UW Math Circle
October 15, 2015

1. There are 16 pirates, one parrot, and one monkey on a pirate ship. They need to choose a captain and a first mate. If the parrot and monkey cannot be captain (but could be first mates), find the number of ways to choose a captain and a first mate from this group.

2. Jake has 9 cousins, 3 boys and 6 girls. How many ways are there for him to...

   (a) choose a group of 4 cousins?

   (b) choose a group of 5 cousins with exactly 2 boys and 3 girls?

   (c) choose a group (of any size) of his girl cousins?

3. How many ways are there to give 11 pieces of candy to 5 students, if the first student must get at least 2 pieces of candy?

4. A frog starts at the upper left corner of a standard 8×8 chessboard. On each move, he can only jump one square to the right or one square down. He is trying to get to the lower right corner of the board. How many paths could he possibly take to get there?

5. A mail carrier delivers mail to the nineteen houses on the east side of Elm Street. The carrier notices that no two adjacent houses ever get mail on the same day, but that there are never more than two houses in a row that get no mail on the same day. How many different patterns of mail delivery are possible?