2012 Summer Workshop, College of the Holy Cross
Foundational Mathematics Concepts for the High School to College Transition

Warm-up Exercise. **One equals zero!** July 23, 2012

This is taken verbatim from Mudd Math Fun Facts: `http://www.math.hmc.edu/funfacts/`,
a Harvey Mudd College Mathematics Department website.

The following is a "proof" that one equals zero.

- Consider two non-zero numbers x and y such that $x = y$.

- Then $x^2 = xy$.

- Subtract the same thing from both sides: $x^2 - y^2 = xy - y^2$.

- Dividing by (x-y), obtain $x + y = y$.

- Since $x = y$, we see that $2y = y$.

- Thus $2 = 1$, since we started with y nonzero.

- Subtracting 1 from both sides, $1 = 0$.

What's wrong with this "proof"?