

Math 4200
Counting Problems

1. Let $S = \{ a, b, c, d, e \}$. How many subsets of S are there?
2. How many ways can you select k objects from a set of n objects and arrange them in order?
3. How many ways can you select k objects from a set of n objects?
4. How many different lottery tickets are there (Idaho, Powerball)?
5. From a group of 15 women and 20 men, how many different committees consisting of 2 women and 3 men can be formed? What if 2 of the men refuse to serve on the committee together?
6. How many ways can you be dealt a straight in poker? A flush? Two pair?
7. Show that

$$\text{a) } \binom{n}{k} = \binom{n-1}{k} + \binom{n-1}{k-1}$$

$$\text{b) } \sum_{k=1}^n k \binom{n}{k} = n \cdot 2^{n-1}$$