The Sum of the First *n* Terms of an Arithmetic Sequence

In a sequence, S_n denotes the sum of the first *n* terms (e.g., $S_3 = a_1 + a_2 + a_3$).

1. Given the sequence 1, 3, 5, 7, 9, . . . , find:
   a) S_1 b) S_2 c) S_3 d) S_4 e) S_n

2. Carl Friedrich Gauss (1777 – 1855), a German mathematician, is thought to have figured out the sum given below *in just seconds* when he was only 10 years old. Can you figure out how he did it so quickly?

$$\sum_{n=1}^{100} n = 1 + 2 + 3 + 4 + \cdots + 99 + 100$$

The formula below is provided on the Reference Sheet.

Sum of a Finite Arithmetic Series

$S_n =$

$S_n =$ the sum of *n* terms (*nth* partial sum)
$a_1 =$ the first term
$a_n =$ the *n*th term

3. An auditorium has 10 seats in the first row, 12 seats in the second row, 14 seats in the third row, and so on. It has 20 rows in all. What is the seating capacity of the auditorium?

4. Find the sum of the first 200 terms of the sequence: 5, 16, 27, 38, . . .

5. Ryan Braun made $2 million in the first year of his contract and gets a $500,000 raise every year. How much will he have earned *in total* after:
   a) 10 years? b) 20 years?

6. Find the sum $1 + 3 + 5 + 7 + \ldots + (2n - 1)$.
   (i.e., find S_n)