The Problem of the Month
November, 2022

Find integers $k$ and $m$ such that $1 < k < m$ and the sum of the integers 1 through $k-1$ equals the sum of the integers from $k+1$ up to and including $m$. That is, we seek the $k$ and $m$ such that the sum of the terms in each of the two bracketed expressions are equal.

$$(1 \ 2 \ 3 \ 4 \ \ldots \ k-1) \ k \ (k+1 \ k+2 \ \ldots \ m)$$

For extra honors, show that the solution is not unique. You must give a mathematically reasoned solution. A simple computer search will not be acceptable.