

7.2 Geometric Sequences

A **Geometric Sequence** is a sequence that has a common ratio between the terms. (ie. you multiply by some number to move sequentially through the sequence)

There are two ways to write formulae for geometric sequences:

Recursive Formula:

$$t_n = r(t_{n-1})$$

$$t_1 = a$$

General Term:

$$t_n = ar^{n-1}$$

For both, $t_1 = a$,

$r =$ the common ratio and

$n \in \mathbb{N}$, $n > 1$.

Eg. 1) Given $t_n = 5(-2)^{n-1}$ find the first 4 terms of the sequence.

Eg. 2) Find the tenth term of the sequence $t_n = 3(2)^{n-1}$.

Eg. 3) Find the general term and recursive formula for the sequence 36, 18, 9, ...

Eg. 4) Determine whether the following sequences are geometric, arithmetic or neither.

a) 99, 33, 11, ...

b) -2, 10, 22, 34

c) 3, 3, 3, ...

d) 47, 44, 40, 32

Eg. 5) Determine the number of terms in the sequence 3, 6, 12, ..., 384.

Eg. 6) In a geometric sequence $t_6 = -2048$ and $t_{11} = -2097152$.
Find the general term and the first 3 terms of the sequence.

Eg. 7) Your boss comes to you and offers you a new pay structure:

Plan A: A cheque of \$10000/month

Plan B: 1 penny per day doubled daily for 30 days.

Which plan would you choose? Justify your answer mathematically.

