Problem 1. Consider the product $1! \cdot 2! \cdot 3! \cdot \cdots \cdot 100!$. Is it possible to remove one of the terms from this product and have the remaining product be a perfect square?

Problem 2. Rectangle I is inscribed in Rectangle II so that each side of Rectangle II contains one and only one vertex of Rectangle I. If Rectangle I measures 1 unit by 2 units and if the area of Rectangle II is $\frac{22}{3}$ units squared, find the perimeter of Rectangle II.

Problem 3. Let $p(x) = x^{2012} - 2000x^{2011} + \cdots + 13$. If all of the roots of $p(x)$ are integers, find all of the roots along with their multiplicities.
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**Problem 2.** Rectangle I is inscribed in Rectangle II so that each side of Rectangle II contains one and only one vertex of Rectangle I. If Rectangle I measures 1 unit by 2 units and if the area of Rectangle II is $\frac{22}{5}$ units squared, find the perimeter of Rectangle II.
Problem 3. Let \( p(x) = x^{2012} - 2000x^{2011} + \cdots + 13 \). If all of the roots of \( p(x) \) are integers, find all of the roots along with their multiplicities.