I.5 Fibonacci Sequence

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To determine if Cassini's identity holds I created a loop that would calculate the *nth* number in a Fibonacci sequence given the starting two values then store all of the calculated values in a list. Then in a separate loop, using that list of values, I wrote code to solve for $F_n^2 - F_{n-1}F_{n+1}$ and $(-1)^{n-1}$ separately then tested see if both sides were equal to each other.

I've noticed that when experimenting with different starting values Cassini's identity doesn't work for any starting values that aren't in the sequence starting with 0 and 1 or 1 and 2. However, I printed out the values of $F_n^2 - F_{n-1}F_{n+1}$ and $(-1)^{n-1}$ to see how different the values were and I found that when the starting values aren't 0 and 1 $F_n^2 - F_{n-1}F_{n+1}$ always ended up being a constant value that alternated between positive and negative just like $(-1)^{n-1}$. Another thing that I found was that when $F1$ was a multiple of $F0$ though Cassini's identity still didn't hold both sides of the equation had the same sign while any other time the signs are flipped.