MATHS

BOOKS - NAGEEN MATHS (HINGLISH)

PERMUTATION AND COMBINATION

Solved Example

1. Evaluate the following:

(i) $7! - 6!$ (ii) $\frac{8!}{6!}$

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2. Solve:

(i) 8! (ii) 4! - 3!

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3. Convert 1.3.5.7.9 into factorial

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4. Convert 5.6.7.8 into factorial.

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5. Find the value of 'n' if

$(n+4)!=56(n+2)!.$

A. 3

B. 5

C. 4

D. 6

Answer: C

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6. Prove that

$$\frac{n!}{r!(n-r)!}+\frac{n!}{(r-1)!(n-r+1)!}=\frac{(n+1)!}{r!(n-r+1)!}$$

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7. Prove that: $\frac{(2n)!}{n!} = \{1.\ 3.\ 5(2n-1)\}2^n.$

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8. Evaluate $.^7 P_4.$

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9. If $\hat{} \ 10P_r = 5040,$ find the value of $r.$

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10. If $.^{6}P_{r} : .^{6}P_{5} = 1:2$, find the value of r.

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11. If $.^{n}P_{4} : .^{n}P_{5} = 1:2$, find the value of n.

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12. If $.^{22}P_{r+1} \therefore .^{20}P_{r+2} = 11:52$, find the value of r.

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13. If $r \leq s \leq n$, then prove that $.^{n}P_{s}$ is divisible by $.^{n}P_{r}$.

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14. There are 4 ways between Delhi and Mumbai. In how many ways can a person comes back after going from Delhi to Mumbai if he returns

(i) with the same way?

(ii) with any way?

(iii) with any remaining way?

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15. In how many ways can 4 letters be posted in 3 letter boxes?

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16. Three are 6 different flags. Find the number of signals which can be formed with the help of at least 3 flags.

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17. Find all 3 digit numbers formed with the digits 1,2,3,4 and 5 if

(i) repetition of digits is allowed?

(ii) repetition of digits is not allowed?

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18. How many signals can be formed with 5 different colours flags, if there are two flags in every signal?

A. 10

B. 20

C. 30

D. None of these

Answer: B

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19. How many words can be formed with the letters of the word 'DAUGHTER', when

(i) there is no restriction?

(ii) all vowels are together?

(iii) Words start from A?

(iv) words start from A and end with R?

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20. How many words can be formed from the letters of the word 'TRIANGLES'. If 'N' is always in the middle?

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21. How many words can be formed with the leters of the word 'EQUATION', which starts with a vowel and ends with a vowel?

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22. How many words can be formed with the letters of the word 'PENCIL' in which

(i) 'C' and 'L' are always together?

(ii) 'C' comes just after 'L'?

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23. How many words can be formed with the letters of the word 'FAILURE' in which consonants may occupy even positions?

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24. How many words can be formed with the letters of the word 'LAHORE', if

(i) L and A are always together?

(ii) L and A are never together?

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25. How many number of 5 digits can be formed with the digits 0,2,4,6,8 if repetition of digits is not allowed?

A. 120

B. 3125

C. 96

D. 24

Answer: C

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26. How many numbers can be formed with the digits 0,1,3,5 by using at least one digit when repetition of digits is not allowed?

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27. How many 5 digit numbers can be formed with the digits 0,1,2,3 and 4 when repetition of digits is allowed?

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28. Find the sum of all those numbers which can be formed by the digits 2,3,4 and 5.

29. How many permutations of the letters of the word 'SERIES' are there?

30. How many different words can be formed by using all the letters of the word 'ALLAHABAD'?

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31. How many words can be formed with the letters of the word 'CALCULUS'? Out of these words, how many words

(i) starts with A ?

(ii) starts with A and ends with S?

(iii) have all vowels together?

(iv) have not all vowels together?

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32. Find the number of words formed (meaningful or meaningless) by the letters of the words $AGAIN$ .If

we write these words in a dictionary, find it 50^{th} word.

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33. How many numbers of 5 digits can be formed by the digits 1,2,2,1,3?

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34. How many 7 digit numbers can be formed with the digits 2,3,0,3,4,4,3?

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35. Find the number of words formed with the letters of the word 'MADHUBANI' which do not start with M but end with I.

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36. In how many ways can 6 persons be seated at a round table?

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37. In how many ways can 12 members be seated at a round table when the secretary and the joint

secretary are always the neighbours of the president.

