

7.5 - Arithmetic Sequence

- GOAL – Calculate the sum of the terms of an arithmetic sequence.
- **Gauss' Addition**

https://www.youtube.com/watch?v=arf8wDP_MJE

Example #1

Determine the sum of the first n terms of the arithmetic sequence.

- $a + (a + d) + (a + 2d) + (a + 3d) + \dots$
- Let's use Gauss' method: write the sum out twice

- $S_n = a + (a + d) + (a + 2d) + (a + 3d) + \dots + t_n$

$$S_n = a + (a + d) + \dots + [a + (n - 2)d] + [a + (n - 1)d]$$

$$+ S_n = [a + (n - 1)d] + [a + (n - 2)d] + \dots + (a + d) + a$$

$$2S_n = [2a + (n - 1)d] + [2a + (n - 1)d] + \dots + [2a + (n - 1)d] + [2a + (n - 1)d]$$

$$2S_n = n \times [2a + (n - 1)d]$$

$$S_n = \frac{n[2a + (n - 1)d]}{2}$$