



MATHS

BOOKS - KUMAR PRAKASHAN KENDRA

MATHS (GUJRATI ENGLISH)

PERMUTATIONS AND COMBINATIONS

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



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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 (i) ${}^5 P_r = {}^2 P_{r-1}$ (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 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 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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Textbook Based Mcqs

1. If $\binom{n}{r} = \frac{n!}{k}$, then $K = \dots\dots$

A. $r!$

B. $(n - n)!$

C. $(n - n)!R!$

D. $(r(n - 1))!$

Answer: C



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2. $\binom{n}{r} = \frac{{}^n P_r}{K}$, then $K = \dots$

A. $r!$

B. $(n - n)!$

C. $(n - n)!R!$

D. $(r - 1)!$

Answer: A



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3. If $\binom{n}{12} = \binom{n}{8}$ then $n = \dots\dots\dots$

A. 20

B. 10

C. 15

D. Not possible

Answer: A



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4. If $\binom{n}{r} = \binom{n}{r+2}$, then $r = \dots$,

A. n

B. $n - 1$

C. 0

$$D. n - \frac{2}{2}$$

Answer: D



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5. $\binom{44}{r-2} = \binom{44}{r+2}$, then $r = \dots$

A. 33

B. 11

C. 22

D. 44

Answer: C



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6. If $\binom{20}{r} = \binom{20}{r+2}$ then $\binom{r}{2} = \dots\dots\dots$

.

A. 11

B. 9

C. 45

D. 36

Answer: D



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7. if $\binom{n}{r} + \binom{n}{r-1} = \binom{n+1}{x}$, then $x =$

....

A. $n - r$

B. $r + 1$

C. n

D. $n - r + 1$

Answer: D



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8. if $\begin{pmatrix} a^2 + a \\ 3 \end{pmatrix} = \begin{pmatrix} a^2 + a \\ 9 \end{pmatrix}$, then $a = \dots$

A. 3

B. 9

C. 12

D. 6

Answer: A



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9.

$$\binom{10}{1} + \binom{10}{2} + \binom{11}{3} + \binom{12}{4} + \binom{13}{5}$$

=

A. $\binom{14}{6}$

B. $\binom{14}{7}$

C. $\binom{13}{6}$

D. $\binom{14}{5}$

Answer: D



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10. if $\binom{77}{r}$ is maximum then $r = \dots$.

A. 35

B. 38.5

C. 39

D. 4

Answer: C



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11. $\binom{33}{10} \dots \binom{33}{8}$.

A. $>$

B. $<$

C. $=$

D. \geq

Answer: A



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12. From 0 to when r increases, ${}^n C_r$ also increases.

A. n

B. $n - 1$

C. $\frac{n}{2}$

D. $\left[\frac{N}{2} \right]$

Answer: D



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13. Number of diagonal of the polygon having

10 sides =

A. 35

B. 45

C. 55

D. 30

Answer: A



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14. if ${}^{18}C_{15} + 2({}^{18}C_{16}) + {}^{17}C_{16} + 1 = {}^nC_3$

then $n = \dots$

A. 19

B. 20

C. 18

D. 24

Answer: B



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15. A person has 6 friends . He invites one or more then one friends. For dinner in Ways.

A. 61

B. 63

C. 18

D. 24

Answer: B



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Latest Exam Mcqs

1. There are 6 different novels and 3 different dictionaries. We have to select 4 novels and 1 dictionary from them and arrange them on a shelf such that the dictionary remains in the middle always. How many ways this arrangement will be done ?



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Textbook Illustrations For Practice Work

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 : (i) $5!$ (ii) $7!$ (iii) $7! - 5!$



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6. Compute (i) $\frac{7!}{5!}$ (ii) $\frac{12!}{(10!)(2!)}$



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



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



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



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10. 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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11. 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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12. Find the value of n such that, ${}^n P_2 = 30$



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



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14. 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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15. 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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16. Find the number of arrangements of the letters of the word INDEPEDENCE. 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 with I and end in P?



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17. If ${}^n C_9 = {}^n C_{17}$.





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18. 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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19. 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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20. 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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21. 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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22. 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 50th word?