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38. In how many ways can 6 boys and 5 girls can be seated at a round table if no two girls are together?

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39. In how many ways can 6 persons can be seated at a round table so that all shall not have the same neighbours in any two arrangements?

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40. In how many ways a garland can be made by using 15 different flowers.

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41. Evaluate $.^{12}C_7$.

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42. If $.^{n}C_{12} = .^{n}C_{16}$, find the value of n

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43. Determine n if (i) $\hat{}\ {}^{2n}C_2 : {}^{n}C_2 = 12:1$ (ii) $\hat{}\ {}^{2n}C_3 : {}^{n}C_3 = 11:1$

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44. For all positive integers n, show that ${}^{2n}C_n + {}^{2n}C_{n-1} = \frac{1}{2}\left({}^{2n+2}C_{n+1}\right)$.

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45. Prove that:

$.{}^{47}C_4 + .{}^{51}C_3 + {}^{50}C_3 + {}^{49}C_3 + {}^{48}C_3 + {}^{47}C_3 = {}^{52}C_4$

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46. If $.^{15}C_r : .^{15}C_{R-1} = 11:5$, then find the value of 'r'.

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47. If $\hat{} \; n+2C_8 :^{n-2} P_4 : 57:16,$ find n.

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48. If $^nC_{r-1} = 36, {}^nC_r = 84$ and $^nC_{r+1} = 126,$ then find the value of $^rC_2$.

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49. If $\hat{} \ {}^{n}P_{r} = {}^{n}P_{r+1} and {}^{n}C_{r} = {}^{n}C_{r-1,}$ then the value of $n + r$ is.

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50. In how many ways 11 players can be selected from 15 cricket players ?

A. 1365

B. 1000

C. 1500

D. 1245

Answer: A

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51. In how many ways 11 players can be selected from 15 players if

(i) one particular player is always selected ?

(ii) one particular player is never selected?

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52. Two subjects are compulsory for a student in an examination. In how many ways can a student select 5 subjects out of given 10 subjects?

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53. In how many ways can 3 boys and 3 girls can be selected from 5 boys and 3 girls?

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54. Find the number of ways in which 4 cards can be selected from a pack of 52 cards. In how many ways

(i) all 4 cards are from one suit?

(ii) all 4 cards are from different suits?

(iii) all 4 cards are face cards?

(iv) two cards are red and 2 cards are black?

(v) all 4 cards are of same colour?

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55. How many teams of 3 boys and 3 girls can be selected from 5 boys and 4 girld?

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56. Find the number of ways in which a committee of 11 members can be formed out of 6 teachers and 8 students if there are at least 4 teachers in the committee.

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57. Find the number of ways in which a committee of 6 members can be formed out of 4 officers and 8 jawans, if there are at least 2 officer in the committee.

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58. Three are 12 points in a plane, no of three of which are in the same straight line, except 5 points whoich are collinear. Find

(i) the numbers of lines obtained from the pairs of these points.

(ii) the numbers of triangles that can be formed with vertices as these points.

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59. Find the number of diagonals by joining the vertices of a polygon of n sides.

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60. In how many ways can 7 green and 5 yellowballs be arranged in a striaght line when 2 yellow balls are not together?

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61. In how many ways can 5 friends of a man be seated on a round table and 4 friends on other round table out of 9 friends?

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62. It is required to get minimum marks in each subject out of 5 subject to pass in an examination. In how many ways can a student fail?

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63. A coin is tossed 5 times. Find the number of ways of getting 3 head and 2 tail.

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64. How many natural numbers are factors of exactly one of the numbers 675 and 1080?

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65. Find in how many ways can

(i) at least one fruit be selected ?

(ii) one fruit of each type be selected?

(iii) at least one fruit of each type be selected ? Grom

5 organs, 7 mangoes and 8 bananas?

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66. In how many ways can 52 cards be divided among

4 players equally, when

(i) each gets equal number of cards?

(ii) cards are divided into 4 groups of 14 cards each?

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67. Find the number of combinations and permutations of 4 letters taken from the word EXAMINATION.

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Exercise A

1. Evaluate the following:

(i) $6! - 5!$ (ii) $\frac{30!}{28!}$

(iii) $\frac{15!}{12!3!}$ (iv) $\frac{1}{4!} + \frac{1}{5!} + \frac{1}{6!}$

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2. If $n = 12, r = 4$, then evaluate the following:

(i) $\frac{n!}{r!(n-r)!}$ (ii) $\frac{n!}{(n-r+2)!}$

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3. Find the H.C.E. and L.C.M. of $6!, 7!, 8!$.

