Flawed Proof 1:

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Claim 1 2 = 1

Proof: Consider the following identities:

\[
\begin{align*}
10n &= n + \ldots + n \\
100n &= n + \ldots + n \\
\cdot n &= n + \ldots + n
\end{align*}
\]

Note of course that \( n \cdot n = n^2 \), and so differentiating both sides of the last equation with respect to \( n \) gives:

\[
2n = 1 + \ldots + 1 = 1 \cdot n = n
\]

This holds for all \( n \). We may therefore select any non-zero value of \( n \) and divide, giving:

\[
2 = 1
\]

This completes the proof.\(^1\) ■

\(^1\)Special thanks to my high school math teacher Ms. Burbank Shmitt for introducing me to this problem!