Outline

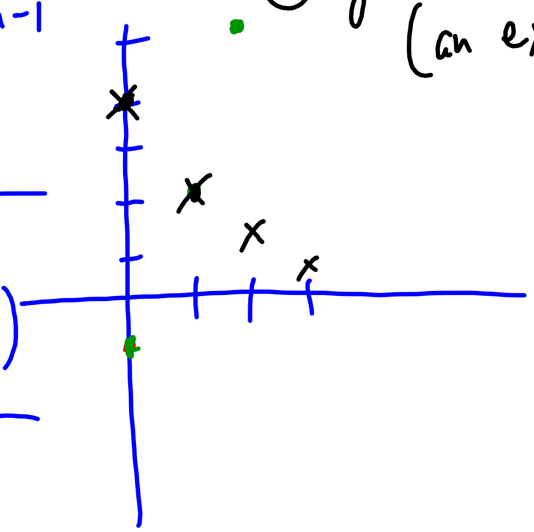
- Sequences. – general term ex. $a_n = 3n^2 - n + 1$
  gives an explicit way to find every term.
  - some sequences are defined recursively.
  - some sequences don't have a general term.

Conway seq. ex, 1, 11, 21, 1211, ...

Main two types: (1) arithmetic sequence (a line)
(2) geometric sequence (an exponential)

$* \ a_n = 3(n-1) + 2$

$* \ b_n = 2\left(\frac{1}{2}\right)^{n-1}$



arithmetic

$a_n = a_1 + d(n-1)$

geometric

$g_n = g_1 (r)^{n-1}$

Series

$$\sum_{n=1}^{4}\left(3\left(\frac{1}{2}\right)^{2n}\right) = 3\left(\frac{1}{4}\right)+3\left(\frac{1}{16}\right)+3\left(\frac{1}{64}\right)+3\left(\frac{1}{256}\right)$$

geometric series ratio $= \frac{1}{4}$

$$\sum_{n=1}^{K} a_1 r^{n-1} = \frac{a_1(1-r^K)}{1-r}$$

$$\sum_{n=1}^{K}\left[a_1+d(n-1)\right] = \left(\frac{a_1+a_K}{2}\right)K$$

Present Value $= \sum_{i=1}^{n} \frac{P_i}{(1+r)^i}$

Annuities
Mortgages.

$$\sum_{n=1}^{\infty}\frac{1}{n^2} = \frac{\pi^2}{6}$$