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4. Convert the following into factorial.

(i) 2.4.6.8.10.12.14.16.18.20

(ii) 1.3.5.7.9.11.13.15

(iii) 3.6.9.12.15

(iv) 6.7.8.9.10

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5. Find the value of n if:

(i) $(n+2)!=12.\ n!$

(ii) $(n+2)!=60-.\ (n-1)!$

$$=\frac{\{2.4.6.\ldots.\ (2n)\}\{1.3.5.\ldots.\ (2.\ -1)\}}{n!}$$

$$= \frac{2^n\{1.2.3...n\}\{1.3.5..... (2n-1)\}}{n!}$$

$$= 2^n\{1.3.5.... (2n-1)\}$$

$= R.H.S.$ Hence Proved.

(iii) $(n+3)! = 2550(n+1)!$

(iv) $(n-2)! = 132.(n-4)!.$

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6. Prove that $n!(n+2) = n! + (n+1)!.$

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7. Find the value of n if $\frac{n}{11!} = \frac{1}{9!} + \frac{1}{10!}.$

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8. (i) If $\frac{n!}{2.(n-2)!} : \frac{n!}{4!.(n-4)!} = 2:1$, find the valye of n.

(ii) If $\frac{(2n)!}{3!(2n-3)!} : \frac{n!}{2!(n-2)!} = 44:3$, then find the value of n.

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9. Prove that:

(i) $\frac{n!}{r!} = n(n-1)(n-2).....(r+1)$

(ii) $(n-r+1).\frac{n!}{(n-r+1)!} = \frac{n!}{(n-r)!}$

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Exercise B

1. Evaluate the following:

(i) $.^{9}P_3$ (ii) $.^{10}P_2$

(iii) $.^{12}P_4$

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2. Find the value of n from each of the following:

(i) $10.^{n}P_6 = .^{n+1}P_3$

(ii) $16.^{n}P_3 = 13.^{n+1}P_3$

(iii) $.^{n-1}P_3 : .^{n}P_4 = 1:9$

(iv) $.^{n}P_{6} = 30.^{n}P_{4}$

(v) $.^{2n+1}P_{n-1} : .^{2n-1}P_{n} = 3:5$

(vi) $P(n, 4) = 30P(n, 2)$

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3. Find thevalue of 'r':

(i) $.^{12}P_{r} = 1320$

(ii) $.^{56}P_{r+6} : .^{54}P_{r+3} = 30800:1$

(iii) $5.^{4}P_{r} = 6.^{5}P_{r-1}$

(iv) $.^{9}P_{5} + 5.^{9}P_{4} = 10P_{r}$

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4. There are 12 boys and 8 girls in a class

(i) In how many ways can a boy be selected?

(ii) In how many ways can one boy and one girl be selected?

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5. How many numbers of 3 digits can be formed with the digits 1,2,3,4,5,6 if,

(i) repetition of digits is allowed?

(ii) repetition of digits is not allowed?

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6. How many codes containing 3 letters can be formed with the 9 letters of English alphabet if repetition is not allowed?

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7. In how many ways can 4 prizes be distributed among 5 students, when No student gets more than one prize? A student may get any number of prizes? No student gets all the prizes?

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8. In how many ways can 4 letters be posted in 5 letter boxes?

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9. A letter lock consists of three rings each marked with 10 different letters. In how many ways it is possible to make an unsuccessful attempt to open the lock?

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10. Seven athletes are participating in a race. In how many ways can the first three athletes win the prizes?

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Exercise C

1. How many words of 6 letters from the word 'SUNDAY' can be formed if

(i) there is no restriction?

(ii) all words start with 'S'?

(iii) all words start with 'S' and ends with 'Y'?

(iv) all vowels come together?

(v) all consonants come together?

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2. How many words of (i) 3 letters, (ii) 4 letters, (iii) 5 letters can be formed by the letters of the word 'COURTESY'?

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3. How many words can be formed by the letters of the word 'SCHOLAR', if each word starts with 'O' and ends with 'S'?

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4. (i) How many words can be formed with the letters of the word 'FAILURE', if A and F are always together?

