## 11.2 - Arithmetic Sequences

A sequence of numbers $a_1, a_2, a_3, \cdots, a_n, \cdots$ is called an **arithmetic sequence** if there is a constant ***d***, called the common difference, such that $\boxed{a_n = a_{n-1} + d}$, for every n > 1.

Solving for ***d***: $\boxed{d = a_n - a_{n-1}}$

The ***nth term of an Arithmetic Sequence*** is:

$\boxed{a_n = a_1 + (n-1)d}$, with $a_1$=first term; d=common difference.

The ***sum of the first n terms*** of an Arithmetic Sequence is:

$\boxed{S_n = \frac{n}{2}(a_1 + a_n)}$ or, in alternate form, $\boxed{S_n = \frac{n}{2}(2a_1 + (n-1)d)}$

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## 11.3 - Geometric Sequences

A sequence of numbers $a_1, a_2, a_3, \cdots, a_n, \cdots$ is called a **geometric sequence** if there is a constant **r**, called the common ratio, such that $\boxed{a_n = ra_{n-1}}$, for every n > 1, r≠0.

Solving for **r**: $\boxed{r = \frac{a_n}{a_{n-1}}}$

The *nth term of a geometric sequence* is:

$\boxed{\mathbf{a_n = a_1 r^{n-1}}}$, where $a_1$=first term; r=common ratio.

The **Sum of the *First N Terms*** of a Geometric Sequence is:

$\boxed{S_N = a\frac{1-r^N}{1-r}, r \neq 0,1}$ where a = first term, r = common ratio.

The **Sum of an Infinite Geometric Series** $S = \sum_{k=1}^{\infty} ar^{k-1}$ with common ratio |r|<1 is: $\boxed{S = \frac{a}{1-r}}$, where a = first term, r = common ratio.