

Arithmetic Sequences

$$S_n = \frac{n(u_1 + u_n)}{2}$$

sum of an arithmetic sequence.

$u_1 \rightarrow 1^{\text{st}}$ term

$u_n \rightarrow n^{\text{th}}$ term

examples

1. $u_1 = 4$

$$u_n = 2n - 4$$

find S_{20}

\uparrow
 $n=20$

$$1^{\text{st}}: 2(20) - 4 = 36 = u_{20}$$

$$S_{20} = \frac{20(4 + 36)}{2} = \frac{20(40)}{2} = 400$$

2. $u_1 = 20$

$$u_{15} = 95$$

find S_{15}

$$S_{15} = \frac{15(20 + 95)}{2} = 862.5$$

3. $u_5 = 28$

$$u_{20} = 156$$

missing pieces

1. find the sum

a) $1 + 4 + 7 + 11 + \dots + 58$

$u_1 = 1$

$u_n = 58$

what's n ?

1st find the explicit formula
(c.d. & u_0)

$$u_n = 3n - 2$$

now find n

$$58 = 3n - 2$$

$$60 = 3n$$

$$20 = n$$

$$S_{20} = \frac{20(58 + 1)}{2} = 590$$

b) $3 + 18 + 33 + \dots + u_{20}$

$u_1 = 3$

$n = 20$

\uparrow
what's u_{20} ?

1st find the explicit formula
(c.d. & u_0)

$$u_n = 15n - 12$$

now find u_{20}

$$u_{20} = 15(20) - 12 = 288$$

$$S_{20} = \frac{20(3 + 288)}{2} = \frac{20(291)}{2} = 2910$$