M1. Find all pairs of integers \((a, b)\) so that \(a\) and \(b\) are the lengths of the two legs of a right triangle so that the hypotenuse is also an integer and that the area of the triangle is equal to the perimeter.

M2. Let \(p \geq 3\) be a prime number. Consider the number

\[
1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{p} = \frac{A_p}{B_p}
\]

where the fraction \(\frac{A_p}{B_p}\) is written in lowest terms. What is the remainder when \(A_p\) is divided by \(p\)? Does your answer change if \(p\) is not prime?

M3. A litter of mice contains two white mice and the rest are brown. Four mice are chosen at random from the litter. The probability that both white mice are chosen is twice the probability that neither are chosen. How many mice are in the litter?

M4. (From Todd Neller): A Sudoku Twist! Can you fill the following 6x6 grid so that the numbers 1-6 appear exactly once in each row, column, and block?