

Collatz Function:

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

EXAMPLES:

| | |
|----------------------------|---------------|
| $col(1) = 3(1)+1 = 4$ | $col(4) = 2$ |
| $col(2) = \frac{2}{2} = 1$ | $col(5) = 16$ |
| $col(3) = 3(3)+1 = 10$ | $col(6) = 3$ |

What happens if we iterate $col(n)$?

example: start with 5

$$col(5) = 16$$

$$col(16) = 8$$

$$col(8) = 4$$

$$col(4) = 2$$

$$col(2) = 1$$

$$col(1) = 4$$

cycle: $4 \rightarrow 2 \rightarrow 1$

A good mathematical question satisfies four characteristics:

1. The question is interesting to you.
2. You don't already know the answer to the question.
3. You haven't already seen the question before, or at least not exactly.
4. You can begin to make computational investigations to shed light on the question.