

Quiz 3 Solution

True/False - No explanation needed. (For each: 1 point if correct, 0 points if not answered, -1 points if incorrect)

- 1.
2. The number of potential sets of heterosexual marriages between 500 men and 500 women is $999 \cdot 997 \cdots 3 \cdot 1 = \frac{1000!}{2^{500}500!}$. True/False

False. This is the formula for roommate pairings, or arbitrary marriages. There are $n!$ sets of heterosexual marriages.

3. $(x + y + z)^{1000}$ has 3^{1000} terms before combining similar terms, and $\binom{1002}{2}$ terms after combining similar terms. True/False

True. Before combining terms, we have 3^{1000} terms as for each of the 1000 parts of the product there are 3 options. After combining, we have three exponents that sum to 1000, meaning this is a balls and urns problem with $\binom{1002}{2}$.

Problems - Need justification.

1. Use the recursion of Sterling numbers, the table of Sterling numbers or another method (besides brute force) to compute $S(4, 2)$ to compute $S(4, 2)$. (10 points)

We can see from the table of Sterling numbers that $S(4, 2) = 7$.

