



# MATHS

## NCERT - NCERT MATHEMATICS

### (GUJRATI)

# PERMUTATIONS AND COMBINATIONS

### Example

1. Find the number of 4 letter words, with or without meaning, which can be formed out of

the letters of the word ROSE, where the repetition of the letters is not allowed.



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2. Given 4 flags of different colours, how many different signals can be generated, if a signal requires the use of 2 flags one below the other?



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



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4. Find the number of different signals that can be generated by arranging at least 2 flags in order (one below the other) on a vertical staff, if five different flags are available.



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5. Evaluate : 5!



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6. Evaluate : 7!



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7. Evaluate :7! - 5!



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8. Compute :  $\frac{7!}{5!}$



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9. Compute :  $\frac{12!}{(10!)(2!)}$



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10. Evaluate  $\frac{n!}{r!(n-r)!}$ , when  $n = 5, r = 2$ .



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11. If  $\frac{1}{8!} + \frac{1}{9!} = \frac{x}{10!}$ , find  $x$ .



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12. Find the number of permutations of the letters of the word ALLAHABAD.



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**13.** How many 4-digit numbers can be formed by using the digits 1 to 9 if repetition of digits is not allowed?



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**14.** How many numbers lying between 100 and 1000 can be formed with the digits 0, 1, 2, 3, 4, 5, if the repetition of the digits is not allowed?



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15. Find the value of  $n$  such that

$${}^n P_5 = 42 {}^n P_3, n > 4$$



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16. Find the value of  $n$  such that

$$\frac{{}^n P_4}{{}^{n-1} P_4} = \frac{5}{3}, n > 4$$



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17. Find  $r$ , if  $5^4 P_r = 6^5 P_{r-1}$







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**18.** Find the number of different 8-letter arrangements that can be made from the letters of the word DAUGHTER so that all vowels occur together .



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**19.** Find the number of different 8-letter arrangements that can be made from the

letters of the word DAUGHTER so that all vowels do not occur together.



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**20.** In how many ways can 4 red, 3 yellow and 2 green discs be arranged in a row if the discs of the same colour are indistinguishable ?



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21. Find the number of arrangements of the letters of the word INDEPENDENCE. In how many of these arrangements, do the words start with P .



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22. Find the number of arrangements of the letters of the word INDEPENDENCE. In how many of these arrangements, do all the vowels always occur together





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**23.** Find the number of arrangements of the letters of the word INDEPENDENCE. In how many of these arrangements, do the vowels never occur together



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**24.** Find the number of arrangements of the letters of the word INDEPENDENCE. In how

many of these arrangements,

do the words begin with I and end in P?



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25. If  ${}^n C_9 = {}^n C_8$ , find  ${}^n C_{17}$ .



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26. A committee of 3 persons is to be constituted from a group of 2 men and 3 women. In how many ways can this be done?

How many of these committees would consist of 1 man and 2 women?



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**27.** What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these

- (i) four cards are of the same suit,
- (ii) four cards belong to four different suits,
- (iii) are face cards,

(iv) two are red cards and two are black cards,

(v) cards are of the same colour?



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**28.** How many words, with or without meaning, each of 3 vowels and 2 consonants can be formed from the letters of the word INVOLUTE ?



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**29.** A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has (i) no girl ? (ii) at least one boy and one girl ? (iii) at least 3 girls ?



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**30.** Find the number of words with or without meaning which can be made using all the letters of the word AGAIN. If these words are



written as in a dictionary, what will be the 50<sup>th</sup> word?



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**31.** How many numbers greater than 1000000 can be formed by using the digits 1, 2, 0, 2, 4, 2, 4?



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**32.** In how many ways can 5 girls and 3 boys be seated in a row so that no two boys are together?



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## Exercise 7 1

**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?



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



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



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4. How many 5-digit telephone numbers can be constructed using the digits 0 to 9 if each number starts with 67 and no digit appears more than once?



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5. A coin is tossed 3 times and the outcomes are recorded. How many possible outcomes are there?



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6. Given 5 flags of different colours, how many different signals can be generated if each signal requires the use of 2 flags, one below the other?



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## Exercise 7 2

1. Evaluate

$8!$



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2. Evaluate

$4! - 3!$



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3. Is  $3! + 4! = 7!$ ?