(ii) In how many ways can 6 question papers be arranged if the best and worst papers are always together?

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5. How many words can be formed with the letters of the word 'GUJRAT', if all vowels are always together?

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6. How many words can be formed with the letters of the word 'NUMBERS', if all consonants are always together?

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7. How many words can be formed with the letters of the words 'TRIANGLE', if each word starts with R and ends with E?

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8. How many words can be formed with the letters of the words 'SQUARE', which ends with E?

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9. How many words can be formed by the letters of the word 'TUESDAY' which starts and ends with a vowel?

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10. How many words can be formed with the letters of the word 'DELHI' if E and H never occur together?

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11. How many words can be formed with the letters of the word 'GANESHPURI' in which vowels occupy odd positions?

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12. How many words can be formed with the letters of the word 'ANGLE' in which vowels occupy odd positions?

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13. How many words can be formed with the letters of the word $LUCKNOW$ in which L,U,C occupy odd positions?

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14. How many even numbers of 4 digits can be formed with the digits 2,3,5,7,9 when repetition is not allowed?

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15. How many numbers of 4 digits can be formed with the digits 0,1,3,4,6 if

(i) repetition of digits is allowed?

(ii) repetition of digits is not allowed?

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16. How many numbers are there between 3000 and 4000 which can be formed with the digits 3,4,5,6,7,8 and repetition of digits is not allowed?

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17. How many numbers of 5 digits can be formed with the digits 1,3,0,2,4,8 if

(i) repetition is not allowed?

(ii) repetition is allowed?

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18. Find the sum of all those 4 digits numbers which can be formed with the digits 1,2,3,4.

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19. Find the sum of all those numbers which can be formed with the digits 0,1,2,3 taken together.

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20. How many numbers between 6000 and 7000 a divisible by 5 which can be formed with the digits 5,6,7 and 9?

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21. How many 3 digit odd numbers can be formed with the digits 1,3,5,6,8?

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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. In how many ways 7 men and 7 women can be seated around a round table such that no two women can sit together

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24. In how many ways 3 books of Mathematics, 4 books of Physics and 2 books of Chemistry can be arranged on a table if all the books of one subject placed together?

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Exercise D

1. Find the number of words formed with the letters of the word 'INDIA'.

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2. Find the number of words formed with the letters of the word 'MISSISSIPPI'.

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3. Find the number of arrangements of the letters of the INDEPENDENCE. In how many of these arrangements, (i) do the words start with P (ii) do all the vowels always occur together (iii) do the vowels never occur together (iv) do the words begin wit

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4. (i) Find the number of words formed with the letters of the word 'MATHEMATICS' in which vowels never occur together.

(ii) Find the number of words formed with the letters of the word'CHANDIGARH'. In now many words, both 'A' will not be together?

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5. How many permutations can be there with $x^3.y^2z^4$? How many of these arrangements, all z are not together?

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6. How many numbers can be formed with the digits 2,4,4,3,7 which are greater than 40000?

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7. How many 7 digit numbers can be formed with the digits 2,3,0,3,4,4,3?

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8. How many different words can be formed with letters of the word SUNDAY ? How many of the words

begin with N? How many begin with N and end Y?

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9. How many words can be formed with the letters of the word 'BINOMIAL'? In how many words, vowels will occur together?

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10. How many 6 digit numbers can be formed with the digits 1,3,3,0,1,2?

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11. In how many ways can 3 red and 4 black balls be arranged in a row?

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12. How many signals can be formed with 4 green and 3 red flags arranged vertically?

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Exercise E

1. In how many ways can 5 persons be seated at a round table?

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2. In how many ways can 8 boys be seated at a round table?

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3. In how many ways can 5 boys and 4 girls be seated at a round table, if no two girls are together?

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4. In how many ways can 15 members be seated at a round table, if the secretary and vice-president are the neighbours of the president?

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5. In how many ways can 4 boys and 5 girls can stand such that no two boys are together.

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6. In how many ways a garland can be made by using 15 different flowers.

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7. Find the number of ways in which six persons can be seated at a round table, so that all shall not have the same neighbours n any two arrangements.

