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Class :-11(Maths) Date:- 11.01.2021

1. How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that

(i) Repetition of the digits is allowed?

(ii) Repetition of the digits is not allowed?

Solution:

(i) Let the 3-digit number be ABC, where C is at the units place, B at the tens place and A at the hundreds place.

Now when repetition is allowed,

The number of digits possible at C is 5. As repetition is allowed, the number of digits possible at B and A is also 5 at each.

Hence, the total number possible 3-digit numbers =5 × 5 × 5 =125

(ii) Let the 3-digit number be ABC, where C is at the units place, B at the tens place and A at the hundreds place.

Now when repetition is not allowed,

The number of digits possible at C is 5. Let's suppose one of 5 digits occupies place C, now as the repletion is not allowed, the possible digits for place B are 4 and similarly there are only 3 possible digits for place A.

Therefore, The total number of possible 3-digit numbers=5 × 4 × 3=60

2. How many 3-digits even numbers can be formed from the digits 1, 2, 3, 4, 5, 6 if the digits can be repeated?

Solution:

Let the 3-digit number be ABC, where C is at the unit's place, B at the tens place and A at the hundreds place.

As the number has to even, the digits possible at C are 2 or 4 or 6. That is number of possible digits at C is 3.

Now, as the repetition is allowed, the digits possible at B is 6. Similarly, at A, also, the number of digits possible is 6.

Therefore, The total number possible 3 digit numbers = 6 × 6 × 3 = 108.

3. How many 4-letter code can be formed using the first 10 letters of the English alphabet, if no letter can be repeated?

Solution:

Let the 4 digit code be 1234.

At the first place, the number of letters possible is 10.

Let’s suppose any 1 of the ten occupies place 1.

Now, as the repetition is not allowed, the number of letters possible at place 2 is 9. Now at 1 and 2, any 2 of the 10 alphabets have been taken. The number of alphabets left for place 3 is 8 and similarly the number of alphabets possible at 4 is 7.

Therefore the total number of 4 letter codes=10 × 9 × 8 × 7=5040