

UW Math Circle
November 13, 2014

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 if one of them must be a girl?

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

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

3. How many four digit numbers are there that begin with 1 and have exactly two identical digits? (Examples of such numbers are 1800, 1231, 1447.)

4. Given any word, a rearrangement of the word is a rearrangement of the letters in the word. For example, the word BAT has 6 rearrangements: BAT, BTA, ATB, ABT, TAB, TBA. Compute the number of rearrangements of each of the following words:

(a) DART

(b) GOOD

(c) NUGGET

(d) SELFLESS

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?

