

1. How many ways are there to arrange 5 books on a shelf?
2. How many ways are there to arrange 5 different cans of soda in a circle?
3. The letters in the word "comet" are randomly rearranged. What is the probability that the letters alternate consonant-vowel-consonant-vowel-consonant?
4. Two 6-sided dice are rolled. How many ways can they add up to 7? What is the probability that they add up to 7? Answer the same question for 10-sided dice.
5. Two people independently choose a random letter. What is the probability that they choose the same letter? What is the probability that they choose different vowels? (that is, they both chose vowels, and the two vowels are different) What is the probability that their letters are consecutive in the alphabet?
6. How many different 5-card hands can be dealt from a standard 52-card deck? (answer in symbols and as a number) How many of those hands are all diamonds?
7. What is the probability that 4 cards randomly chosen from a deck all have the same value? What is the probability that 4 cards randomly chosen from a deck all have the same suit? What is the probability that 4 cards chosen from a deck have all different values?
8. You flip a coin 10 times. Which is more likely: the first two flips are "heads", or exactly 5 of the flips are heads? What is the probability that the number of head and tails differs by 2?
9. You flip 5 coins and roll 5 dice. Which is more likely: all 5 coins are the same, or all 5 dice are the same? (You shouldn't have to calculate too much to find that answer!). How many coins do you have to flip before having all coins the same is less likely than 5 dice all the same? (For this problem assume the dice have 6 sides.)
10. 5 women and 5 men randomly sit down at a round table. What is the probability that the seating alternates boy-girl-boy-girl-....? What is the probability that all the men are sitting 5-in-a-row next to each other?
11. Pennsylvania license plates are 4 letters followed by 3 numbers. Delaware license plates are 5 characters where every character can be either a letter or number. Are there more possible license plates in Pennsylvania or Delaware?
12. What is the most likely total for 3 dice (assume 6 sided dice)?
13. You flip a coin 10 times. Which is more likely: all are the same (all heads or all tails), or that the flips alternate heads and tails?
14. 1000 coins are flipped. Is it more likely that the number of heads and tails differs by less than 5, or by more than 5?
15. 50 United States Senators are randomly chosen. What is the probability that exactly one is chosen from each state? (The US Senate has 100 people: 2 from each state).
16. What is the probability of throwing a train wreck in the game Cosmic Wimpout?

For problems 14 and 15 use Stirling's approximation.