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8. Three boys and three girls are to be seated around a table in a circle. Among them, the boy X does not

want any girl neighbour and the girl Y does not want any boy neighbour. The number of such arrangements are possible is

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Exercise F

1. Evaluate the following:

(i) $.^{10}C_5$ (ii) $.^{12}C_8$

(iii) $.^{15}C_{12}$ (iv) $.^{n+1}C_n$

(v) $.^{14}C_9$

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2. Evaluate: $.^{20}C_5 + ^{20}C_4 + ^{21}C_4 + ^{22}C_4$

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3. Find the value of n:

(i) $.^nC_{10} = ^nC_{16}$ (ii) $.^5C_n = ^{15}C_{n+3}$

(iii) $.^{10}C_n = ^{10}C_{n+2}$ (iv) $.^{23}C_{3n} = .^{25}C_{n+1}$

(v) $.^nC_r = .^nC_{r-2}$

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4. If $.^nC_{10} = .^nC_{15}$, then evaluate $.^{27}C_n$.

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5. If $.^{18}C_r = .^{18}C_{r+1}$, then evaluate $.^{r}C_5$.

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6. If $.^{n}C_5 = .^{n}C_7$, then find $.^{n}P_3$

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7. If $.^{16}C_r = .^{16}C_{r+6}$, then find $.^{5}C_r$.

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8. Determine n if (i) $\hat{}\ 2nC_2 :^n C_2 = 12:1$ (ii) $\hat{}\ 2nC_3 :^n C_3 = 11:1$

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9. Determine n if (i) $\hat{}\ 2nC_2 :^n C_2 = 12:1$ (ii) $\hat{}\ 2nC_3 :^n C_3 = 11:1$

Watch Video Solution

10. Determine n if (i) $\hat{}\ 2nC_2 :^n C_2 = 12:1$ (ii) $\hat{}\ 2nC_3 :^n C_3 = 11:1$

Watch Video Solution

11. If $.^{15}C_r : .^{15}C_{r-1} = 1:5$, then find r.

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12. If $.^{n-1}P_3 : .^{n+1}P_3 = 5:12$, find n.

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13. If $.^{n}P_r = 720$ and $.^{n}C_r = 120$, then find r.

$$= \frac{5 \times 4 \times 3}{3 \times 2 \times 1} \times \frac{4 \times 3 \times 2}{3 \times 2 \times 1}$$

$$= 10 \times 4 = 40.$$

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14. If $\hat{}\ (n+1)C_{r+1} : {}^{n}C_{r} : {}^{n-1}C_{r-1} = 11:6:2$ find the values of n and r.

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15. If $.^{n}C_{4}, .^{n}C_{5}, .^{n}C_{6}$ are in A.P., then find the value of n.

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16. If $\alpha = {}^{m}C_{2}$, then find the value of ${}^{\alpha}C_{2}$.

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17. In how many ways can a team of 11 players be selected from 14 players?

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18. In how many ways 2 persons can be selected from 4 persons?

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19. In how many ways can a person invites his 2 or more than 2 friends out of 5 friends for dinner?

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20. In how many ways can 11 players be selected from 14 players if

(i) a particular player is always included?

(ii) a particular player is never included?

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21. In how many ways can 5 subjects be chosen from 9 subjects if three subjects are compulsory?

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22. In how many ways can 4 books be chosen from 12 books if

(i) there is no restriction?

(ii) a particular book is always included?

(iii) a particular book is never included?

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23. There are 5 black and 6 red bills in a bag. Find one number of ways in which 2 black and 3 red balls can be selected.

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24. In 25 cricket players, there are 10 batsmen, 9 bowlers, 4 all-rounders and 2 wicket-keppers. In how many ways can a team of 11 players be selected which includes 5 batsmen, 4 bowlers, 1 all-rounder and 1 wicketkeeper?

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25. There are 8 math's books and 6 science books in a almirah. In how many wayscan 4 books of each subject be selected?

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26. There are 3 parts A,B and C in a question paper of Math's, which includes 6,7 and 8 questions respectivelty. From these parts 3,4 and 5 questions respectively are to be solved. In how many ways can a student select the questions from these parts?

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Exercise G

1. In how many ways can a committee of 6 members e formed out of 4 teachers and 7 students when

(i) one teacher is in the committee?

(ii) at least one teacher is in the committee?

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2. In how many ways can a committee of 6 members e formed out of 4 teachers and 7 students when

(i) one teacher is in the committee?

(ii) at least one teacher is in the committee?

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3. There are 5 red and 6 black balls in a bag. In how many ways 6 balls can be selected if there are at least 2 balls of each colour?

