Recurrence Relations

Example



Test Your Understanding



Combined Sequences

Sequences (or series) can be generated from a combination of both an arithmetic and a geometric sequence.

Example



Extension

1. *[AEA 2011 Q3]* A sequence $\{u\_{n}\}$ is given by

$$u\_{1}=ku\_{2n}=u\_{2n-1}×p,   n\geq 1u\_{2n+1}=u\_{2n}×q           n\geq 1$$

1. Write down the first 6 terms in the sequence.
2. Show that $\sum\_{r=1}^{2n}u\_{r}=\frac{k\left(1+p\right)\left(1-\left(pq\right)^{n}\right)}{1-pq}$

 $[x]$ means the integer part of $x$, for example $\left[2.73\right]=2, \left[4\right]=4$.
Find $\sum\_{r=1}^{\infty }6×\left(\frac{4}{3}\right)^{\left[\frac{r}{2}\right]}×\left(\frac{3}{5}\right)^{\left[\frac{r-1}{2}\right]}$

2. [MAT 2014 1H] The function $F\left(n\right)$ is defined for all positive integers as follows: $F\left(1\right)=0$ and for all $n\geq 2$,

$F\left(n\right)=F\left(n-1\right)+2$ if 2 divides $n$ but 3 does not divide $,$

$F\left(n\right)=F\left(n-1\right)+3$ if 3 divides $n$ but 2 does not divide $n,$

$F\left(n\right)=F\left(n-1\right)+4$ if 2 and 3 both divide $n$

$F\left(n\right)=F\left(n-1\right)$ if neither 2 nor 3 divides $n$.

Then the value of $F\left(6000\right)$ equals what?

3. [MAT 2016 1G] The sequence $\left(x\_{n}\right)$, where $n\geq 0$, is defined by $x\_{0}=1$ and

$x\_{n}=\sum\_{k=0}^{n-1}\left(x\_{k}\right)$ for $n\geq 1$

Determine the value of the sum $\sum\_{k=0}^{\infty }\frac{1}{x\_{k}}$

Ex 3G Pg 80