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





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24. 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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Ncert Exemplar Problems Short Answer Type Questions

1. Eight chairs are numbered 1 to 8. Two women and 3 man wish to occupy one chair each. First the women choose the chair each. First the women choose the chairs from amongst the chairs 1 to 4 and then men select from the remaining chairs. Find the total number of possible arrangements.



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2. If the letters of the word 'RACHIT' are arranged in all possible ways as listed in dictionary. Then, what is the rank of the word 'RACHIT' ?



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3. A candidate is required to answer 7 questions out of 12 questions, which are divided into two groups, each containing 6 questions. He is not permitted to attempt

more than 5 questions from either group. Find the number of different ways of doing questions.



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4. Out of 18 points in a plane, no three are in the same line except five points which are collinear. Find the number of lines that can be formed joining the point.



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5. We wish to select 6 person from 8 but, if the person A is chosen, then B must be chosen. In how many ways can selections be made ?



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6. How many committee of five person with a chairperson can be selected from 12 persons ?



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7. How many automobile licence plates can be made, if each plate contains two different letters followed by three different digits ?



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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. Find the number of permutations of n distinct things taken r together, in which 3 particular things must occur together.



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10. Find the number of different words that can be formed from the letters of the word TRIANGLE, so that no vowels are together.



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11. Find the number of positive integers greater than 6000 and less than 7000 which are divisible by 5, provided that no digit is to be repeated.



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12. There are 10 persons named $P_1, P_2, P_3, \dots, P_{10}$. Out of 10 persons, 5 persons are to be arranged where P_1 must occur where as P_4 and P_5 do not occur. Find the number of such possible arrangements.



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13. There are 10 lamps in a hall, Each one of them can be switched on independently. Find the number of ways in which the hall can be illuminted,

Thinking Process : Total numbers of ways to lightned room is out of given n bulbs at least one or all bulls are lightened. we get total number of ways using following fromula.



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14. A box contains two white, three black and four red balls. In how many ways can three balls be drawn from the box, if at least one black ball is to be included in the draw ?



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15. if ${}^n C_{r-1} = 36$, ${}^n C_r = 84$ and ${}^n C_{r+1} = 126$, then find the value of ${}^r C_2$.



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16. Find the number of integers greater than 7000 that can be formed with the digits 3, 5, 7, 8 and 9 where no digit are repeated .



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17. If 20 lines are drawn in a plane such that no two of them are parallel and no three are concurrent, in how many points will they intersect each other ?



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18. In a certain city, all telephone numbers have six digits, the first two digits always being 41 or 42 or 46 or 60 or 64. How many telephone numbers have all six digits distinct?



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19. In an examination, a student has to answer 4 questions out of 5 questions, questions 1 and 2 are however compulsory. Determine the number of ways in which the student can

make the choice .

Thinking Process: We know that in selection of r objects out of given n objects if p objects are included then total numbers of selection

are $\binom{n-p}{r-p}$.



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20. If a convex polygon has 44 diagonals, than find the number of its sides.

Remember : Numbers of diagonal of the

polygon having n sides = $\binom{n}{2} - n$.



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Ncert Exemplar Problems Long Answer Type Questions

1. 18 mice were placed in two experimental groups and one control group with all groups equally large. In how many ways can the mice be placed into three groups ?



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2. A bag contains six white marbles and five red marbles. Can be drawn from the bag, if (i) they can be of any colour. (ii) two must be white and two red. (iii) they must all be of the same colour.



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3. In how many ways can a football team of 11 players be selected from 16 players ? How many of them will

(j) Include 2 particular players ?

(ii) Exclude 2 particular players ?



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4. A sports team of 11 students is to be constituted, choosing atleast 5 from class XI and atleast 5 from class XII. If there are 20 students in each of these classes, in how many ways can the team be constituted ?



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5. 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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6. A committee of 6 is to be chosen from 10 men and 7 women. So as to contain atleast 3 man and 2 women. In how many different ways can this be done, if two particular women refuse to serve on the same committee ?



