Problem 1 Prove the following formula:

\[ \sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}. \]

Problem 2 Prove that every natural number greater than or equal to 5 can be written as the sum of twos and threes.

Problem 3 Prove that for each even \( n \) we have

\[ \left( 1 - \frac{1}{2} \right) \left( 1 + \frac{1}{3} \right) \left( 1 - \frac{1}{4} \right) \cdots \left( 1 - \frac{1}{n} \right) = \frac{1}{2}. \]