S 12

Determining Probability Using Permutations and Factorials

Example 1:
Software for generating multiple-choice tests randomly assigns A, B, C, or D as the correct answer. On a 10-question test, what is the probability that all 10 questions have C as the correct answer?

Example 2:
An illusionist asks five people to each secretly write a number between 1 and 100 on a card. Incredibly, they all write the same number.
a) What is the probability of tis occurring?

b) Relate your answer to part a) to the probability of rolling a six on a standard die five times in a row.

Example 3:
Four students, one from each grades 9, 10, 11, and 12, line up to pose for a photograph. What is the probability that they will be in order of their grades?

Example 4:
Eight people on a waiting list for advance tickets to a concert have been selected to choose their seats. What is the probability they have been notified in order from youngest to oldest?

Example 5:
Logan selects five cards in order, without replacement, from a standard deck of cards. What is the probability that

a) she selects three aces followed by two jacks?

b) Logan selects two hearts followed by three clubs?

Example 6: "The very famous birthday problem"
From a group of 16 people, what is the probability that:

a) none share a birthday?

b) at least two of them share the same birthday?

Note:

- Permutations and factorials can be used in probability calculations only if the trials are **dependent.**