

# A Proof that $2 = 1$

Step	Reason
Let $a = b$	choose <b>a</b> and <b>b</b> to be equal.
$a^2 = ab$	multiply both sides by <b>a</b> .
$a^2 - b^2 = ab - b^2$	subtract <b>b</b> <sup>2</sup> from both sides.
$(a + b)(a - b) = b(a - b)$	factor both sides.
$a + b = b$	divide both sides by <b>(a-b)</b> .
$b + b = b$	substitute <b>b</b> for <b>a</b> , since $a = b$ .
$2b = b$	simplify the LHS.
$2 = 1$	divide both sides by <b>b</b> .

We have proven that  $2 = 1$ .

But  $2 \neq 1$ .

Where is the flaw in the reasoning?