Example

- Consider the sequence

$$1 + 4 - 9 + 16 - 25 + 36 + \dots$$

- Specifically,

$$S_n = \sum_{i=1}^{n} (-1)^{i+1} i^2.$$

- We compute:

$$S_1 = 1, \quad S_2 = 1-4 = -3, \quad S_3 = 1-4+9 = 6, \quad S_4 = 1-4+9-16 = -10,$$

and the pattern we see inspires the guess

$$S_n = (-1)^{n+1} T_n = (-1)^{n+1} \frac{n(n+1)}{2}.$$