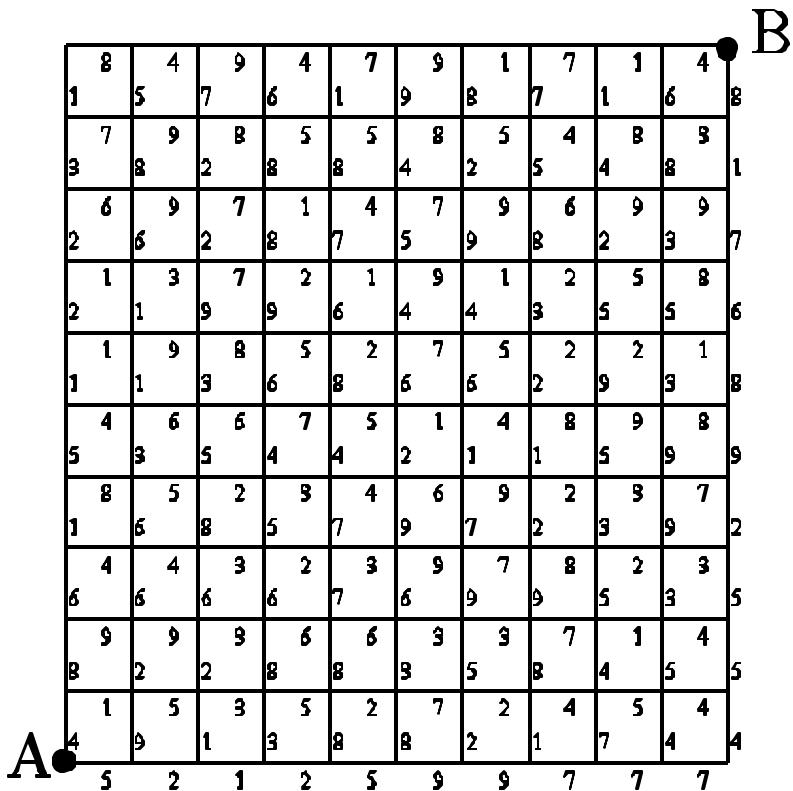
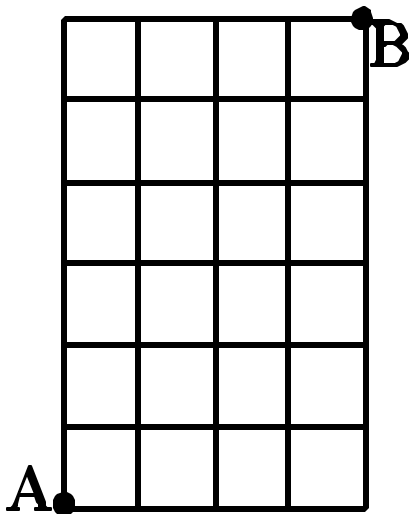
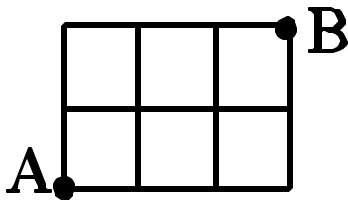
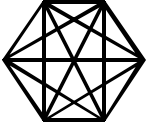


Some Practice Counting Problems

- Print your first name. How many arrangements of the letters are possible, if we consider that letters of the same type are indistinguishable? For example, there are 6 ways for Eva to arrange the letters of her name, but only 3 ways for Eve.
- How many ways can you arrange the letters in the word “Kentucky”? In the word “Tennessee”?
- Ben Franklin has 9 kites and 12 keys at home, and wants to select three of each to bring with him when he does his next experiment. How many different ways are there for him to do this?
- Ned was sent to *Bob’s Ice Cream Sundaes* to get a sundae for Nora, but when he arrived, he couldn’t remember which three flavors of ice cream Nora had asked for, though he was sure that they were three different flavors. Looking over the list of 14 available flavors didn’t help him either, so he decided that he would get one sundae for each possible selection of three flavors. How many sundaes will poor Ned have to buy?
- How many anagrams are there of each of the following words: “levee”, “teeth”, “monsoon”, and Mississippi?
- How many routes are there from A to B in each of the following grids? (A “route” follows the lines and always goes either north (N) or east (E). Ignore the weights in the large grid unless you want to find the shortest route.)



7. You want to see the top six movies.
- In how many sequences would that be possible?
 - If you have money for only three movies, how many different sets of three movies could you choose to see?
 - How many different ways are there to pick three of these movies to see on three consecutive nights?
8. a. In how many ways can you select a three-letter initial?
 b. In how many ways can you select a three-letter initial consisting of different letters?
 c. In how many ways can you select a set of three different letters from the alphabet?
9. King Lewser unjustly condemns eight of his subjects to death and locks them in a prison cell deep beneath his castle. Immediately, the prisoners start digging an escape tunnel which will take them 65 days to complete. According to the rules of the land, at sunrise of each day the prisoners may send a delegation from among themselves to plead for their lives, but subject to two conditions: a) The delegation must be the same size each day, and b) the delegation must never consist of the same set of people as on any previous day. When they run out of delegations, King Lewser has the option of executing them. The prisoners may select the size of delegation they send. What size should they choose? Can they save themselves?
10. How many ways are there for Carol to add X's and O's to her letters to Dave if she uses 7 characters altogether? (Note that Carol and Dave don't have any problem with two O's appearing next to each other.) How many ways are there if she uses exactly 2 X's and the rest are O's? How many ways are there if she uses exactly 5 X's and the rest are O's?
11. A teacher wants to assign 6 students to three teams; a red team, a green team and a blue team, so that each team gets two students. How many different ways are there to do this?
12. A CD player is programmed to shuffle the order in which it plays the eight pieces on one disk and the 11 pieces on another disk without repeating. How many ways is this possible if all pieces on the first disk are played before the second starts? if the machine shuffles between disks as well as pieces?
13. A hexagon, as shown to the right, has 9 diagonals. Let's determine the number of diagonals that a convex polygon with 75 vertices will have:
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- Since there are 75 vertices, there will be $75 \text{ choose } 2$, which equals _____, lines altogether, including the sides of the polygon. Thus the number of diagonals will be _____.
 - There are 75 vertices, and each vertex is the endpoint of _____ diagonals, so there will be _____ endpoints of diagonals altogether. When we correct for over-counting, we discover that there will be _____ diagonals altogether.
14. There are some men and 21 women in a room. No person shakes hands with someone of the same sex, but it is noted that each man shakes hands with 3 women, and each woman shakes hands with 5 men. How many men are in the room?