

**Exercise Five: Alignment, Part Two - Labels and Annotation**

**Claim.** *The real number 2 is equal to the real number 1.*

*Proof.*

- |     |                             |                                                               |
|-----|-----------------------------|---------------------------------------------------------------|
| (1) | $a = b$                     | Suppose $a, b \in \mathbb{R}$ are non-zero and that $a = b$ . |
| (2) | $a^2 = ab$                  | What's the harm in multiplying each side by $a$ ?             |
| (3) | $a^2 - b^2 = ab - b^2$      | And it's fair to subtract $b^2$ from each side, no?           |
| (4) | $(a - b)(a + b) = b(a - b)$ | Just factoring. Nothing fishy here.                           |
| (5) | $a + b = b$                 | Cancel the factor $(a - b)$ from each side.                   |
| (6) | $b + b = b$                 | Recall from (1) that $a = b$ , so we replace $a$ by $b$ .     |
| (7) | $2b = b$                    | Who could possibly object to this?                            |
| (8) | $2 = 1$                     | In (1) we defined $b \neq 0$ , so we can divide by $b$ .      |

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