



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai

Accredited by NAAC-UGC with 'A++' Grade (Cycle III) &

Accredited by NBA (B.E - CSE, EEE, ECE, Mech & B.Tech.IT)

COIMBATORE-641 035, TAMIL NADU



Unit-II: Quantitative Ability IV

Permutation & Combination, Probability, and Mensuration—**without equations, with clear answers and explanations:**

Permutation & Combination

Puzzle 1:

You have five different colored books. In how many different ways can you arrange them on a shelf if the red and blue books must always be together?

Answer:

Treat the red and blue books as a single unit. Now you have four items to arrange (the red-blue pair and the other three books), which can be arranged in 24 ways. But the red and blue books can be arranged among themselves in 2 ways (red first or blue first). So, total arrangements = $24 \times 2 = 48$ ways.

Puzzle 2:

A password consists of three letters followed by two digits. If letters and digits can be repeated, how many unique passwords can you create?

Answer:

There are 26 choices for each letter and 10 choices for each digit. So, total passwords = $26 \times 26 \times 26 \times 10 \times 10 = 1,757,600$ passwords.

Puzzle 3:

You are forming a committee of three people from a group of six friends. How many different committees can you form if two particular friends refuse to be on the committee together?



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Answer:

First, calculate all possible committees: 20.

Now, subtract the number of committees where both those friends are together: If both are on the committee, you need one more member from the remaining four friends, which can be done in 4 ways.

So, total = $20 - 4 = 16$ committees.

Probability

Puzzle 4:

You are on a game show with three doors. Behind one is a car; behind the others, goats. You pick a door. The host, who knows what's behind the doors, opens another door to reveal a goat. Should you stick with your original choice or switch to the other unopened door? Why?

Answer:

You should switch. Switching gives you a 2 in 3 chance of winning the car, while sticking with your original choice gives you only a 1 in 3 chance. This is the famous Monty Hall problem.

Puzzle 5:

A bag contains 4 red balls and 6 blue balls. You pick two balls at random, one after the other, without putting the first one back. What is the chance that both balls are the same color?

Answer:

There are two ways for both balls to be the same color: both red or both blue.

- Probability both are red: $(4/10) \times (3/9) = 12/90$
 - Probability both are blue: $(6/10) \times (5/9) = 30/90$
- Add them: $12/90 + 30/90 = 42/90 = 7/15$



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Puzzle 6:

There are 30 students in a class. What is the likelihood that at least two of them share the same birthday?

Answer:

Surprisingly, with 30 students, the chance that at least two share a birthday is over 70%. This is known as the birthday paradox.

Mensuration

Puzzle 7:

You have a rectangular garden. If you double the length and triple the width, how does the area of your garden change?

Answer:

The new area is 6 times the original area (since doubling and tripling multiplies the area by $2 \times 3 = 6$).

Puzzle 8:

A cylindrical water tank is filled to the top. If you pour half the water into another identical tank, how does the height of the water in each tank compare to the original?

Answer:

Since the tanks are identical, pouring half the water into the other tank means both tanks will have water at half the original height.

Puzzle 9:

You want to wrap a present shaped like a cube. If the length of each side is doubled, how does the amount of wrapping paper needed change?



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Answer:

The surface area increases by a factor of 4 (since area scales with the square of the side length), so you need four times as much wrapping paper.