

1. **(original)** How many people must you talk to in order to guarantee you find two of them born in the same month?
2. **(original)** Suppose you have a drawer of socks in a dark room. If you have just white and black socks, how many socks do you need to grab in order to ensure you get a matching pair? What if you have 7 different colors of socks? What if you have 3 legs and 5 different colors of socks? What if you have n legs and k colors of socks?
3. **(original)** Show that in a section of 22 students, all of whom are first, second, or third years, at least one of the following must be true:
 - (a) at least 15 are first years
 - (b) at least 5 are second years
 - (c) at least 4 are third years.
4. **original** Is it always true that in a group of 5 people, two of them will have the same number of friends within the group?
5. **(textbook 6.2.13)** Let (x_i, y_i, z_i) , $i = 1, 2, 3, 4, 5, 6, 7, 8, 9$ be a set of nine distinct points with integer coordinates in xyz -space. Show that the midpoints of at least one pair of these points has integer coordinates.
6. **(textbook 6.2.46)** There are 51 houses on a street. Each house has an address that is a positive integer between 1000 and 1099, inclusive. Show that at least two houses have addresses that are consecutive integers.
7. **(textbook 6.2.7)** Find the number of 5-permutations of a set with 9 elements.
8. **(textbook 6.2.17)** How many subsets with more than two elements does a set with 100 elements have?
9. **(textbook 6.2.37)** How many bit strings contain exactly eight 0s and ten 1s if every 0 must be immediately followed by a 1?
10. **(textbook 6.2.23)** How many ways are there for eight men and five women to stand in a line so that no two women stand next to each other?
11. **(original)** A tennis competition has 6 players. In how many ways can three one-on-one matches be scheduled such that each player plays in exactly one match if
 - (a) the three matches are distinguishable (for example, they happen at different times of the day)?
 - (b) the three matches are indistinguishable (so all that matters is who each player faces)?
12. **(textbook 6.2.17)** How many subsets with more than two elements does a set with 100 elements have?