

**6.1.1 The multiplication rule**

<p>1. There are 3 routes joining village A and village B and 4 routes joining village B and village C. Find the number of different ways of traveling from village A to village C via village B.</p> <p style="text-align: right;">[12]</p>	<p>2. There are 2 bus companies that provide transport from town E to town F and 3 bus companies that provide transport from town F to town G. Find the number of ways a person can travel from town E via to town G via town F by taking a bus.</p> <p style="text-align: right;">[6]</p>
<p>3. There are 3 boys and 2 girls in a group. Find the number of ways to pick a boy and a girl for a Mathematics quiz.</p> <p style="text-align: right;">[6]</p>	<p>4. Lim has to choose a shirt and a trouser from 6 shirts and 4 trousers in his cupboard. Find the possible number of ways he can do this.</p> <p style="text-align: right;">[24]</p>
<p>5. Team A which consists of 5 players wishes to have badminton matches with team B which consists of 6 players. Find the number of different single matches that can be held.</p> <p style="text-align: right;">[30]</p>	<p>6.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="display: flex; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 30px; text-align: center;">A</div> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 30px; text-align: center;">B</div> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 30px; text-align: center;">C</div> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 30px; text-align: center;">D</div> </div> <div style="display: flex; gap: 10px; margin-left: 50px;"> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 30px; text-align: center;">1</div> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 30px; text-align: center;">2</div> <div style="border: 1px solid black; padding: 5px; width: 30px; height: 30px; text-align: center;">3</div> </div> </div> <p>The diagram above shows cards of a game. If a player is going to select a letter card and a digit card, find the number of different ways can this be done.</p> <p style="text-align: right;">[12]</p>
<p>7. Hashim can choose to go to office by car or by bus. Find the number of different ways Hashim can go to school for three consecutive working days.</p> <p style="text-align: right;">[8]</p>	<p>8. A football team plays four friendly matches in a month. Find the number of possible outcomes from the four matches.</p> <p style="text-align: right;">[16]</p>
<p>9. There are 5 Malays, 3 Chinese and 2 Indians in a group. Find the number of ways can a Malay, a Chinese and an Indian be chosen from the group.</p> <p style="text-align: right;">[30]</p>	<p>10. There are 2 pieces of cakes on plate A, 3 pieces of cakes plate B and 4 pieces of cakes on plate C. If a boy is going to select a cake from each plate, find the number of different ways can this be done.</p> <p style="text-align: right;">[24]</p>



**6.1.3 Permutations of n different objects taken r at a time.**

<p>1. In how many ways can 6 students be seated on 3 chairs arranged in a row ?</p> <p>[120]</p>	<p>2. There are 8 contestants in a drawing contest. How many possible ways for the first three places to be won by the contestants ?</p> <p>[336]</p>
<p>3. How many ordered arrangements are there if we want to arrange 5 out of 12 basket players ?</p> <p>[95040]</p>	<p>4. An examination paper has six questions. The students need only to answer four of them. In how many different ways can the students answer the 4 questions ?</p> <p>[360]</p>
<p>5. In how many different ways can 3 of the letters in the word ' PROGRAM ' be arranged without repetition ?</p> <p>[210]</p>	<p>6. In how many different ways can 4 of the letters in the word ' COMPUTER ' be arranged without repetition ?</p> <p>[1680]</p>
<p>7. In how many different ways can 2 of the letters in the word ' VISTA ' be arranged without repetition ?</p> <p>[20]</p>	<p>8. In how many different ways can half of the letters in the word ' MODULE ' be arranged without repetition ?</p> <p>[120]</p>
<p>9. How many four-digit numbers can you form using the digits 2, 3, 5, 6 and 7 ?</p> <p>[120]</p>	<p>10. How many five-digit numbers can you form using the digits 2, 3, 4, 6, 7, 8 and 9 ?</p> <p>[2520]</p>

**6.1.4 Permutations of n different objects under given conditions.**

<p>1. In how many ways can all the letters in the word 'SECTION' be arranged without repetition such that the first letter is vowel ?</p> <p>[2160]</p>	<p>2. In how many ways can all the letters in the word 'SECTION' be arranged without repetition such that the first letter is consonant ?</p> <p>[2880]</p>
<p>3. In how many ways can all the letters in the word 'SECTION' be arranged without repetition such that the first and last letters are vowels ?</p> <p>[720]</p>	<p>4. In how many ways can all the letters in the word 'SECTION' be arranged without repetition such that the three letters in the middle are vowels ?</p> <p>[144]</p>
<p>5. In how many ways can all the letters in the word 'SECTION' be arranged without repetition such that the first letter is a vowel and last letter is a consonant ?</p> <p>[1440]</p>	<p>6. In how many ways can all the letters in the word 'SECTION' be arranged without repetition such that the first letter is E and last letter is T ?</p> <p>[120]</p>
<p>7. In how many ways can all the letters in the word 'SECTION' be arranged without repetition such that the vowels placed adjacent to each other ?</p> <p>[720]</p>	<p>8. In how many ways can all the letters in the word 'SECTION' be arranged without repetition such that the vowels separated from each other ?</p> <p>[4320]</p>