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4. Compute  $\frac{8!}{6! \times 2!}$



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5. If  $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$ , find  $x$



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6. Evaluate  $\frac{n!}{(n-r)!}$ , when

$$n = 6, r = 2$$



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7. Evaluate  $\frac{n!}{(n-r)!}$ , when

$$n = 9, r = 5$$



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## Exercise 7 3

1. How many 3-digit numbers can be formed by using the digits 1 to 9 if no digit is repeated?



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2. How many 4-digit numbers are there with no digit repeated?



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3. How many 3-digit even numbers can be made using the digits 1,2,3,4, 6, 7, if no digit is repeated?



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4. Find the number of 4-digit numbers that can be formed using the digits 1, 2, 3, 4, 5 if no digit is repeated. How many of these will be even?



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5. From a committee of 8 persons, in how many ways can we choose a chairman and a vice chairman assuming one person can not hold more than one position?



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6. Find  $n$  if  ${}^{n-1}P_3 : {}^n P_4 = 1 : 9$ .



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7. Find  $r$  if  ${}^5P_r = 2{}^6P_{r-1}$



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8. Find  $r$  if  ${}^5P_r = {}^6P_{r-1}$



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9. How many words, with or without meaning, can be formed using all the letters of the word EQUATION, using each letter exactly once?



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**10.** How many words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if.

(i) 4 letters are used at a time, (ii) all letters are used at a time,

(iii) all letters are used but first letter is a vowel?



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**11.** In how many of the distinct permutations of the letters in MISSISSIPPI do the four I's not come together?



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**12.** In how many ways can the letters of the word PERMUTATIONS be arranged if the  
(i) words start with P and end with S, (ii) vowels are all together,

(iii) there are always 4 letters between P and S?



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## Exercise 7 4

1. If  ${}^n C_8 = {}^n C_2$ , find  ${}^n C_2$ .



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2. Determine n if

$${}^{2n}C_3 : {}^nC_3 = 12 : 1 .$$



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3. Determine n if

$${}^{2n}C_3 : {}^nC_3 = 11 : 1$$



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4. How many chords can be drawn through 21 points on a circle?



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5. In how many ways can a team of 3 boys and 3 girls be selected from 5 boys and 4 girls?



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6. Find the number of ways of selecting 9 balls from 6 red balls, 5 white balls and 5 blue balls if each selection consists of 3 balls of each colour.



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7. Determine the number of 5 card combinations out of a deck of 52 cards if there is exactly one ace in each combination.



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8. In how many ways can one select a cricket team of eleven from 17 players in which only 5 players can bowl if each cricket team of 11 must include exactly 4 bowlers?



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9. A bag contains 5 black and 6 red balls. Determine the number of ways in which 2 black and 3 red balls can be selected.



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**10.** In how many ways can a student choose a programme of 5 courses if 9 courses are available and 2 specific courses are compulsory for every student?



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**Miscellaneous Exercise On Chapter 7**

1. How many words, with or without meaning, each of 2 vowels and 3 consonants can be formed from the letters of the word DAUGHTER ?



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2. How many words, with or without meaning, can be formed using all the letters of the word EQUATION at a time so that the vowels and consonants occur together?





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3. A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of:

(i) exactly 3 girls ? (ii) atleast 3 girls ? (iii) atmost 3 girls ?



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4. If the different permutations of all the letter of the word EXAMINATION are listed as in a

dictionary, how many words are there in this list before the first word starting with E ?



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5. How many 6-digit numbers can be formed from the digits 0, 1, 3, 5, 7 and 9 which are divisible by 10 and no digit is repeated ?



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6. The English alphabet has 5 vowels and 21 consonants. How many words with two different vowels and 2 different consonants can be formed from the alphabet ?



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7. In an examination, a question paper consists of 12 questions divided into two parts i.e., Part I and Part II, containing 5 and 7 questions, respectively. A student is required to attempt



8 questions in all, selecting at least 3 from each part. In how many ways can a student select the questions?



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8. Determine the number of 5-card combinations out of a deck of 52 cards if each selection of 5 cards has exactly one king.



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**9.** It is required to seat 5 men and 4 women in a row so that the women are in even places. How many such arrangements are possible ?



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**10.** From a class of 25 students, 10 are to be chosen for an excursion party. There are 3 students who decide that either all of them will join or none of them will join. In how many ways can the excursion party be chosen ?





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**11.** In how many ways can the letters of the word ASSASSINATION be arranged so that all the S's are together?



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