12.1 Geometric sequences

A geometric sequence will have a common ratio, r, that is multiplied by each term to find the next term.

1) Consider the following sequence 3, 6, 12, 24, ...

a) Prove the sequence is not Arithmetic

$6-3=3$, but $12-6=6$

no common difference

b) Show that the common ratio (r) is 2.

$\frac{6}{3}=2$; $\frac{12}{6}=2$; $\frac{24}{12}=2$

c) Write a recursive formula with $f(1)=a$

$f(1)=3$; $f(n)=2\cdot f(n-1)$; $n\geq 2$

$$f(1)=a;\ f(n)=r\cdot f(n-1);\ n\geq 2$$

d) Write an explicit formula

$f(n)=3\cdot 2^{n-1}$ $\qquad$ $f(n)=a\cdot r^{n-1}$

e) Find the 7th term $f(7)=3\cdot 2^{7-1}$

$3\cdot 2^{6}=192$

2) Consider the table

n	0	1	2	3	...
f(n)	200	120	72	43.2	...

a) write a recursive formula

$$f(0) = 200;\ f(n) = 0.6 \cdot f(n-1),\ n \geq 1$$

b) Explicit formula

$$f(n) = 200(0.6)^n$$

c) Find the 7th term

$$f(7) = 200(0.6)^7 \approx^{\text{exact}} 5.59872 \approx^{\text{3 sig fig}} 5.60$$