Re: Is zero even or odd?

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Date: Mon, 27 Dec 2004 16:14:48 -0600
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On Mon, 27 Dec 2004 20:58:44 +0100, Michael Mendelsohn
<invalid@msgid.michael.mendelsohn.de> wrote:

>Below, you remove the short from my diagram.
>However, you also remove the power supply, which achieves the same
>thing.

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---
I don't know what you mean, since the + and - terminals are there and
I refer to the voltage across the resistance as being 1V.
>
>> The proper circuit:
>>
>>       +---(V)---+
>>       |         |
>> (-)---o---[R]---o---(A)---o---(+)
>>
>> Will yield the proper results if examined using Ohm's law.
>>
>> Assuming that the voltage across the resistance is 1V and the current
>> through it is 1A, then the resistance will be:
>>
>>              E     1V
>>          R = --- = ---- = 1 ohm                       (1)
>>              I     1A
>>
>
>Assuming that the voltage across the resistance is 2V and the current
>through it is 1A, then the resistance will be: 2 ohm.
---
Why would I want to do that?  I'm specifically setting up a set of
conditions to illustrate _my_ point, not yours.
---
>> If we now reduce the voltage to 0.5V and rearrange to solve for I,
>> we'll now have:
>>
>>              E     0.5V
>>          I = --- = ------ = 0.5A                      (2)
>>              R      1R
>
>We'll then have I = 1V/2R = 0.5 A
>
>> plugging that current into (1) gives us
>>
>>             0.5V
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>>          R = ------ = 1 ohm
>>               0.5A
>
>
>R = 1V / 0.5 A = 2 ohm
>
>
>> If we continue to reduce the voltage, the current and voltage will
>> always be numerically equal, R will remain at 1 ohm and, clearly, will
>> remain at 1 ohm even if we disconnect the voltage supply, forcing both
>> the voltmeter and ammeter to read 0, in which case we'll have:
>>
>>               0V
>>          R = ---- = 1 ohm
>>               0A
>
>
>If we continue to reduce the voltage, the current will always be
>numerically half of the voltage, R will remain at 2 ohm and, clearly,
>will remain at 2 ohm even if we disconnect the voltage supply, forcing
>both the voltmeter and ammeter to read 0, in which case we'll have:
> R = 0V / 0A = 2 ohm
>
>
>> Now, if we go to the more general case of:
>>
>>               x
>>          y = ---
>>               x
>>
>> we can see that for any value of x, as x goes to zero, y will remain
>> constant, and exactly equal to 1.  Therefore,
>>
>>
>>            0
>>           --- = 1
>>            0
>
>This is only true because you assumed a resistor of 1 ohm. If you assume
>a resistor of 2 ohm, then 0/0 = 2.
---
Yes, of course.  But I didn't "assume" a resistance of one ohm, I
selected the voltage and current to force the resistance to one ohm.
---

>Again, you can only state with concidence that 0/0 = 1 in this case
>because you already *know* that the resistance is 1; you have not
>computed it from 0/0, because the 0/0 quotient doesn't help you to know
>that the resistance is 1 ohm.
---
The game being to prove that 0/0 = 1, I'm not looking so much for a
resistance of 1 ohm as I am a set of values which when divided by
themselves will result in a quotient of 1.  1 volt and one ampere are
convenient, easy to visualize, and yield the quotient I'm looking for,
so that's why I chose them.  I could just as easily have chosen a
zillion amps and a zillion volts or one picovolt and one picoamp, the
point being to get a numerator and a denominator which were the same
value, numerically.
By doing that, we can say:
             E     1 gazillion volts
        R = --- = ------------------- = 1 ohm
             I     1 gazillion amps
```

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or, more generally:
            1 gazillion
       x = ------------- = 1
            1 gazillion
Now, let's reduce the numerator and the denominator by enough each to
make them each equal to a million:
            1 million
       x = ----------- = 1
            1 million

Notice that x is still equal to 1.
Now, let's reduce the numerator and the denominator by enough each to
make them each equal to 100000:
            100000
       x = -------- = 1
            100000
Notice that x is still equal to 1
Now, let's take a HUGE step and reduce the numerator and the
denominator by enough each to make them each equal to 1:
            1
       x = --- = 1
            1
Notice that x has been oblivious to all of this and is still equal to
1!  When will it change?  Obviously not if we make the numerator and
denominator very large, but maybe if we make them very small?  Let's
see...
Let's make them each equal to 1E-40:
            1E-40
       x = ------- = 1
            1E-40
Damn! That x is still equal to 1!
It seems that no matter what we do, as long as the numerator and
denominator are equal, the quotient will always be 1. So, if the
smallest number we can come up with is 0, and if 0 = 0, then it seems
we can say:
            0
       x = --- = 1
            0
!
---
>> >> Consider: Since
>> >>
>> >>               x
>> >>          y = --- = 1
>> >>               x
>> >>
>> >> is certainly true for x = 1, x = 0.5, x = 0.25, and doesn't seem to
>> >> change as x diminishes toward, through and into the negative realm on
>> >> the other side of zero, why should there be an anomaly where x = 0?.
>> >
>> >Because you can't see from 0/0
>> >that it is the result of putting x=0 into x/x.
---
See above
---
>> The value of x is unimportant.  What does matter is that the numerator
>> and denominator be numerically equal.
>
>No, it matters that they are algebraically equal.
---
Yeah, good point. they have to have the same sign in order for the
quotient to come out positive.
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>When they are numerically equal, that is only useful if the number's not
>zero.

Actually, the only time the sign doesn't matter is _when_ they're
zero!

>You can cancel out the "x"s, and you should definitely do that if you
>can, but you can't cancel out the zeroes.
---
sure you can, but it would look like this :
        x = ---
so you don't cancel them out, you divide the denominator into the
numerator.

>
>> >It might have been the result of putting 0 into 2x/x,
>> >in which case the result ought to be 2.
>>
>> ---
>> It might have been, but it wasn't.
>
>How do you know?

Because that's not what I did.

>If I give you a resistor to measure, but no power supply, you will
>measure 0A and 0V, but must the resistor always be 1 ohm, then?

Since R = E/I, I won't be able to make a measurement, so the cat will
be both dead and alive.

>> >In fact, any c = cx/x = 0/0 for any c in R with x=0,
>> >so 0/0 could be any number c in R.
>
>In other words, your above experiment could have been carried out with
>any resistor of c ohm.

Of course it "could have been", but then it would have defeated my
purpose. Duh.
--
John Fields