Give all answers in the simplest form that you can.

1. Simplify \( \sum_{10 \leq i \leq 1000} i \).

2. Simplify \( \sum_{1 \leq i} \left\lfloor \frac{1000}{i} \right\rfloor \).

3. You have one coin that comes up heads 1/3rd of the time. You have a second coin that comes up heads 2/3rds of the time. If you flip both coins \( n \) times, how likely is the first coin to come up heads more often than the second coin.

4. Simplify \( \sum_{i,j,k} x^i \binom{n}{i,j,k} \).

5. Simplify \( \sum_i \binom{n}{2p+2i+1} \binom{p+i}{i} \).