Ch12 Sequences and series (C)

12.1 Sequences

- **sequence**: a set of numbers written down in a specific order
- **term**: each number in the sequence

12.2 Arithmetic progressions

$\rightarrow$ forming a sequence by adding a fixed amount to the previous term

An arithmetic progression can be written $a, a+d, a+2d, a+3d\ldots$ a is the **first term**, d is the **common difference**.

The nth term of an arithmetic progression is given by $a+(n-1)d$.

12.3 Geometric progressions

$\rightarrow$ forming a sequence by multiplying a fixed amount to the previous term

An geometric progression can be written $a, ar, ar^2, ar^3\ldots$ a is the **first term**, r is the **common ratio.**

The nth term of an geometric progression is given by ar^{n-1}.

12.4 Infinite sequences

- **limit**: for $x_k,\ k=1,2,3,\ldots$ As k gets larger and larger, and approaches infinity, the terms of the sequence get closer and closer to zero. "As k tends to infinity, the **limit** of the sequences is zero." $\lim_{k\to\infty}\frac{1}{k}=0$
- **converge**: when a sequence possesses a limit (meaning have a limit)
- **diverge**: the opposite of *converge* (increase indefinitely as more of its terms are added)

12.5 Series and sigma notation

- **series**: result of a sequence added, **sum.**

12.6 Arithmetic series

The sum of the first n terms of an arithmetic series with first term a and common difference d is denoted by S_n and given by $\boxed{S_n=\frac{n}{2}(2a+(n-1)d)}$.

12.7 Geometric series

The sum of the first n terms of an geometric series with first term a and common ratio r is denoted by S_n and given by $\boxed{S_n=\frac{a(1-r^n)}{1-r}}$ provided r is not equal to 1.

12.8 Infinite geometric series

The sum of an infinite number of terms of a geometric series is denoted by S_∞ and is given by $\boxed{S_\infty=\frac{a}{1-r}}$ provided $-1<r<1$.