Name: _____

**Directions:** Show all work.

1. **[3 points]** How many ways are there to shuffle a standard 52-card playing deck so that all spades are consecutive?

2. **[3 points]** How many $(8 \times 8)$-matrices are there such that each entry is a zero or a one, and each row has exactly 3 ones?

3. **[4 points]** Suppose $n \geq 2$. How many circular arrangements of $\{1, \ldots, n\}$ are there if 1 and $n$ are not allowed to be consecutive? If a circular arrangement is chosen at random, what is the probability that 1 and $n$ are not consecutive?