NCERT Solutions Class 11 Maths
Chapter 6: Permutations and Combinations
EXERCISE 6.2

Quick Summary: In NCERT Solutions Class 11 Maths Chapter 6 Exercise 6.2, students learn fundamental concepts of permutations and factorial operations through step-by-step solutions. This exercise covers factorial notation, evaluation of factorial expressions, and basic permutation formulas which are essential for building a strong foundation in combinatorics for CBSE board exams and competitive tests.

Key Takeaways:

- Master factorial notation and learn to evaluate expressions like $\frac{8!}{6!}$ and $\frac{1}{6!} + \frac{1}{7!}$
- Understand that factorials grow rapidly: $3! + 4! \neq 7!$ ($6 + 24 \neq 5040$)
- Apply the fundamental permutation formula $^nP_r = \frac{n!}{(n-r)!}$ for arranging objects
- Develop problem-solving skills for CBSE exams by practicing factorial simplification techniques

Complete Solutions

Question 1

QUESTION

Evaluate:

(i) 8!

(ii) 4! - 3!

SOLUTION

This question tests our understanding of the factorial notation. We need to evaluate the given expressions involving factorials.

(i) Evaluate

The factorial of a non-negative integer , denoted by , is the product of all positive integers less than or equal to . That is, .

Step 1: Write the definition of

Step 2: Calculate the product

We can calculate this product step by step:

Final Answer:

(ii) Evaluate

Step 1: Calculate

Step 2: Calculate

Step 3: Subtract from

Final Answer:

ANSWER

(i) 40320

(ii) 18

Question 2

Is 3! + 4! = 7!?

SOLUTION

The question asks us to determine if the sum of 3 factorial and 4 factorial is equal to 7 factorial.

Step 1: Calculate 3!

Recall that . Therefore,

Step 2: Calculate 4!

Step 3: Calculate 3! + 4!

Step 4: Calculate 7!

Step 5: Compare 3! + 4! and 7!

We found that and .

Since , we can conclude that .

Final Answer: 30, No

The factorial function grows very rapidly. Adding factorials of smaller numbers will generally not equal the factorial of a larger number formed by simply adding the original numbers.

ANSWER

30, No

Question 3

Compute (8!)/(6! × 2!)

SOLUTION

We are asked to compute the value of the expression . This involves understanding the factorial notation.

Step 1: Understand the factorial notation

The factorial of a non-negative integer , denoted by , is the product of all positive integers less than or equal to . That is, .

Step 2: Expand the factorials in the expression

We have:

So, the expression becomes:

Step 3: Simplify the expression by cancelling out common factors

Notice that appears in both the numerator and the denominator. We can cancel it out:

Now, we have:

Step 4: Perform the final calculation

We can simplify further by dividing 8 by 2:

So, the expression becomes:

Final Answer: The value of is 28.

ANSWER

28

Question 4

If $(1)/(6!) + (1)/(7!) = (x)/(8!)$, find x

SOLUTION

We are given the equation and we need to find the value of .

Step 1: Rewrite the equation

The given equation is:

Step 2: Find a common denominator for the left-hand side

We can rewrite as . So, the left-hand side becomes:

Step 3: Rewrite the equation with the simplified left-hand side

Now our equation is:

Step 4: Express 8! in terms of 7!

We know that . Substituting this into the equation, we get:

Step 5: Solve for x

Multiply both sides of the equation by to isolate :

Final Answer:

ANSWER

64

Question 5

Evaluate (n!)/((n-r)!) for:

(i) n = 6, r = 2

(ii) n = 9, r = 5

SOLUTION

This question tests our understanding of the factorial notation and how to evaluate expressions involving factorials.

(i)

Step 1: Substitute the given values of and into the expression.

We have to evaluate for and . Substituting these values, we get:

Step 2: Simplify the denominator.

Step 3: Expand the factorial in the numerator to match the denominator.

Recall that . Therefore,

So, we can rewrite the expression as:

Step 4: Cancel out the common factorial term.

We can cancel out from the numerator and the denominator:

Step 5: Calculate the final result.

Therefore, the value of for and is 30.

