

Sum of an arithmetic progression

№1. In a theater, the first row contains 50 seats. The second row has 2 additional seats on the sides, the third row — 2 more, and so on. How many seats are there in the theater if it has five rows?

№2. It can be shown that the sum S_n of the first n terms of an arithmetic progression can be calculated using the first and the n -th terms by the formula

$$S_n = \frac{a_1 + a_n}{2} \cdot n.$$

Show that this sum can also be found using only a_1 and d :

$$S_n = \frac{2a_1 + d(n-1)}{2} \cdot n.$$

№3. Find the number of seats in the theater from №1 if it has 20 rows.

№4. Compute the sum of the first one hundred natural numbers.

№5. (*Ukraine 2022*) In an arithmetic progression, the third term is equal to 20 and the common difference is $d = -3.2$. Find the sum of the first six terms of this progression.

№6. (*Ukraine 2024*) The figure shows a **fragment** of a cross-section of a stack of wooden logs. There are 13 logs in the bottom row of the stack and one log in the top row. Determine the total number of logs in the stack.



№7. The sum of the first six terms of an arithmetic progression is 39, and the sum of the first fourteen terms is -77 . Find the first term and the common difference of the progression.