

Odds and Evens Answers

To complete the number chains below follow these steps:

- * if the number is **odd** multiply it by 3 then add 1 ($\times 3 + 1$)
- * if the number is **even** divide it by 2 ($\div 2$)
- * continue this pattern until the answer is 1.
- * record the number of steps needed to reach the answer of 1

Examples:

$$11 \xrightarrow{\times 3+1} 34 \xrightarrow{\div 2} 17 \xrightarrow{\times 3+1} 52 \xrightarrow{\div 2} 26 \xrightarrow{\div 2} 13 \xrightarrow{\times 3+1} 40 \xrightarrow{\div 2} 20 \xrightarrow{\div 2} 10 \xrightarrow{\div 2} 5 \xrightarrow{\times 3+1} 16 \xrightarrow{\div 2} 8 \xrightarrow{\div 2} 4 \xrightarrow{\div 2} 2 \xrightarrow{\div 2} 1 \quad \text{14 Steps}$$

$$36 \xrightarrow{\div 2} 18 \xrightarrow{\div 2} 9 \xrightarrow{\times 3+1} 28 \xrightarrow{\div 2} 14 \xrightarrow{\div 2} 7 \xrightarrow{\times 3+1} 22 \xrightarrow{\div 2} 11 \xrightarrow{\times 3+1} 34 \xrightarrow{\div 2} 17 \xrightarrow{\times 3+1} 52 \xrightarrow{\div 2} 26 \xrightarrow{\div 2} 13 \xrightarrow{\times 3+1} 40 \xrightarrow{\div 2} 20 \xrightarrow{\div 2} 10 \xrightarrow{\div 2} 5 \xrightarrow{\times 3+1} 16 \xrightarrow{\div 2} 8 \xrightarrow{\div 2} 4 \xrightarrow{\div 2} 2 \xrightarrow{\div 2} 1 \quad \text{21 Steps}$$

Number	Chain	Steps
1	1 > 4 > 2 > 1	3
2	2 > 1	1
3	3 > 10 > 5 > 16 > 8 > 4 > 2 > 1	7
4	4 > 2 > 1	2
5	5 > 16 > 8 > 4 > 2 > 1	5
6	6 > 3 > 10 > 5 > 16 > 8 > 4 > 2 > 1	8
7	7 > 22 > 11 > 34 > 17 > 52 > 26 > 13 > 40 > 20 > 10 > 5 > 16 > 8 > 4 > 2 > 1	16
8	8 > 4 > 2 > 1	3
9	9 > 28 > 14 > 7 > 22 > 11 > 34 > 17 > 52 > 26 > 13 > 40 > 20 > 10 > 5 > 16 > 8 > 4 > 2 > 1	19
10	10 > 5 > 16 > 8 > 4 > 2 > 1	3
11	11 > 34 > 17 > 52 > 26 > 13 > 40 > 20 > 10 > 5 > 16 > 8 > 4 > 2 > 1	14
12	12 > 6 > 3 > 10 > 5 > 16 > 8 > 4 > 2 > 1	9
13	13 > 40 > 20 > 10 > 5 > 16 > 8 > 4 > 2 > 1	9
14	14 > 7 > 22 > 11 > 34 > 17 > 52 > 26 > 13 > 40 > 20 > 10 > 5 > 16 > 8 > 4 > 2 > 1	17
15	15 > 46 > 23 > 70 > 35 > 106 > 53 > 160 > 80 > 40 > 20 > 10 > 5 > 16 > 8 > 4 > 2 > 1	17
16	16 > 8 > 4 > 2 > 1	4
17	17 > 52 > 26 > 13 > 40 > 20 > 10 > 5 > 16 > 8 > 4 > 2 > 1	12
18	18 > 9 > 28 > 14 > 7 > 22 > 11 > 34 > 17 > 52 > 26 > 13 > 40 > 20 > 10 > 5 > 16 > 8 > 4 > 2 > 1	20
19	58 > 29 > 88 > 44 > 22 > 11 > 34 > 17 > 52 > 26 > 13 > 40 > 20 > 10 > 5 > 16 > 8 > 4 > 2 > 1	19
20	20 > 10 > 5 > 16 > 8 > 4 > 2 > 1	7