Math 55 Section 101 Quiz 6

Note You can leave your final answers in unsimplified form (no need to break out a calculator).

Problem 1 (6.4 Q 27) A club has 25 members.

1.A (2 pt) The club needs an executive committee to organize an event. How many possible 4 member committees can be made from the groups 25 members?

Answer: $\binom{25}{4}$. Here order does not matter, since every committee member is the same.

1.B (2 pt) How may ways are there to choose a president, vice president, secretary and treasurer of the club, where no person can hold more than one office?

Answer: $P(25, 4) = \frac{25!}{21!}$. Here order does not matter, since every committee member is the same.

Problem 2 How many ways are there for m men and w women to stand in line so that no two men are next to each other in the following situations? Assume that the men (and women) are indistinguishable (m-tuplets and w-tuplets?). Argue the correctness of your answer.

2.A (3 pt) If $w < m - 1$? (Hint: To formalize your answer, use the pigeon hole principle).

Answer: There are 0 ways. Proof: Any such configuration corresponds to taking a line of w women and choosing places between the women to place the men. But by the pigeon hole principle, since there are $w + 1$ holes and greater than $w + 1$ men (the pigeons in this situation), at least one hole must have more

2.B (3 pt) If $w \geq m - 1$? Do this on the back please.

Answer: I basically did this in class on Monday. Again, such a configuration corresponds to taking a line of w women and choosing places between them to place the men. There are $w + 1$ such places and m men, so the number of ways of choosing such places is $\binom{w+1}{m}$.