

Zero power zero

We have the binomial theorem

$$(a + b)^N = \sum_{k=0}^N \binom{N}{k} a^k b^{N-k} \quad (1)$$

We notice that if $a = 1$ and $b = -1$ and $N = 0$

$$(1 - 1)^0 = \sum_{k=0}^0 \binom{0}{k} 1^k (-1)^{0-k} = \frac{0!}{0!0!} 1^0 (-1)^0 = 1 * 1 * 1 = 1 \quad (2)$$

what gives

$$0^0 = 1 \quad (3)$$

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