

COLLATZ FUNCTION

$$C(n) = \begin{cases} 3n+1 & \text{if } n \text{ is odd} \\ \frac{n}{2} & \text{if } n \text{ is even} \end{cases}$$

Let $n=5$ and iterate $C(n)$:

$$C(5) = 3(5) + 1 = 16$$

$$C(16) = 8$$

$$C(8) = 4$$

$$C(4) = 2$$

$$C(2) = 1$$

$$C(1) = 3(1) + 1 = 4$$

cycle of iterates:
4, 2, 1, ...

Collatz Conjecture: Starting with any positive integer n , the sequence of Collatz iterates eventually reaches 1.

This has been verified for all n up to $\sim 10^{20}$.