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7. if ${}^nC_{12} = {}^nC_8$, then n is equal to

A. 20

B. 12

C. 6

D. 30

Answer: 20



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Ncert Exemplar Problems Objective Type Questions

1. The number of possible outcomes when a coin is tossed 6 times is

A. 36

B. 64

C. 12

D. 32

Answer: D



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2. The number of different four - digit number that can be formed with the digits 2, 3, 4, 7, and using each digit only once is

A. 120

B. 96

C. 24

D. 100

Answer: B::D



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3. The sum of the digits in unit place of all the numbers formed with the help of 3, 4, 5 and 6 taken all a time is

A. 432

B. 108

C. 36

D. 18

Answer: A



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4. The total number of words formed by 2 vowels and 3 consonants taken from 4 vowels and 5 consonants is

A. 60

B. 120

C. 7200

D. 720

Answer: B



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5. If a five-digit number divisible by 3 is to be formed using the number 0, 1, 2, 3, 4 and 5 without repetitions, then the total number of ways this can be done is

A. 216

B. 600

C. 240

D. 3125

Answer: A::B



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6. Everybody in a room shakes hands with everybody else. If the total number of hand shakes is 66, then the total number of persons in the room is

A. 11

B. 12

C. 13

D. 14

Answer: A::B



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7. The number of triangles that are formed by choosing the vertices from a set of 12 points, seven of which lie on the same line is

A. 105

B. 15

C. 175

D. 185

Answer: A



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8. The number of parallelograms that can be formed from a set of four parallel lines

intersecting another set of three parallel lines
is

A. 6

B. 18

C. 12

D. 9

Answer: A



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9. The number of ways in which a team of eleven players can be selected from 22 players always including 2 of them and excluding 4 of them is

A. ${}^{16}C_{11}$

B. ${}^{16}C_5$

C. ${}^{16}C_9$

D. ${}^{20}C_9$

Answer: A::C



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10. The number of 5 digit telephone numbers having atleast one of their digits repeated is

A. 90000

B. 10000

C. 30240

D. 69760

Answer:



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11. The number of ways in which we can choose a committee from four men and six women, so that the committee includes at least two men and exactly twice as many women as men is

A. 94

B. 125

C. 128

D. None of these

Answer: D



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12.are the 9 digit numbers formed from the number with all digits different.

A. $10!$

B. $9!$

C. $9 \times 9!$

D. $10 \times 10!$

Answer:



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13. The number of words which can be formed out of the Letters of the word 'ARTICLE, so that vowels occupy the even place in

A. 1440

B. 144

C. 7!

D. ${}^4C_4 \times {}^3C_3$

Answer: A::D



14. Given 5 different green dyes, four different blue dyes and three different red dyes, the number of combinations of dyes which can be chosen taking atleast one green and one blue dye is

Thinking Process : The numbers of ways to select dyes from 5 green, 4 blue and 3 red are 2^5 , 2^4 and 2^3 respectively.

A. 3600

B. 3720

C. 3800

D. 3680

Answer: B::C



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15. If ${}_n P_r = 840$ and ${}_n C_r = 35$, then r is equal to....



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Ncert Exemplar Problems Fillers

1. $\binom{15}{8} + \binom{15}{9} - \binom{15}{6} - \binom{15}{7} = \dots\dots$



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2. The number of permutations of n different objects, taken r at a time, when repetitions are allowed, is



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3. Different words are formed by arranging the letters of the word 'SUCCESS'

Q. the number of words in which no two C's and no two S's are together, is



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4. Three balls are drawn from a bag containing 5 red, 4 white and 3 black balls. The number of ways in which this can be done, if at least 2 are red, is.



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5. The number of six digit number all digit of which are odd, is



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6. In a football championship, 153 matches were played. Every two teams played one match with each other. The number of teams, participating in the championship is



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7. The total number of ways in which six '+' and four '-' signs can be arranged in a line such that no two '-' signs occur together, is



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8. A box contains 2 white balls, 3 black balls and 4 red balls. The number of ways three balls be drawn from the box, if atleast one black ball is to be included in the draw is



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Ncert Exemplar Problems True False

1. There are 12 points in a plane of which 5 points are collinear, then the number of lines obtained by joining these points in pair is

$${}^{12}C_2 - {}^5C_2 + 1,$$



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2. Three Letters can be posted in five letter boxes in 3^5 ways.



