A partition of a positive integer $n$ is a non-increasing sequence of positive integers whose sum is $n$. A partition identity is a theorem stating that for all $n$, the number of partitions of $n$ satisfying some conditions equals the number of partitions of $n$ satisfying some other conditions. In this talk, we will show how functional equations and computer algebra can be used to prove such identities. In particular we will discuss a semi-automatic method using recurrences and q-difference equations, and what would be needed to make it fully automatic.