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4. There are 4 girls and 7 boys in a group. In how many waysa team of 5 members can be selected if

(i) there is no girl in the team?

(ii) there are at least 3 girls in the team?

(iii) there are at least one boy and at least one girl in the team?

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5. There are 8 questions in a paper and a student have to attempt 5 questions. How many ways it can be done if

(i) there is no restriction?

(ii) first two questions are compulsory.

(iii) at least 3 questions are compulsory out of first 5 questions?

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6. (i) In how many ways a committee of 4 members out of 5 gents and 6 ladies can be formed if there is at least one lady in the committee?

(ii) From a class of 12 boys and 8 girls, 10 students are to be chosen for a competition, including at least 4 boys and 4 girls. The two boys whho won the prizes last year should be included. In how many was can this selection be made?

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7. Out of 20 consonants and 5 vowels, how many words can be formed containing 2 consonants and 2

vowels?

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8. Out of 12 consonants and 5 vowels, how many words of 2 consonants and 3 vowels can be formed?

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9. How many words can be formed with 3 vowels and 2 consonants taken from the word 'EQUATION'?

A. 30

B. 120

C. 1200

D. 3600

Answer: D

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10. There are 10 points on a plane of which 5 points are collinear. Also, no three of the remaining 5 points are collinear. Then find (i) the number of straight lines joining these points: (ii) the number of triangles, formed by joining these points.

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11. There are 16 points in a plane of which 6 points are collinear and no other 3 points are collinear.Then the number of quadrilaterals that can be formed by joining these points is

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12. No. of diagonals of a hexagon are:

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13. Find the number of diagonals of a 16-sided polygon.

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14. (i) Find the number of sides of a polygon if it has 35 diagonals.

(ii) How many triangles can be formed with the vertices of an octagon?

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15. In how many ways can 7 red and 6 black balls be arranged in a row, if no two black balls are together?

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16. In how many ways can 12 white and 8 black balls be arranged in a row if no two black balls are together?

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17. A person invites a group of 10 friends at dinner and sits 5 on a round table and 5 more on another round table, 4 on one round table and 6 on the other round table. Find the number of ways in each case in which he can arrange the guest.

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18. In an examination a minimum is to be secured in ech of 5 subjects for a pass. In how many ways can a student fail?

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19. It is necessary to pass in each subject out of 7 subjects in an examination. In how many ways can a student failed?

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20. Find the number of ways of getting 2 heads and 4 tails in 6 throws of a coin.

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21. How many factors are there of the number 2520?

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22. How may other factors are there of the number 37800?

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23. Out of 4 mangoes, 5 bananas and 6 guava, find

(i) number of ways in which at least on fruit is selected.

(ii) number of ways in which at least one fruit of each type is selected.

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24. There are 4 red, 3 black and 5 white balls in a bag. Find the number of ways of selecting three balls, if at least one black ball is there.

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25. There are 4 white, 3 black and 3 red balls in a bag. Find the number of ways of selecting three balls, if at least one black ball is there.

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26. In how many ways can 8 books be divided between 2 students, if they get 3 and 5 books.

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27. Find the number oif different sums that can be formed with one rupee, one half rupee and one

quarter rupee coins.

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28. How many different amounts can be formed with one-one coin of Rs 1, Rs 2, Rs 5 and Rs 10?

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29. In how many ways can 12 books be divided in 3 students equally?

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30. In a plane there are 37 straight lines, of which 13 pass pass through the point B. Besides, no three lines paseh both points A and B and no two are parallel, then theline passes through both points A and B and no number of intersection points the lines have, is

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31. Find the number of combinations and permutations of 4 letters taken from the word EXAMINATION.

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32. Find the number of words formed containing 4 letters taken from the letters of the word 'INEFEECTIVE'.

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33. In an electrion the coinvencing will be done by 20, 25 and 30 persons in three districts. If 75 persons are avilable then in how many ways then can be selected?

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34. From a class of 15 students, 10 are to be chosen. There are 3 students who decide that either all of them will select or non of them will select. In how many ways can they be chosen?

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Exercise H

1. ${}^{12}P_3 = ?$

A. 210

B. 455

C. 2730

D. None of these

Answer: C

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2. If ${}^{10}P_r = 5040,$ find the value of r.

