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Stat 230 practice exercises

1. Let A be a set with 4 letters: a, b, c, d . Let $S = A^{10}$. How many members of S are there :
 - a) Containing two "a".
 - b) Containing at least 3 "a".
 - c) Containing exactly two "b" and four "c".
 - d) Containing at least one "a" and at least one "b".
2. In how many ways can the letters of the word MISSISSIPPI be arranged?
3. Five persons, A, B, C, D , and E , are going to speak at a meeting.
 - a) In how many ways can they take their turns if B must speak after A .
 - b) How many if B must immediately speak after A .
4. Four married couples are to be seated into a row of 8 seats.
 - a) How many possible ways of seating are there?
 - b) In how many ways the men are grouped together?
 - c) In how many ways the end seats are occupied by women?
 - d) In how many ways every man sits next to his wife?
5. A box contains: two white balls, two black, two green, and two red balls. Four balls are drawn at random without replacement, what is the probability that the four colors are represented?
6. Of ten twenty-dollar bills, two are counterfeit. Six bills are chosen at random without replacement. What is the probability of obtaining the two bad bills?
7. A box contains 8 keys of which 3 open a given door and the rest do not. You are to select 4 keys at random and try all four to the given door. What is the probability that the door opens?
8. Twelve identical bottles of soda will be distributed on four people. What is the probability that each person gets at least one bottle.
9. What is the probability that four different persons are born in the same month of the year? (a year consists of 12 months)
10. What is the probability that three different people are born on three different days of the week?

11. Four fair dice are to be thrown. Calculate the following probabilities.

- a) Of getting number 6 exactly twice.
- b) Of getting number 1 at least once.
- c) Of getting number 4 at most once.
- d) Of getting number 3 as the highest among the four numbers.
- e) Of getting number 4 as the lowest among the four numbers.

12. A box contains 12 socks which constitute 6 pairs. Six socks are selected without replacement. Calculate the following probabilities;

- a) Of getting no original pair.
- b) Of getting exactly two original pairs.
- c) Of getting 3 original pairs.

13. Six distinct objects are to be randomly distributed into 5 distinct boxes. Calculate the following probabilities.

- a) That exactly three objects fall into the first box.
- b) That all objects fall into any one box.
- c) That no box remains empty.

14. A student committee consists of five women and four men. It is to be divided, by chance, into two working groups, one group having three members and one group having 6 members. If two specific people want to be on the same group, what is the probability that their wish comes true?

15. Five distinct flags are to be distributed onto 3 distinct poles. What is the probability that all the flags fall on any of the poles?