MATH PROBLEM OF THE WEEK

Spring 2021

Problem 1

Let S_n be the sum of the first n terms of the sequence

$$0, 1, 1, 2, 2, 3, 3, 4, 4, 5, \cdots$$

where the nth term of the sequence is given by

$$a_n = \begin{cases} \frac{n}{2} & \text{if } n \text{ is even,} \\ \frac{n-1}{2} & \text{if } n \text{ is odd.} \end{cases}$$

Show that if n and m are positive integers and $n > m$ then $nm = S_{n+m} - S_{n-m}$.

The undergraduate participant with the most number of correct solutions will receive an award of $500. If there are more than one winners, this amount will be divided among all of them.

Deadline: Monday, April 5, 10 am

Send solutions to: mathpotw@nmsu.edu