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3. In the permutations of n things r , taken together, the number of permutation in which m particular things occur together is

$${}^{(n-m)}P_{(r-m)} \times {}^rP_m.$$



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4. In a steamer there are stalls for 12 animals and there are horses, cows and calves (not less than 12 each) ready to be shipped. They can be loaded in 3^{12} ways.



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5. If some or all of n objects are taken at a time then the number of combinations is $2^n - 1$.



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6. A bag contains 4 white and 5 black balls. Another bag contains 9 white and 7 black balls. A ball is transferred from the first bag to the second and then a ball is drawn at random from the second bag. Find the probability that the ball drawn is white.



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7. There are $2n$ guests at a dinner party. Supposing that the master and mistress of the house have fixed seats opposite one

another and that there are two specified guests who must not be placed next to one another. Find the number of ways in which the company can be placed.



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8. A candidate is required to answer 7 questions out of 12 questions, which are divided into two groups, each containing 6 questions. He is not permitted to attempt more than 5 questions from either group. Find

the number of different ways of doing questions.



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9. To fill 12 vacancies there are 25 candidates of which 5 are from scheduled castes. If 3 of the vacancies are reserved for scheduled caste candidates while the rest are open to all, the number of ways in which the selection can be made is ${}^5C_3 \times {}^{22}C_9$.



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Ncert Exemplar Problems Matching The Columns

1. There are 3 books on Mathematics ,4 on physics and 5 on English , Howm any different collections can be made such that each collection consists ?

Column - I	Column - II
(i) One book of each subject	(a) 3968
(ii) Atleast one book of each subject	(b) 60
(iii) Atleast one book of English	(c) 3255



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2. Five boys and five girls form a line. Find the number of ways of making the seating arrangement under the following condition.

Column - I	Column - II
(i) Boys and girls alternate	(a) $5! \times 6!$
(ii) No two girls sit together	(b) $10! - 5! 6!$
(iii) All the girls sit together	(c) $(5!)^2 + (5!)^2$
(iv) All the girls are never together	(d) $2! 5! 5!$



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3. There are 10 professors and 20 lecturers, Out of whom a committee of 2 professors and

3 lecturers is to be formed, find

Column - I	Column - II
(i) In how many ways committee can be formed ?	(a) $^{10}C_2 \times ^{19}C_3$
(ii) In how many ways a Particular professor is included ?	(b) $^{10}C_2 \times ^{19}C_2$
(iii) In how many ways a particular lecturer is included ?	(c) $^9C_1 \times ^{20}C_3$
(iv) In how many ways a Particular lecturer is excluded ?	(d) $^{10}C_2 \times ^{20}C_3$



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4. Using the digit 1, 2, 3, 4, 5, 6, and 7, a number of 4 different digit is formed find,

Column - I	Column - II
(i) How many numbers are formed ?	(a) 840
(ii) How many numbers are exactly divisible by 2 ?	(b) 200
(iii) How many numbers are exactly divisible by 25 ?	(c) 360
(iv) How many of these are exactly divisible by 4 ?	(d) 40



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5. How many words (with or without dictionary meaning) can be made from the letters of the word 'MONDAY', assuming that no letter is

repeated, if

Column - I	Column - II
(i) 4 letters are used at a time	(a) 720
(ii) All letters are used at a time	(b) 240
(iii) All letters are used but the first is a vowel.	(c) 360



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Practice Work

1. How many 4-digit number can be formed with the digit 1, 2, 3, 4, 6 and 8 if repetition of digits is not allowed.



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2. How many 3- digit even numbers are formed using the digits 0, 1, 2, 9, if the repetition of digit is not allowed ?



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3. Find the number of 4-letter words with or without meaning which can be formed out of the letters of the word KENY when,

The repetition of letters is not allowed.

E is at first place.



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4. How many four digit odd number are there
? (Repetition of digit is not allowed)



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5. How many number between 99 and 1000 are
there if (i) Last digit is 0 ? (ii) Last digit is 5 ?



