

Permutations and Combinations — Assignment 1

Class 11 Maths · Topic-wise question bank covering every concept of the chapter · Narayan Gurukul Academy

Instructions: (1) Attempt all questions. This worksheet walks through every concept of the chapter, topic by topic.
(2) The interactive MCQ version of these questions (with instant answer reveal) is available on the notes page.
(3) Universal values: $g = 10 \text{ m/s}^2$ unless stated. Give answers with correct SI units.

Fundamental Principle of Counting

MCQ Questions (choose the correct option)

- If an event can occur in m ways and another in n ways, then the number of ways both can occur is
 - $m \times n$
 - $m + n$
 - $m - n$
 - m^n
- If a job can be done in m ways or n ways, the total number of ways is
 - $m + n$
 - $m \times n$
 - $m - n$
 - m^n
- The number of ways to choose a shirt from 4 and trousers from 3 is
 - 12
 - 7
 - 4
 - 3
- The multiplication principle is used when events occur
 - one after another (in sequence)
 - alternatively
 - independently only
 - never

1 Mark Questions

- State the fundamental principle of counting (multiplication).
- If there are 4 shirts and 3 trousers, in how many ways can a person dress?
- When is the addition principle used?

2 Mark Questions

- A password consists of 2 letters followed by 2 digits. How many passwords are possible (repetition allowed)?
- In how many ways can a person choose one book from 5 English and 4 Hindi books?

3 Mark Questions

- Using the fundamental principle of counting, find the number of ways a 3-digit number can be formed from the digits 1–9 with repetition, and without repetition.
- Explain the fundamental principle of counting and use it to find the number of ways a team of a boy and a girl can be selected from 5 boys and 4 girls.

Factorials and Permutations

MCQ Questions (choose the correct option)

1. The value of $5!$ is
 - (A) 120
 - (B) 20
 - (C) 24
 - (D) 60
2. The number of permutations of n distinct objects taken r at a time is
 - (A) $nPr = n!/(n-r)!$
 - (B) $nCr = n!/(r!(n-r)!)$
 - (C) $n!$
 - (D) n^r
3. The value of $0!$ is
 - (A) 1
 - (B) 0
 - (C) undefined
 - (D) infinite
4. The number of ways to arrange 3 objects from 5 distinct objects is
 - (A) 60
 - (B) 10
 - (C) 15
 - (D) 120

1 Mark Questions

1. Evaluate $5!$.
2. Write the formula for nPr .
3. What is the value of $0!$?

2 Mark Questions

1. Evaluate $8P3$.
2. Evaluate $4! - 3!$.

3 Mark Questions

1. Find the value of n if $nP2 = 30$.
2. Prove that $nPr = n \times (n-1)P(r-1)$.

Permutations of Objects Not All Distinct

MCQ Questions (choose the correct option)

1. The number of arrangements of the letters of 'BOOK' is
 - (A) 12
 - (B) 24
 - (C) 6
 - (D) 4

2. The number of permutations of n objects where p are alike of one kind and q alike of another is
 - (A) $n!/(p! q!)$
 - (B) $n!$
 - (C) $n!/(p q)$
 - (D) nPr
3. The number of distinct arrangements of the letters of 'MISSISSIPPI' involves dividing by
 - (A) $4! 4! 2!$
 - (B) $11!$
 - (C) $2!$
 - (D) $4!$
4. The number of arrangements of the letters of 'LEVEL' is
 - (A) 30
 - (B) 120
 - (C) 60
 - (D) 20

1 Mark Questions

1. Find the number of arrangements of the letters of 'BOOK'.
2. Write the formula for permutations when objects are not all distinct.
3. How many arrangements does 'LEVEL' have?

2 Mark Questions

1. Find the number of distinct permutations of the letters of 'ALLAHABAD'.
2. In how many ways can the letters of 'INDIA' be arranged?

3 Mark Questions

1. Find the number of distinct permutations of the letters of the word 'MISSISSIPPI'.
2. Find the number of arrangements of the letters of 'STATISTICS' and explain the formula used.

Circular Permutations

MCQ Questions (choose the correct option)

1. The number of circular permutations of n distinct objects is
 - (A) $(n - 1)!$
 - (B) $n!$
 - (C) $n!/2$
 - (D) $(n + 1)!$
2. The number of ways 5 people can sit around a round table is
 - (A) 24
 - (B) 120
 - (C) 60
 - (D) 20
3. In a circular arrangement, the clockwise and anticlockwise orders are the same for
 - (A) a necklace (garland)
 - (B) a round table of people

- (C) a line
 - (D) a queue
4. The number of ways 4 people can be seated around a circular table is
- (A) 6
 - (B) 24
 - (C) 12
 - (D) 4

1 Mark Questions

1. Write the formula for circular permutations of n distinct objects.
2. In how many ways can 5 people sit around a round table?
3. When are clockwise and anticlockwise arrangements treated as the same?

2 Mark Questions

1. In how many ways can 6 people sit around a round table?
2. In how many ways can a garland be made from 6 different flowers?

3 Mark Questions

1. In how many ways can 6 people sit around a round table if two particular people must sit together?
2. In how many ways can 5 boys and 5 girls sit around a round table such that boys and girls alternate?

Combinations

MCQ Questions (choose the correct option)

1. The number of combinations of n objects taken r at a time is
 - (A) $n!/(r!(n-r)!)$
 - (B) $n!/(n-r)!$
 - (C) $n!$
 - (D) n^r
2. The value of ${}^5C_2$ is
 - (A) 10
 - (B) 20
 - (C) 5
 - (D) 15
3. The number of ways to choose 3 from 7 objects is
 - (A) 35
 - (B) 21
 - (C) 7
 - (D) 210
4. In combinations, the order of selection
 - (A) does not matter
 - (B) matters
 - (C) is always fixed
 - (D) doubles the count

1 Mark Questions

1. Write the formula for nCr .
2. Evaluate $5C2$.
3. In how many ways can 3 objects be chosen from 7?

2 Mark Questions

1. Evaluate $8C3$.
2. In how many ways can a committee of 4 be chosen from 10 people?

3 Mark Questions

1. In how many ways can a committee of 5 be chosen from 6 men and 4 women so as to include exactly 2 women?
2. In how many ways can a selection of at least one book be made from 5 distinct books?

Key Properties and Relations

MCQ Questions (choose the correct option)

1. nCr is equal to
 - (A) $nC(n-r)$
 - (B) nPr
 - (C) $n!$
 - (D) $r! n!$
2. $nC0$ is equal to
 - (A) 1
 - (B) 0
 - (C) n
 - (D) $n!$
3. nCn is equal to
 - (A) 1
 - (B) 0
 - (C) n
 - (D) $n!$
4. The relation between nPr and nCr is
 - (A) $nPr = r! \times nCr$
 - (B) $nCr = r! \times nPr$
 - (C) $nPr = nCr$
 - (D) $nPr = nCr / r!$

1 Mark Questions

1. Write the relation between nPr and nCr .
2. Find the value of $nC0$ and nCn .
3. Simplify $nC(n-r)$.

2 Mark Questions

1. If $nC2 = 15$, find n.
2. Prove that $nCr + nC(r-1) = (n+1)Cr$.

3 Mark Questions

1. Prove that $nCr = nC(n-r)$ and $nCr + nC(r-1) = (n+1)Cr$.
2. Find n if $2nC3 : nC2 = 12 : 1$.