A. 5

B. 4

C. 6

D. None of these

Answer: B

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3. If $P(n, 6) = 30P(n, 4)$, then $n = ?$

A. 6

B. 9

C. 8

D. None of these

Answer: A

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4. No. of combinations by selecting one or more than one object out of n objects is:

A. 2^{n-1}

B. 2^{n-1}

C. 2^{n}

D. None of these

Answer: B

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5. If $C(n, 12) = C(n, 16)$, then $C(30, n) = ?$

A. 435

B. 870

C. 420

D. None of these

Answer: A

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6. No of words formed with the letters of the word 'INDIA' is:

A. 120

B. 60

C. 40

D. None of these

Answer: B

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7. The number of ways in which $p+q$ things can be divided into two groups containing p and q things respectively is

A. $\frac{(p+q+r)!}{p!q!r!}$

B. $\frac{(pqr)!}{(p+q+r)!}$

C. $\frac{(p+q+r)!}{(pqr)!}$

D. None of these

Answer: A

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8. No of words formed from the letters of the word 'SUNDAY' starting with 'S' are:

A. 720

B. 600

C. 240

D. None of these

Answer: D

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9. No of 4 digit numbers formed with the digits 3,4,5 and 6 which are divisible by 5, are:

A. 24

B. 12

C. 6

D. 3

Answer: C

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10. No. of diagonals of a hexagon are:

A. 6

B. 9

C. 12

D. None of these

Answer: B

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Exercise I

1. The sum of all five digit numbers formed with the digits 1,2,3,4,5 without repetition of digits are

A. 3,00,000

B. 3,60,000

C. 3,90,000

D. None of these

Answer: D

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2. No. of even 6 digits numbers, without repetition of digits, using digits 1,2,3,4,5,6,7 are:

A. 720

B. 288

C. 144

D. None of these

Answer: A

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3. $\lfloor 24$ is divisible by:

A. 6^{24}

B. 24^6

C. 48^6

D. None of these

Answer: B

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4. No. of selections of one or more balls from 10 white, 9 black and 4 red balls, are:

A. 360

B. 359

C. 549

D. None of these

Answer: C

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5. No. of positive integral solutions of the equation $abc = 42$ is:

A. 27

B. 30

C. 6

D. None of these

Answer: A

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6. No. of diagonals of a polygon are 170. No. of sides in this polygon are:

A. 18

B. 20

C. 17

D. None of these

Answer: B

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7. If 7 points out of 12 are in the same straight line, then the number of triangles formed is

A. 185

B. 158

C. 172

D. None of these

Answer: A

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8. If ${}^nC_{r-1} = 36, {}^nC_r = 84$ and ${}^nC_{r+1} = 126$, then find the value of ${}^rC_2$.

A. (8,4)

B. (9,3)

C. (7,5)

D. (6,5)

Answer: B

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9. If all the words formed with the letters of the word 'RANDOM' arranged in a dictionary then the word 'RANDOM' will be placed at position no:

A. 610

B. 612

C. 614

D. None of these

Answer: C

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10. How many 10-digit numbers can be formed by using digits 1 and 2

A. 10^2

B. 2^{10}

C. $.^{10}C_2$

D. None of these

Answer: B

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Exercise 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 constucted using the digits 0 to 9 if each numbers 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 2

1. Evaluate:

(i) 8! (ii) $4! - 3!$

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

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

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

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

(i) $n=6, r=2$ (ii) $n=9, r=5$

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Exercise 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 nunbers 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 chirman and a vice chairman assuming one person cannot hold more than one position?


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

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7. Find r if

(i) $.^{5}P_r = 2.^{6}P_{r-1}$ (ii) $.^{5}P_r = {}^{6}P_{r-1}.$

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8. 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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9. 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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10. In how many of the distinct permutations of the letters in MISSISSIPPI do the four I's not come together?

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11. 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 4

1. If $.^{n}C_{8} = .^{n}C_{2}$, find $.^{n}C_{2}$.

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2. Determine n if

(i) $.^{2n}C_3 : .^{n}C_3 = 12:1$

(ii) $.^{2n}C_3 : .^{n}C_3 = 11:1$

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

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4. 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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5. 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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6. 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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7. 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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8. 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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9. 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

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) exactrly 3 girls?

(ii) at least 3 girls

(ii) almost 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 0,3,5,7 and 9 which are divisible by 10 and no digits is repeated?

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6. The English alphabet has 5 vowels and 21 consonants. How many words with 2 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

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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 thatr women occupy the even places. How many such arrangement 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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