Natural Numbers: Sum the First 50

A clear pairing method with an arithmetic-series formula check.

QUESTION

Find 1 + 2 + 3 + ... + 49 + 50.

Here, natural numbers means the positive counting numbers starting at 1.

PAIRING IDEA

Pair opposite ends: 1+50, 2+49, ... Each pair totals 51.

Opposite-end pairs

There are 25 pairs, and every pair has the same sum.

PAIRS 1-5	PAIRS 6-10	PAIRS 11-15	PAIRS 16-20	PAIRS 21-25
1 + 50 = 51	2 + 49 = 51	3 + 48 = 51	4 + 47 = 51	5 + 46 = 51
6 + 45 = 51	7 + 44 = 51	8 + 43 = 51	9 + 42 = 51	10 + 41 = 51
11 + 40 = 51	12 + 39 = 51	13 + 38 = 51	14 + 37 = 51	15 + 36 = 51
16 + 35 = 51	17 + 34 = 51	18 + 33 = 51	19 + 32 = 51	20 + 31 = 51
21 + 30 = 51	22 + 29 = 51	23 + 28 = 51	24 + 27 = 51	25 + 26 = 51

STEP-BY-STEP

1. **Pair the first and last terms.**
   1+50 = 2+49 = ... = 51.
2. **Count the pairs.**
   50 terms make 50 / 2 = 25 pairs.
3. **Multiply pair count by pair sum.**
   S = 25 x 51 = 1,275.
4. **Verify with the formula.**
   S_n = n(n+1)/2; S_50 = 50 x 51 / 2 = 1,275.

ANSWER

1 + 2 + ... + 50 = 1,275

Some courses include 0 among the natural numbers; this example explicitly starts at 1.