

Find the sum of the following arithmetic series:

1.) $1 + 2 + 3 + \dots + 99 + 100$

$+ 100 + 99 + 98 + \dots + 2 + 1$

$101 + 101 + 101 + \dots + 101 + 101$

Karl Gauss

$$\frac{101(100)}{2} = 101(50) = \boxed{5050}$$

Arithmetic Series Formula :

$$S_n = \frac{n(a_1 + a_n)}{2}$$

2.) Find the **sum** of the first 30 terms of the sequence: $4, 7, 10, 13, \dots$

91

$$a_n = a_1 + (n-1)d$$

$$a_{30} = 4 + (30-1)3$$

$$a_{30} = 4 + (29)3$$

$$a_{30} = 91$$

$$S_{30} = \frac{30(4+91)}{2}$$

$$\boxed{S_{30} = 1425}$$

$$a_n = 4 + (n-1)3$$

$$a_n = 4 + 3n - 3$$

$$a_n = 3n + 1$$

$$\sum_{n=1}^{30} (3n+1) = \boxed{1425}$$

3.) Find the **sum** of the first 19 terms of the sequence: $(-10), (-5), 0, 5, \dots$

$$a_{19} = -10 + (19-1)5$$

$$a_{19} = 80$$

$$S_{19} = \frac{19(-10+80)}{2}$$

$$S_{19} = 665$$

$$a_n = -10 + (n-1)5$$

$$a_n = -10 + 5n - 5$$

$$a_n = 5n - 15$$

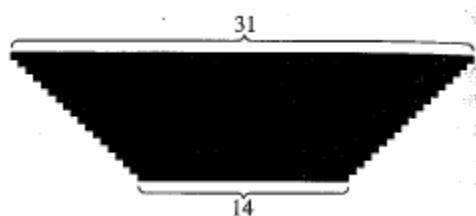
$$\sum_{n=1}^{19} 5n - 15 = 665$$

4.) A brick patio has the approximate shape of a trapezoid. The patio has **18 rows of bricks**. The first row has 14 bricks and the 18th row has 31 bricks. How many total bricks are in the patio?

1-brick each time

$$S_{18} = \frac{18(14+31)}{2}$$

$$S_{18} = 405$$



5.) Write the **sigma notation formula** that would represent the following arithmetic series:

$$5+7+9+11+\dots$$

$$a_n = 5 + (n-1)2$$

$$a_n = 5 + 2n - 2$$

$$a_n = 2n + 3$$

$$\sum_{n=1}^n 2n + 3$$