

Permutation, Combination and Probability (1)

1. (a) In how many ways can a student answers 8 true-false questions ?
(b) In how many ways may the test be completed if a student is imposed for each incorrect answer, so that the student may leave some questions unanswered?
2. In how many ways can a committee of 2 Englishmen, 2 Frenchman, 1 American be chosen from 6 Englishmen, 7 Frenchman 3 American ? In how many ways do a particular Englishman and a particular Frenchman belong to a committee ?
3. A company has 12 construction workers. The manager plans to assign 3 to job site A, 4 to job site B and 5 to job site C. In how many different ways can the manager make this assignment?
4. How many different arrangements of four letters in a row that can be made from the letters of the word (a) "COMBINE" (b) "PROBABILITY"
5. A bag contains 5 green marbles, 4 blue marbles and 6 red marbles. A marble is picked at random. Without replacing the first marble, another marble is taken from the bag. Calculate the probability that
 - (a) the first marble is green and the second marble red.
 - (b) two marbles are NOT of the same colour.
6. In arranging a 10-day examination time-table involving 10 subjects and one subject per day, a teacher plans to have Mathematics, Physics and Chemistry all separated by at least one day. How many ways are possible?
7. 0000, 0001, 0002, ..., 9999 are ten thousand 4-digits numbers. The numbers are classified into the following groups,
 - (a) All 4 digits are the same.
 - (b) Three digits are the same and the remaining digit is different.
 - (c) Two pairs of the same digits
 - (d) One pair of the same digits and the other two digits are different.
 - (e) All digits are different.Calculate the number of numbers in each group.

8. A production process uses two machines in its daily production. A random sampling produced are inspected and the following contingency table is obtained

	Defective	Non-defective
Machine X	15	285
Machine Y	6	194

If an item is selected randomly, what is the probability that the item is

- (a) defective
 - (b) produced by machine X and defective,
 - (c) produced by machine X or non-defective,
 - (d) defective given that it is produced by machine X
9. A navigation signal is made of flags arranged in a row. If there are 4 red flags, 2 blue flags and 2 green flags, find the number of different signals possible if
- (a) we can use all the flags
 - (b) at least 7 flags must be used for the signal.
10. A group of students sit for both the Mathematics and Physics papers in school examination. Their results are summarized as follow:
- 75% pass Mathematics
 - 70% passes Physics
 - 40% fail in at least one of the subjects.
- A student is selected randomly from the group.
- (a) Find the probability that the student passes only one of the two subjects.
 - (b) Among those who pass Mathematics, find the probability that they also pass Physics.
11. In how many ways can a committee of 3 women and 4 men are chosen from 8 women and 7 men? What is the number of ways if Miss X refuses to serve if Mr. Y is a member?
12. Find the number of permutations that can be formed from the letters of the word POPULAR. How many of these permutations:
- (a) begin and end with P?
 - (b) have the two P's separated?
 - (c) have the vowels together?