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6. Evaluate :

(i) $2 \times 6! - 3 \times 5!$

(ii) $\frac{8!}{4!}$ (iii) $\frac{20!}{18!(20-18)!}$



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7. IF $(n + 2)! = 2550n!$ find n .



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8. Prove that $(n!)(n + 2) = [n! + (n + 1)!]$

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9. if $\frac{1}{7!} + \frac{1}{9!} = \frac{x}{10!}$ then find x.

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10. Evaluate : $\frac{(12!) - (10!)}{9!}$

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11. How many words can be formed out of the letters of the word VOWEL. So that the vowels occupy the vowels place ?



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12. 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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13. How many words can be made from the letters of the word DAUGHTER assuming that no letter is repeated? How many words can be made from this word in which so that consonants and vowels occupy their own place?



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14. How many three-digit numbers can be made using the digits 0, 1, 2, ..., 9, if no digit is repeated ?



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15. From a committee of 10 persons, in how many ways can we choose a chairman, vice-chairman and president assuming one person can not hold more than one position ?

A.

B.

C.

D.

Answer: 720



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16. How many 3-digit even numbers that can be formed using the digit 2,4,6,8 ?



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17. Find r : ${}^5P_r = 42 {}^6P_{r-1}$

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18. Prove that ,

$${}^nP_r = (n-1) {}^nP_r + r \cdot {}^{n-1}P_{(r-1)}$$

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19. If ${}_n P_r = 840$ and ${}_n C_r = 35$, then r is equal to....



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20. If ${}^{(n+2)} C_8 : {}^{(n-2)} P_4 = 57 : 16$ then find n.



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21. If ${}_n C_{10} = {}_n C_{12}$ then find ${}^{23} C_n$.



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22. In how many ways can a football team of 11 players be selected from 16 players ? How many of them will

(j) Include 2 particular players ?

(ii) Exclude 2 particular players ?



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23. 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) at least 3 girls ? (iii)
at most 3 girls ?



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24. A polygon has 65 diagonals, then find the number of its side.



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25. 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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26. How many four digit numbers divisible by 4 can be made with the digit 1, 2, 3, 4, 5, 6. If the repetition of the digit is not allowed ?



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27. How many different words can be formed by using all the letters of the word ZERO without repetition ? What is the rank of the word ZERO in a dictionary ?



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28. 6 letters be posted by 3 boxes. The number of ways of posting the letters when no letterbox remains empty is ?



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29. How many different words can be formed by using all the letters of the word MATHEMATICS ? In how many of them, vowels are always together ?



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30. In how many different words can be formed by using all the letters of the word ARROW if the two R's are not together ?



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31. In a room, there are 12 bulb of same waltage each having a separate switch. The number of ways to light the room with

different amounts of illumination is how much ?



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32. There are 8 points in a plane. Out of them, 3 points are collinear. Using them how many triangles are formed ? How many lines are there passing through them ? How many line segment we get ?



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33. What is the number of ways of choosing 3 cards from a pack of 52 playing cards ? In how many of these three cards are face cards. In how many of these cards are of same colour ? In how many of these cards of the same suit ?



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34. A box contains 2 white balls, 3 black balls and 4 red balls. The number of ways three balls be drawn from the box, if atleast one black ball is to be included in the draw is



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35. How many numbers greater than 7000 can be formed with the digits 2, 5, 6, 8, 9 without repetition ?



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36. Determine the number of 5 cards combinations out of a deck of 52 cards, if at least one of the 5 cards has to be an ace ?



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37. How many different words can be formed by using all the letters of the word ALLAHABAD ? In how many of them, vowels occupy the even position ? In how many of them has two L's are not together ?



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38. Find the number of ways in which 4 boys and 4 girls be seated in a row so that,

(i) No two girls may sit together.

(ii) All the girls sit together and all the boys sit together.



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39. How many four digit numbers are formed using the digit 2745 without repetition ? Out of them, how many are divisible by 3 ? Out of them how many are divisible by 9 ?



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40. How many three digit numbers are there multiple of 5 ? (without repetition)



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