Sequences

Exercises

1.

Give the first 5 terms of the sequence $\{a_n\}$, $n \in \mathbb{N}$ where

1. $a_n = \dfrac{1}{2^n}$,
2. $a_1 = 2, \quad a_{n+1} = a_n + 4.$

2.

Give three partial sequences of the sequence $\{a_n\}$, $n \in \mathbb{N}$ where

$$a_n = \frac{1}{n}.$$

3.

Show that the sequence with the general term

$$a_n = 2n + (-1)^n$$

is non-decreasing.

4.

Show that the sequence $\{a_n\} = \{n^3\}$, $n \in \mathbb{N}$, is bounded below.

5.

Show that the sequence $\{a_n\} = \left\{\dfrac{1}{n}\right\}$, $n \in \mathbb{N}$, is bounded.

6.

Let $\{a_n\}$, $n \in \mathbb{N}$ where

$$a_n = \frac{n+2}{n+3}.$$

Show that $a_n \to 1$ as $n \to +\infty$.

7.

Let $\{a_n\}$, $n \in \mathbb{N}$ where

$$a_n = \frac{4 - 7n^2}{n^2 + 3n}.$$

Show that $a_n \to -7$ as $n \to +\infty$.

8.
Let $a_n = \sqrt{n+1} - \sqrt{n}$. Show that $a_n \to 0$ as $n \to +\infty$.

(To be continued.)