(ii)

Step 1: Substitute the given values of and into the expression.

We have to evaluate for and . Substituting these values, we get:

Step 2: Simplify the denominator.

Step 3: Expand the factorial in the numerator to match the denominator.

So, we can rewrite the expression as:

Step 4: Cancel out the common factorial term.

We can cancel out from the numerator and the denominator:

Step 5: Calculate the final result.

Therefore, the value of for and is 15120.

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📋 Key Formulas

Important Formulas for Exercise 6.2

Formula / Concept	Description
Factorial Notation: n!	The notation n! (read as 'n factorial') represents the product of the first n natural numbers. It is the product of all positive integers up to n. The formula is given by: $n! = n \times (n-1) \times (n-2) \times \dots \times 3 \times 2 \times 1$ By definition, 0! = 1.
Permutations	A permutation is an arrangement of a number of objects in a definite order, taking some or all at a time. In permutations, the order of the objects is important.
Permutation Formula (nPr)	The number of permutations of 'n' different objects taken 'r' at a time is denoted by nPr or P(n, r). The formula is: $^n P_r = \frac{n!}{(n-r)!}, \text{ where } 0 \le r \le n$ This formula is used when the objects are distinct and repetition is not allowed.
Combinations	A combination is a selection of items from a set where the order of selection does not matter.
Combination Formula (nCr)	The number of combinations of 'n' different objects taken 'r' at a time is denoted by nCr or C(n, r). The formula is: $^n C_r = \frac{n!}{r!(n-r)!}, \text{ where } 0$

Formula / Concept	Description
	$\le r \le n$ This formula is used to find the number of ways to choose 'r' objects from 'n' objects where the order is not important.
Relationship between Permutations and Combinations	The number of permutations is related to the number of combinations by the following formula: $^n P\_r = {^n C\_r} \times r!$ This shows that the number of ways to arrange 'r' items is the number of ways to choose 'r' items multiplied by the number of ways to arrange those 'r' items.

？ Top FAQs

Q1. How many questions are in NCERT Solutions Class 11 Maths Chapter 6 Permutations and Combinations Exercise 6.2?

Exercise 6.2 of NCERT Solutions for Class 11 Maths Chapter 6 Permutations and Combinations contains exactly 5 questions. These questions primarily focus on the application of nPr formula and permutation concepts as per the CBSE board exam 2025-26 syllabus.

Q2. Where can I download free PDF of NCERT Solutions for Class 11 Maths Chapter 6 Permutations and Combinations Exercise 6.2 with step by step solutions?

You can download the free PDF of NCERT Solutions for Class 11 Maths Chapter 6 Exercise 6.2 from the official NCERT website or various educational platforms offering step by step solutions. These solutions are updated for CBSE board exam 2025-26 session and include detailed explanations of all permutation problems using nPr formula.

Q3. How many marks does Permutations and Combinations carry in CBSE Class 11 board exam 2025-26 for Unit II Algebra?

Permutations and Combinations carries 5 marks in CBSE Class 11 board exam 2025-26 as part of Unit II - Algebra. Chapter 6 Exercise 6.2 focuses specifically on permutation concepts including nPr formula, making it crucial for scoring these marks in the examination.

Q4. Which is the most difficult question in NCERT Solutions Class 11 Maths Chapter 6 Permutations and Combinations Exercise 6.2?

Question 5 is generally considered the most challenging in Exercise 6.2 of NCERT Solutions Class 11 Maths Chapter 6 as it involves complex application of nPr formula and permutation principles. Students preparing for CBSE board exam 2025-26 should practice this question with step by step solutions to master the concept thoroughly.

Q5. What is nPr Formula explained in NCERT Solutions for Class 11 Maths Chapter 6 Permutations and Combinations Exercise 6.2?

The nPr formula in NCERT Class 11 Maths Chapter 6 Exercise 6.2 is $nPr = n!/(n-r)!$, where n is the total number of objects and r is the number of objects to be arranged. This fundamental permutation formula is extensively used in all 5 questions of Exercise 6.2 and is important for CBSE board exam 2025-26.

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