



## Exploration with Even Numbers

First, let's consider some concrete examples. Imagine there are four numbers: the following table lists out some data

Sum	Result	Pattern?
$1 + 2 + 3 + 4$	10	As we saw before, we also have an arithmetic progression which result depends. The difference is 4, and the start is 10.
$2 + 3 + 4 + 5$	14	
$3 + 4 + 5 + 6$	18	
$4 + 5 + 6 + 7$	22	
$5 + 6 + 7 + 8$	26	
$6 + 7 + 8 + 9$	30	

For a general formula involving even numbers - if there are  $2n$  numbers which the ~~start~~ start number is  $a$ , the formula is  $T_{2n} + 2n(a-1)$  whereby  $T_n$  is the  $n$ th triangular number.

$$\begin{aligned} T_{2n} + 2n(a-1) &= \frac{2n(2n+1)}{2} + 2n(a-1) \\ &= n(2n+1) + 2n(a-1) \end{aligned}$$