5.1 Sequence

technically a sequence is a function from $\mathbb{Z}^+$ to $\mathbb{R}$

$a_n = n^2$ subscript notation $a_1 = 1^2 = 1$ $a_2 = 2^2 = 4$ $a_3 = 3^2 = 9$

$f(x) = x^2$ $f(\frac{1}{2}) = \frac{1}{4}$ $f(\pi) = \pi^2$

Think of sequences as an infinite list

a_1

sometimes

sequences can be defined recursively.

$a_0 = 5$

$a_n = 2a_{n-1} - 2$ for $n \geq 1$

$a_0 = 5$

$a_1 = 2 \cdot 5 - 2 = 8$ $a_1 = 2a_0 - 2$

$a_2 = 2 \cdot 8 - 2 = 14$

$a_3 = 2 \cdot 14 - 2 = 26$

$\sum_{n=3}^{7} n^2 = 3^2 + 4^2 + 5^2 + 6^2 + 7^2 = 9 + 16 + 25 + 36 + 49 = 135$

sums can be defined as recursive

$\sum_{n=q}^{b} a_n$ by definition $\sum_{n=p}^{p} a_n = a_p$

$\sum_{n=p}^{q+1} a_n = \sum_{n=p}^{q} a_n + a_{q+1}$

$(a_p + a_{p+1} \ldots a_q + a_{q+1}) = (a_p \ldots a_q) + a_{q+1}$