

WEEK 7: MORE COUNTING, PROBABILITY

1. (Ribet Spr15) Alice's 5 card poker hand contains the ace of spades and the ace of diamonds. Find the probability that it contains all four aces.
2. (Ribet Spr15) Bob's 5 card poker hand contains at least two aces. Find the probability that it contains all four aces.
3. (Ribet Spr15) In how many ways can a class of 240 students be divided into 10 equally-sized discussion sections?
4. (Ribet Spr15) In how many ways can 240 identical chairs be placed in 10 classrooms so that each classroom gets at least 20 chairs?
5. (Ribet Spr13) Before going on vacation for a week, you ask a forgetful friend to water your plan. Without water, the plant has a 90 percent chance of dying. With watering, it has a 20 percent chance of dying. The probability that your friend will forget to water the plant is 30 percent. What is the probability that your plant will survive the week? If you return to a dead plant, what is the probability your friend forgot to water it? (GSI remark: technically you haven't learned this yet. But I think you can do it if you draw an "area-accurate" diagram.)
6. (Ribet Spr13) Show that the sum of the values n -choose- k over all the odd values of k , equals the sum of the values n -choose- k , over all the even values of k .
7. (Ribet Spr13) 26 identical bagels are to be distributed to 10 students. How many ways can the bagels be distributed? What if Noah, one of the students, needs to get 3 or more bagels?
8. (Ribet Spr13) Bob and Alice toss a fair coin repeatedly until either two tails have come up in a row or the sequence heads-tails has come up. Bob wins the first case; Alice wins the second. What is the probability that Alice wins?