1. Show that the given sum solves the recurrence equation and matches the initial sum.

   (a) Sum: $T_n = 0 + 1 + 2 + 3 + \cdots + (n-1)$,
       Recurrence equation: $t_n = t_{n-1} + (n - 1)$,
       Initial sum: $t_0 = 0$.

   (b) Sum: $M_n = 1 + 2 + 2^2 + \cdots + 2^{n-1}$,
       Recurrence equation: $m_n = 2m_{n-1} + 1$,
       Initial sum: $m_0 = 0$.

2. Let $\vec{X} = \langle x_0, x_1, x_2, \ldots \rangle$ be a sequence of numbers. Consider the sum

   $S_n = \sum_{k=0}^{n-1} x_k$

   (a) What is the value of $S_0$?

   (b) Write a recurrence equation for $S_{n+1}$ using $S_n$ and a term the sequence $\vec{X}$.