Name: _____

Pid: _____

1. Let a_1, a_2, ..., a_t be positive integers. Show that if $a_1 + a_2 + \cdots + a_t - t + 1$ objects are placed into t boxes, then for some $i \in [t]$, the ith box contains at least a_i objects.

Solution:

2. Find the cardinality of the set

$$\{(A, B) \ : \ A, B \subseteq [n] \text{ and } A \cap B \neq \emptyset\}.$$

Solution:

3. How many numbers from [999] are not divisible neither by 3, nor by 5, nor by 7.

Solution:

4. Show that $\sum_{i=0}^{k} \binom{n}{i}\binom{m}{k-i} = \binom{n+m}{k}$.

Solution: