Submission for the Test Flight Project for Introduction to Mathematical Thinking.

Problem 3:

Proposition: For any integer n, the number $n^2 + n + 1$ is odd.

Proof: This can be proved directly using arithmetic. We can rewrite $n^2 + n + 1$ as

$$n(n + 1) + 1$$

And because n and $n + 1$ are consecutive, one must be an even number so $n(n + 1)$ is also even. By adding 1 we see that $n(n + 1) + 1$ must be odd which proves the claim. $\square$