Sequences

Arithmetic Sequences

Each term is derived by adding a constant, d, to the previous term; *i.e.*,

$a_n = a_{n-1} + d$ ← This is the recursive version of the sequence

The n^{th} term of an arithmetic sequence:

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

Note that n in this case is the number of elements you're adding, not necessarily the element number of the last element.

The sum of an arithmetic sequence with n terms:

$S = \frac{n}{2}(a_{first} + a_{final})$

Finding *d*

$d = a_2 - a_1$
$d = a_3 - a_2$
etc.

Geometric Sequences

Each term is derived by multiplying the previous term by a constant, r; *i.e.*,

$a_n = r \cdot a_{n-1}$ ← This is the recursive version of the sequence

Finding *r*

$r = \frac{a_2}{a_1}$
$r = \frac{a_3}{a_2}$
etc.

The n^{th} term of geometric sequence:

$a_n = a_1 r^{n-1}$

The sum of a geometric sequence with n terms:

$$S = a_{first}\left(\frac{1 - r^n}{1 - r}\right)$$

Note that n in this case is the number of elements you're adding, not necessarily the element number of the last

The sum of an infinite geometric sequence ($-1 < r < 1$)

$$S = \frac{a_1}{1 - r}$$

Sigma Notation

$$\sum_{i=1}^{6} 3n - 6$$

The element number of the last element you are

The equation for calculating a_n.

The element number of the first element you are

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