<p>9. How many five-digit even numbers that can be formed using the digits 2, 3, 4, 6 and 7 without repetition.</p> <p>[72]</p>	<p>10. How many five-digit odd numbers that can be formed using the digits 2, 3, 4, 6 and 7 without repetition.</p> <p>[48]</p>
<p>11. How many five-digit numbers that are greater than 40000 can be formed using the digits 2, 3, 4, 6 and 7 without repetition.</p> <p>[72]</p>	<p>12. How many five-digit numbers that are smaller than 40000 can be formed using the digits 2, 3, 4, 6 and 7 without repetition.</p> <p>[48]</p>
<p>13. In how many ways can 2 boys and 3 girls be arranged in a line if the two boys must be at the front and the back of the line respectively ?</p> <p>[12]</p>	<p>14. In how many ways can 2 boys and 3 girls be arranged in a line if the two boys must be at the first two position of the line respectively ?</p> <p>[12]</p>
<p>15. 8 different cards are to be arranged in a row. In how many ways can all the cards be arranged if 2 particular cards must be next to each other ?</p> <p>[10080]</p>	<p>16. 8 different cards are to be arranged in a row. In how many ways can all the cards be arranged if 3 particular cards must be next to each other ?</p> <p>[4320]</p>

**6.1.5 Permutations of n different objects taken r at a time under given conditions.**

<p>1. How many four-letter codes can be formed using the letters in the word 'WINSDOM' without repetition such that the first letter is vowel ?</p> <p>[240]</p>	<p>2. How many four-letter codes can be formed using the letters in the word 'WINSDOM' without repetition such that the first letter is consonant ?</p> <p>[600]</p>
<p>3. How many four-letter codes can be formed using the letters in the word 'WINSDOM' without repetition such that the first letter and the last letter are vowels ?</p> <p>[40]</p>	<p>4. How many four-letter codes can be formed using the letters in the word 'WINSDOM' without repetition such that the first letter and the last letter are consonants ?</p> <p>[400]</p>
<p>5. How many four-letter codes can be formed using the letters in the word 'WINSDOM' without repetition such that the first letter is a vowel and the last letter is a constant ?</p> <p>[200]</p>	<p>6. How many four-letter codes can be formed using the letters in the word 'WINSDOM' without repetition such that the first letter is S and the last letter is D ?</p> <p>[20]</p>
<p>7. How many five-letter codes can be formed using the letters in the word 'WINSDOM' without repetition such that the vowels placed adjacent to each other ?</p> <p>[720]</p>	<p>8. How many four-letter codes can be formed using the letters in the word 'WINSDOM' without repetition such that the vowels separated from each other?</p> <p>[4320]</p>

<p>9. How many four-digit even numbers that can be formed using the digits 2, 3, 4, 6 and 7 without repetition.</p> <p>[72]</p>	<p>10. How many four-digit odd numbers that can be formed using the digits 2, 3, 4, 6 and 7 without repetition.</p> <p>[48]</p>
<p>11. How many four-digit numbers that are greater than can be 3000 formed using the digits 2, 3, 4, 6 and 7 without repetition.</p> <p>[96]</p>	<p>12. How many four-digit numbers that are smaller than can be 6000 formed using the digits 2, 3, 4, 6 and 7 without repetition.</p> <p>[72]</p>
<p>13. 2 boys and 4 girls are to be seated in a row of 5 chairs. Find the number of ways they can be seated if the first and the last are boys.</p> <p>[48]</p>	<p>14. 2 boys and 4 girls are to be seated in a row of 5 chairs. Find the number of ways they can be seated if the first and the last are girls.</p> <p>[288]</p>
<p>15. Calculate the number of ways to arrange 3 different Mathematics books and 4 different Sciences books on a bookrack if the Mathematics books have to be placed together.</p> <p>[720]</p>	<p>16. Calculate the number of ways to arrange 3 different Mathematics books and 4 different Sciences books on a bookrack if the Sciences books have to be placed together.</p> <p>[576]</p>

