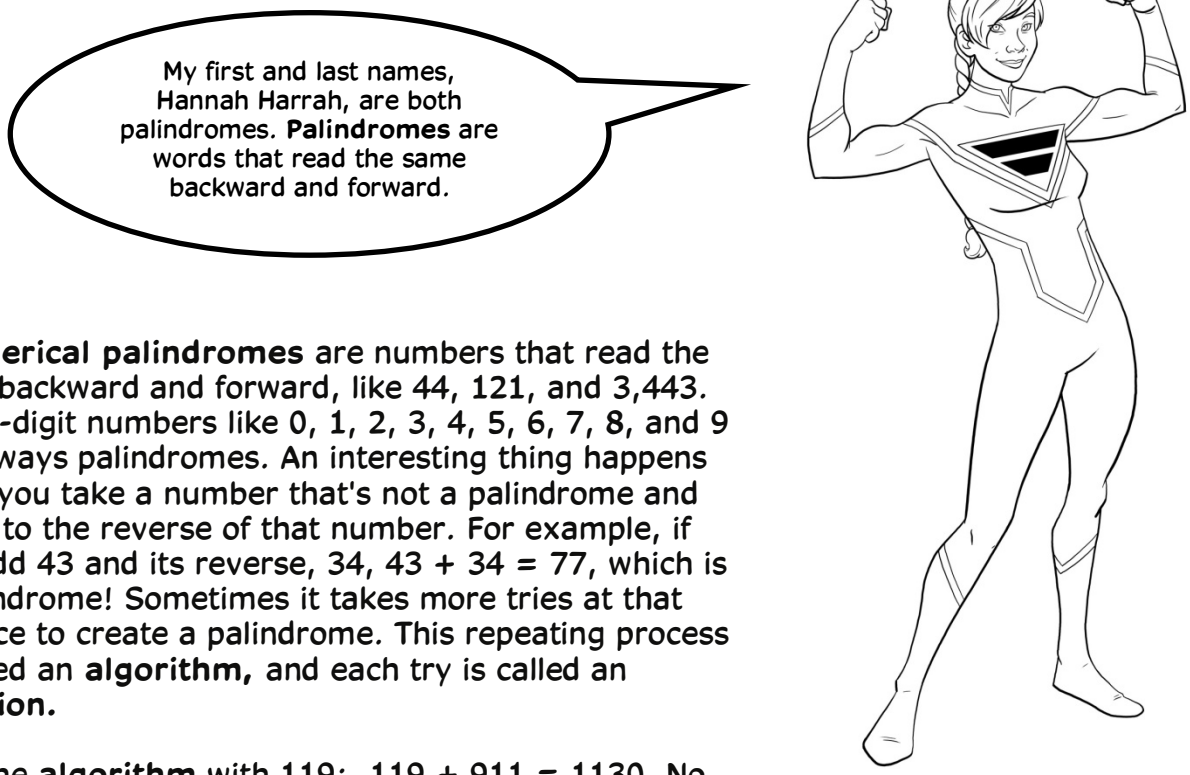
# EQUALITY'S PALINDROME SEARCH




**"Numerical palindromes** are numbers that read the same backward and forward, like 44, 121, and 3,443. Single-digit numbers like 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 are always palindromes. An interesting thing happens when you take a number that's not a palindrome and add it to the reverse of that number. For example, if you add 43 and its reverse, 34, 43 + 34 = 77, which is a palindrome! Sometimes it takes more tries at that practice to create a palindrome. This repeating process is called an **algorithm,** and each try is called an **iteration.**

"Try the **algorithm** with 119: 119 + 911 = 1130. No palindrome. Reverse the 1130 to make 0311 (just call it 311) and add it to your 1130 result. 1130 + 311 = 1,441. It's a palindrome! But this time, it took two **iterations** to make a palindrome out of it.

"78 takes four **iterations** to come back to a palindrome: 78 + 87 = 165. 165 + 561 = 726. 726 + 627 = 1353. 1353 + 3531 = 4,884! It's a palindrome!"

"So, do all numbers eventually lead back to a palindrome? Although it hasn't been definitively proven, 196 hasn't yet worked out to be a palindrome despite the fact that a computer has tried over 2.4 *million* **iterations** of the **algorithm**, resulting in a number over a million digits long! Such a number is called a Lychrel Number. Lychrel is a jumble (also called an anagram) of Cheryll, the discoverer's girlfriend's name. Aren't mathematicians clever? This **algorithm** is now called the 196-algorithm!"

**Which number less than 196 requires the highest number of iterations that still results in a palindrome?**