

## 1.2 Starry, Starry Night, E2

1. [PUMAC 18/4] Jackson has a  $5 \times 5$  grid of squares. He places coins on the grid squares – at most one per square – so that no row, column, or diagonal has five coins. What is the maximum number of coins that he can place?

Proposed by Alex Song

2. [AIME2 08/12] There are two distinguishable flagpoles, and there are 19 flags, of which 10 are identical blue flags, and 9 are identical green flags. Find the number of distinguishable arrangements using all of the flags in which each flagpole has at least one flag and no two green flags on either pole are adjacent.

Proposed by Chris Jeuell

3. [USAJMO 2016/2] Prove that there exists a positive integer  $n < 10^6$  such that  $5^n$  has six consecutive zeros in its decimal representation.

Proposed by Evan Chen