



MATHS

BOOKS - V PUBLICATION

PERMUTATIONS AND COMBINATIONS

Questionbank

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 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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3. How many two digit even number with distinct digits can be formed from the digits 1,2,3,4,5.



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4. Find the number of different signals that can be made by arranging at least three flags in order on a vertical pole, if 6 different coloured flags are available.



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



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6. 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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7. 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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8. 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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9. A coin is tossed 3 times and the outcomes are recorded. How many possible outcomes are there?



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10. 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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11. Evaluate.

(i) $5!$

ii) $7!$

(iii) $7! - 5!$



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12. Evaluate the following:

$$\frac{12!}{10! \times 2!}$$



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



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



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15. Evaluate $4! - 3!$



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



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



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



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19. Evaluate $\frac{n!}{(n-r)!}$ $n = 9, r = 5$



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20. Find the number of permutation of the letters of the word ALLAHABAD.



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21. How many 4 -digit numbers can be formed by using' the digits 1 to 9 'if repetitions of digits is not allowed?



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22. 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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23. Find the value of n such that

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

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



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



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25. 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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26. 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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27. Find the arrangements of letters of the word INDEPENDENCE. In how many of these arrangements.

do the words start with P.



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



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



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30. 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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31. 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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32. From a committee of 8 persons, in how many ways can we choose a chairman and a vice chairman, assuming one person can't hold more than one position?



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33. Find r , if ${}^5P_r = 2 \times {}^6P_{r-1}$



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34. 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 the consonants occur together?



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35. How many words, with or without meaning that can be made from the letters of the word 'MONDAY', assuming that no letter is repeated if 4 letters are used at a time.



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36. How many permutations are there of the 11 letters in MISSISSIPPI
all the I's not come together?



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37. In how many ways can the letters of the word PERMUTATIONS be arranged if, the word starts with P and ends with S?



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38. If ${}^n C_9 = {}^n C_8$ find 'n' and ${}^n C_{17}$



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39. A committee of 3 persons is to be constituted from a group of 2 men and 3 women.

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



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40. What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how

many of these

cards are of the same colour?



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41. If ${}^n C_2 = {}^n C_8$ then find n



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



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43. 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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44. 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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45. 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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46. 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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47. 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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48. 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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49. How many words with or without meaning each of three vowels and two consonants can be formed from the letters of the word INVOLUTE.



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50. 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 at least one boy and one girl?



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51. If all the permutations of the word ‘AGAIN’ are arranged in a dictionary order, what is the 50^{th} word?



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



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53. 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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54. 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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55. 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 the consonants occur together?



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56. 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 exactly 3 girls?



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57. Suppose that the different permutations of the word 'EXAMINATION' are listed as in a

dictionary. How many items are there in the list before the first word starting with E?



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58. 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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59. 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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60. 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 the student select the questions?



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



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



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63. 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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64. Consider the word ASSASSINATION.

How many different ways can be arranged so that the 4S's come together?



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65. How many words, with or without meaning that can be made from the letters of the word 'MONDAY', assuming that no letter is repeated if 4 letters are used at a time.



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66. How many different numbers less than 400 can be formed from the digits 1, 2, 3, 4 and 5 if repetitions

(i) are not allowed

(ii) are allowed.



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67. In how many ways can 5 children stand in a queue?



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68. A family of 4 males and 3 females are to be arranged in a row for a photograph. In how

many ways can they be seated if (a) all the females sit together (b) all females are separated.



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69. From a class of 12 boys and 10 girls, 10 students are to be chosen for a competition, including at least 4 boys and 4 girls. The two girls who won the prizes last year should be included. In how many ways can the selection be made?



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70. Out of 18 points in a plane, no three are in the same line except 5 points which are collinear. How many straight lines can be formed by joining the given points?



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71. A class consists of 40 girls and 60 boys. In how many ways can a president, vice president, treasurer and secretary be chosen if

the treasurer must be girl, the secretary must be a boy and a student may not hold more than one office.



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72. Convert into factorials

4.5.6.7.8.9.10.11



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73. Express $(2x + 1)!$ in terms of $(2x - 1)!$, $(x + 2)!$ in terms of $(x - 1)!$

.Hence, solve the equation

$$\frac{(2x + 1)!}{(x + 2)!} \times \frac{(x - 1)!}{(2x - 1)!} = \frac{3}{5}$$



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74. Prove that $33!$ is divisible by 2^{15} . What is the largest integer n such that $33!$ is divisible by 2^n ?



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75. Find n , if ${}^9P_5 + 5 \cdot {}^9P_4 = {}^{10}P_n$



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76.

Show

that

$${}^{2n}C_n = \frac{1 \times 3 \times 5 \times \dots \times (2n - 1)}{n!} \cdot 2^n$$



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77. If n and r are positive integers such that.

$2 \leq r \leq n$, show that

$${}^n C_r + 2{}^n C_{r-1} + {}^n C_{r-2} = {}^{n+2} C_r$$



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78. In an exam, Arjun has to select 4 questions from each part. There are 6, 7 and 8 questions in Part I, Part II and Part III, respectively. What is the number of possible combinations in which he can choose the questions?



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79. A polygon has 44 diagonals. Find the number of its sides



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