**6.2.1 Combinations of r different objects chosen from n different objects.**

<p>1. In how many ways can 3 prefects be chosen from a group of 8 students?</p> <p style="text-align: right;">[56]</p>	<p>2. In how many ways can 4 teachers be chosen from a group of 10 teachers for an expedition ?</p> <p style="text-align: right;">[210]</p>
<p>3. A committee of 5 members are to be chosen from 12 candidates. In how many ways can the committee be formed ?</p> <p style="text-align: right;">[792]</p>	<p>4. A team of 5 players are to be chosen from 12 players. In how many ways can the team be formed ?</p> <p style="text-align: right;">[792]</p>
<p>5. Lim is given a chance to choose 4 subjects from the 8 subjects offered in a course. Find the number of combinations she can make?</p> <p style="text-align: right;">[70]</p>	<p>6. Wahid is given a chance to choose 3 courses from the 8 courses offered in a college. Find the number of combinations he can make?</p> <p style="text-align: right;">[56]</p>
<p>7. A school has a committee of 3 male teachers and 2 female teachers. Find the number of different such committees that can be formed from 8 male teachers and 11 female teachers ?</p> <p style="text-align: right;">[3080]</p>	<p>8. The Parents-Teachers Association of a school has a committee of 3 teachers and 5 parents. Find the number of different such committees that can be formed from 10 teachers and 15 parents ?</p> <p style="text-align: right;">[360360]</p>
<p>9.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 10px;">A</div> <div style="border: 1px solid black; padding: 2px 10px;">B</div> <div style="border: 1px solid black; padding: 2px 10px;">C</div> <div style="border: 1px solid black; padding: 2px 10px;">D</div> <div style="border: 1px solid black; padding: 2px 10px;">5</div> <div style="border: 1px solid black; padding: 2px 10px;">6</div> <div style="border: 1px solid black; padding: 2px 10px;">7</div> </div> <p>The diagram shows 4 letters and 3 digits. A code is made up of 3 letters and 2 digits. Find the number of ways it can be.</p> <p style="text-align: right;">[12]</p>	<p>10.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 10px;">A</div> <div style="border: 1px solid black; padding: 2px 10px;">B</div> <div style="border: 1px solid black; padding: 2px 10px;">C</div> <div style="border: 1px solid black; padding: 2px 10px;">D</div> <div style="border: 1px solid black; padding: 2px 10px;">5</div> <div style="border: 1px solid black; padding: 2px 10px;">6</div> <div style="border: 1px solid black; padding: 2px 10px;">7</div> </div> <p>The diagram shows 4 letters and 3 digits. A code is made up of 2 letters and 1 digits. Find the number of ways it can be.</p> <p style="text-align: right;">[18]</p>

**6.2.2 Combinations of r different objects chosen from n different objects under given conditions.**

<p>1. They are a couple in a group of 10 people. In how many ways can a team of 5 people be formed from the group if the couple must be included ?</p> <p style="text-align: right;">[56]</p>	<p>2. They are monitor and assistant monitor in a group of 20 students. In how many ways can a committee of 8 people be formed from the group if the monitor and assistant monitor must be included ?</p> <p style="text-align: right;">[18564]</p>
<p>3. Find the number of ways of choosing 4 letters including the letter O from the word 'OBJECT'.</p> <p style="text-align: right;">[10]</p>	<p>4. Find the number of ways of choosing 4 letters including the letter A from the word 'IMAGE'.</p> <p style="text-align: right;">[4]</p>
<p>5. Find the number of ways of choosing at least 3 students from 5 students to represent their class in a Mathematics Quiz.</p> <p style="text-align: right;">[6554]</p>	<p>6. Find the number of ways of choosing at least 1 colour from 3 colours to paint the poster.</p> <p style="text-align: right;">[7]</p>
<p>7. In a class of 8 boys and 6 girls, 4 boys and 3 girls or 3 boys and 4 girls are to be chosen to form a committee. In how many ways can the committee be formed ?</p> <p style="text-align: right;">[2240]</p>	<p>8. In a group of 10 men and 8 women, 5 men and 4 women or 4 men and 5 women are to be chosen to form a committee. In how many ways can the committee be formed ?</p> <p style="text-align: right;">[29400]</p>
<p>9. 10 students are divided into three groups that consists of 5, 3 and 2 students respectively. Find the number of ways of forming the three groups.</p> <p style="text-align: right;">[8820]</p>	<p>10. 12 students are divided into three groups that consists of 5, 4 and 3 students respectively. Find the number of ways of forming the three groups.</p> <p style="text-align: right;">[27720]</p>

<p>11. A committee that consists of 6 members is to be selected from 7 teachers and 5 parents. Find the members of different committees that can be formed if the number of teachers must same as the number of parents.</p> <p>[350]</p>	<p>12. A committee that consists of 8 members is to be selected from 9 men and 7 women. Find the members of different committees that can be formed if the number of men must same as the number of women.</p> <p>[4410]</p>
<p>13. A committee that consists of 6 members is to be selected from 7 teachers and 5 parents. Find the members of different committees that can be formed if it consists of not more than 2 teachers.</p> <p>[112]</p>	<p>14. A committee that consists of 8 members is to be selected from 9 men and 7 women. Find the members of different committees that can be formed if it consists of not more than 2 men.</p> <p>[261]</p>
<p>15. A committee that consists of 6 members is to be selected from 7 teachers and 5 parents. Find the members of different committees that can be formed if it consists of at least 4 teachers.</p> <p>[462]</p>	<p>16. A committee that consists of 8 members is to be selected from 9 men and 7 women. Find the members of different committees that can be formed if it consists of at least 6 men.</p> <p>[2025]</p>
<p>17. A committee that consists of 6 members is to be selected from 7 teachers and 5 parents. Find the members of different committees that can be formed if it consists of at most 2 teachers.</p> <p>[112]</p>	<p>18. A committee that consists of 8 members is to be selected from 9 men and 7 women. Find the members of different committees that can be formed if it consists of at most 2 men.</p> <p>[261]</p>