Geometric Sequences

A geometric sequence has a **common ratio**

x3   x3   x3

2, 6, 18 , 54 , ... , $2 \times 3^{n-1}$

xr   xr   xr

U_1 , $U_1 \times r$, $U_1 \times r^2$, $U_1 \times r^3$, ... $U_1 \times r^{n-1}$

The nth term of a geometric sequence , $U_n = U_1 \times r^{n-1}$

Series

A series is formed when we add terms together: 2 + 6 + 18 + 54

We can find the sum of this series using the formulae

$$S_n = \frac{U_1(r^n - 1)}{r - 1}$$, useful when r > 1

$$S_n = \frac{U_1(1 - r^n)}{1 - r}$$, useful when r < 1

If -1 < r < 1 , the series converges and we can find the sum to infinity

$$S_\infty = \frac{U_1}{1 - r}$$, if -1 < r < 1

Solving Problems with GDC

You can make good use of your graphical calculator to find out how many terms there are in a sequence. The table function is particularly useful:

INTHINKING