponents to solve the following
$(0^1)\div(0^1)=0^{(1-1)}=0^0$

Now let's solve it traditionally
$(0^1)\div(0^1)=0\div0$

Combining the 2 solutions using Transitive Property would give
$0^0=0\div0$

We see that using the exact same steps as proving the Zero Exponent Rule actually disproves the Zero Exponent Rule only when the base is 0. It is well established that $0\div0$ is undefined. Therefore, 0^0 is also undefined, not 1.

V. Moving Forward…

As a result of this ground-breaking discovery, which may be classed as the most crucial math discovery into the 21st century, we are demanding very high compensation for our efforts. We will also be taking retribution from the monopolies that misled people into thinking that $0^0=1$. Thus, we will first sue the biggest misleader of them all: Google. The built-in Google calculator serves as the go-to calculator for millions due to its accessibility. For such a highly-trusted company to try to mislead people into having errors in their calculations, we demand a compensation of $3,000,000 to be paid to the Fityah Institute. We also demand to be the winners of the Nobel Prize of Mathematics, or the Fields Medal, by the International Mathematical Congress. This error must be made aware to humanity, and be fixed on all calculators.