Section 11.1: Sequences

Problem 1. List the first four terms of the sequence.
Note: The definition of $n! = n(n-1)(n-2)(n-3)\cdots 2\cdot 1$**. For example,** $4! = 4\cdot 3\cdot 2\cdot 1 = 24$**.**
We call $n!$**, "**n **factorial."**

(a) $a_n = \dfrac{2n+1}{n!+1}$, (b) $a_1 = 2,\ a_{n+1} = \dfrac{a_n}{1+a_n}$

Problem 2. Find a formula for the general term a_n of the sequence, assuming that the pattern of the first few terms continues.

$\{a_n\}_{n=0}^{\infty} = \left\{-3, 2, -\dfrac{4}{3}, -\dfrac{8}{9}, -\dfrac{16}{27}, \ldots\right\}$. **Note:** The sequence begins with a_0.

Problem 3. Determine whether the sequence converges or diverges. If it converges, find the limit.

(a) $a_n = \dfrac{3\sqrt{n}}{\sqrt{n}+2}$, (b) $a_n = \cos\left(\dfrac{n\pi}{n+1}\right)$, (c) $a_n = \dfrac{(2n-1)!}{(2n+1)!}$, (d) $a_n = \dfrac{\ln(n)}{\ln(2n)}$.