

# OTM – Only This Much COMBINATIONS

**MATH, LR & STATS**  
**CA FOUNDATION DEC 2023**

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**SESSION LINK:**

[https://www.youtube.com/live/iXzit-oGER8?si=7crPb8d1mwS6Pe\\_G](https://www.youtube.com/live/iXzit-oGER8?si=7crPb8d1mwS6Pe_G)

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Permutations and Combinations | Past Trends

Attempt	Easy	Moderate	Advance Level	Total
May 2018	2	0	0	2
Nov 2018	2	2	0	4
Jun 2019	2	1	1	4
Nov 2019	3	2	0	5
Nov 2020	2	2	0	4
Jan 2021	3	2	2	7
Jul 2021	2	2	0	4
Dec 2021	4	1	0	5
Jun 2022	6	2	0	8
Dec 2022	4	0	0	4
Jun 2023	3	1	1	4

Combinations – Basics

Meaning	<ul style="list-style-type: none"> <li>The number of ways in which <b>smaller or equal</b> number of things are <b>selected</b> from a collection of things</li> <li>where the <b>order</b> of selection or arrangement is <b>not important</b>, are called combinations.</li> </ul>
Theorem	<p>Number of Combinations when <b>r objects</b> are chosen out of <b>n different</b> objects</p> ${}^n C_r = \frac{n!}{(n-r)!r!}$ <p>Conditions: <math>n \geq r</math> and <math>n</math> is a positive integer</p>
Linkage with Permutations	${}^n C_r = \frac{{}^n P_r}{r!} \text{ or } {}^n P_r = {}^n C_r \times r!$
Standard Result	${}^n C_0 = 1$ ${}^n C_n = 1$
Complimentary Combinations	${}^n C_r = {}^n C_{n-r}$
Combination to choose one or more objects	<p>Combinations of <b>n</b> different things taking <b>one or more</b> out of <math>n</math> things at a time:</p> $2^n - 1$
Number of ways to do things with choices	<p>If a task is to be done <math>n</math> times with <math>r</math> choices for every task, then total ways of doing task = <math>n^r</math></p>
Special Formula	${}^{n+1} C_r = {}^n C_r + {}^n C_{r-1}$
Number of handshakes	${}^n C_2$



PYQ May 18

If  ${}^{1000}C_{98} = {}^{999}C_{97} + {}^x C_{901}$  find x

- a. 999                      b. 998                      c. 997                      d. 1000

Ans: a

PYQ Nov 18

If  ${}^n P_r = 720$  and  ${}^n C_r = 120$ , then r is

- a. 3                              b. 4                              c. 5                              d. 6

Ans: a

PYQ Nov 18

If there are 40 guests in a party. If each guest takes a handshake with all the remaining guests. Then the total number of handshakes is \_\_\_\_\_

- a. 1600                      b. 840                      c. 1560                      d. 780

Ans: d

PYQ Nov 18

If  ${}^{11}C_x = {}^{11}C_{2x-4}$  and  $x \neq 4$  then the value of  ${}^7 C_x =$ 

PYQ Jun 22

- a. 20                              b. 21                              c. 22                              d. 23

Ans: b

PYQ Nov 19

How many different groups of 3 people can be formed from a group of 5 people?

- a. 5                              b. 6                              c. 10                              d. 9

Ans: c

PYQ Nov 19

In how many ways can 4 people be selected at random from 6 boys and 4 girls if there are to be exactly 2 girls?

- a. 90                              b. 360                              c. 92                              d. 480

Ans: a

PYQ Jun 22

7 boys and 4 girls from which a team of 5 is to be selected, each team should have at least one girl is:

- a. 429                              b. 439                              c. 419                              d. 441

Ans: d

PYQ Nov 20

A fruity basket contains 7 apples, 6 bananas, and 4 mangoes. How many selections of 3 fruits can be made so that all 3 are apples?

- a. 35                              b. 120                              c. 165                              d. 70

Ans: a

PYQ Jan 21

A business house wishes to simultaneously elevate two of its six branch heads. In how many ways can these elevations take place?

- a. 12                              b. 3                              c. 6                              d. 15

Ans: d

Example 3

ICAI

An examination paper with 10 questions consists of 6 questions in Algebra and 4 questions in Geometry. At least one question from each section is to be attempted. In how many ways this can be done?

- a. 1023                              b. 945                              c. 1718                              d. 816

Ans: b



**PYQ Jun 22**

There are 5 questions each having four options. Then in how many different ways can we answer the questions?

- a. 20                      b. 120                      c. 1024                      d. 60

Ans: c

**Geometry Based Formulas**

No. of Straight Lines with the given $n$ points	${}^n C_2$ 2 is used as we need to select two points to make a line
No. of Triangles with the given $n$ points	${}^n C_3$ 3 is used as we need to select two points to make a line
No. of Straight Lines with the given $n$ points where $m$ points are collinear	${}^n C_2 - {}^m C_2 + 1$
No. of Triangles with the given $n$ points where $m$ points are collinear	${}^n C_3 - {}^m C_3$
No. of Parallelogram with the given one set of $m$ parallel lines and another set of $n$ parallel lines	${}^n C_2 \times {}^m C_2$ Selecting 2 lines from each set of parallel lines
No. of Diagonals with $n$ sides	${}^n C_2 - n$

**PYQ May 18**

The number of triangles that can be formed by choosing the vertices from a set of 12 points, seven of which lie on the same straight line is

- a. 185                      b. 175                      c. 115                      d. 105

Ans: a

**PYQ Jun 22**

If there are 6 points in a line and 4 points in another line. Find the number of parallelograms formed?

- a. 80                      b. 70                      c. 90                      d. 100

Ans: c

**MTP Nov 19**

The number of diagonals in a polygon of 6 sides

- a. 9                      b. 8                      c. 6                      d. 12

Ans: a

**Exercise 5C Q 21**

The Supreme Court has given a 6 to 3 decision upholding a lower court, the number of ways it can give a majority decision reversing the lower court is

- a. 256                      b. 276                      c. 245                      d. 226

Ans: a

**PYQ Jun 22**

If there are 6 points in a line and 4 points in another line. Find the number of parallelogram formed?

- a. 80                      b. 70                      c. 90                      d. 100

Ans: c

