

MATHEMATICS · JEE MAIN

Permutations & Combinations

Chapter-wise previous year questions, with answer key

105

PYQS

2020–2025

PAPERS

5

TOPICS

Permutations

Combinations

Distribution Problems

Fundamental Principle of Counting

Rank of a Word

- 1 Attempt each question on paper first — they're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap “Step-by-step solution” under it for the full working.

Stuck on a question?

Every question has a free step-by-step solution on PrepWiser — tap “Step-by-step solution” under it.

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Permutations · 37 PYQs

Q1 JEE Main 2025 · 2 Apr · Shift 1

The number of sequences of ten terms, whose terms are either 0 or 1 or 2, that contain exactly five 1s and exactly three 2s, is equal to :

- (A) 360 (B) 2520
(C) 1820 (D) 45

[Step-by-step solution](https://www.prepwiser.in/questions/dRUpswnbef) ▶ [prepwiser.in/questions/dRUpswnbef](https://www.prepwiser.in/questions/dRUpswnbef)

Q2 JEE Main 2025 · 28 Jan · Shift 1

The number of different 5 digit numbers greater than 50000 that can be formed using the digits 0, 1, 2, 3, 4, 5, 6, 7, such that the sum of their first and last digits should not be more than 8, is

- (A) 5720 (B) 5719
(C) 4608 (D) 4607

[Step-by-step solution](https://www.prepwiser.in/questions/qMSdSbWd7V) ▶ [prepwiser.in/questions/qMSdSbWd7V](https://www.prepwiser.in/questions/qMSdSbWd7V)

Q3 JEE Main 2025 · 23 Jan · Shift 2

The number of ways, 5 boys and 4 girls can sit in a row so that either all the boys sit together or no two boys sit together, is _____.

Numerical answer — enter the value.

[Step-by-step solution](https://www.prepwiser.in/questions/8fwAfozMRS) ▶ [prepwiser.in/questions/8fwAfozMRS](https://www.prepwiser.in/questions/8fwAfozMRS)

Q4 JEE Main 2025 · 23 Jan · Shift 1

The number of words, which can be formed using all the letters of the word "DAUGHTER", so that all the vowels never come together, is :

- (A) 34000 (B) 37000
(C) 35000 (D) 36000

[Step-by-step solution](https://www.prepwiser.in/questions/7e-F1ZfFH2) ▶ [prepwiser.in/questions/7e-F1ZfFH2](https://www.prepwiser.in/questions/7e-F1ZfFH2)

Q5 JEE Main 2025 · 22 Jan · Shift 2

In a group of 3 girls and 4 boys, there are two boys B_1 and B_2 . The number of ways, in which these girls and boys can stand in a queue such that all the girls stand together, all the boys stand together, but B_1 and B_2 are not adjacent to each other, is :

- (A) 120 (B) 96
(C) 72 (D) 144

[Step-by-step solution](https://www.prepwiser.in/questions/XMsyQQ1lqE) ▶ [prepwiser.in/questions/XMsyQQ1lqE](https://www.prepwiser.in/questions/XMsyQQ1lqE)

Q6 JEE Main 2024 · 8 Apr · Shift 1

The number of 3-digit numbers, formed using the digits 2, 3, 4, 5 and 7, when the repetition of digits is not allowed, and which are not divisible by 3, is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution](https://www.prepwiser.in/questions/vTaMdbGZYB) ▶ [prepwiser.in/questions/vTaMdbGZYB](https://www.prepwiser.in/questions/vTaMdbGZYB)

Q7 JEE Main 2024 · 5 Apr · Shift 1

Let $A = \{1, 3, 7, 9, 11\}$ and $B = \{2, 4, 5, 7, 8, 10, 12\}$. Then the total number of one-one maps $f : A \rightarrow B$, such that $f(1) + f(3) = 14$, is :

- (A) 120 (B) 180
(C) 240 (D) 480

[Step-by-step solution ► prepwisser.in/questions/fZRH5yVcC-](https://www.prepwisser.in/questions/fZRH5yVcC-)

Q8 JEE Main 2024 · 31 Jan · Shift 1

The total number of words (with or without meaning) that can be formed out of the letters of the word 'DISTRIBUTION' taken four at a time, is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/Rd8m0bbVIL](https://www.prepwisser.in/questions/Rd8m0bbVIL)

Q9 JEE Main 2023 · 12 Apr · Shift 1

The number of five digit numbers, greater than 40000 and divisible by 5, which can be formed using the digits 0, 1, 3, 5, 7 and 9 without repetition, is equal to :

- (A) 132 (B) 72
(C) 120 (D) 96

[Step-by-step solution ► prepwisser.in/questions/emrdL559dM](https://www.prepwisser.in/questions/emrdL559dM)

Q10 JEE Main 2023 · 12 Apr · Shift 1

Let the digits a, b, c be in A. P. Nine-digit numbers are to be formed using each of these three digits thrice such that three consecutive digits are in A.P. at least once. How many such numbers can be formed?

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/cZvsulhIoo](https://www.prepwisser.in/questions/cZvsulhIoo)

Q11 JEE Main 2023 · 11 Apr · Shift 1

In an examination, 5 students have been allotted their seats as per their roll numbers. The number of ways, in which none of the students sits on the allotted seat, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/iVARZYzIoK](https://www.prepwisser.in/questions/iVARZYzIoK)

Q12 JEE Main 2023 · 10 Apr · Shift 1

The number of permutations, of the digits 1, 2, 3, ..., 7 without repetition, which neither contain the string 153 nor the string 2467, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/sEnSb0BuGi](https://www.prepwisser.in/questions/sEnSb0BuGi)

Q13 JEE Main 2023 · 10 Apr · Shift 2

The sum of all the four-digit numbers that can be formed using all the digits 2, 1, 2, 3 is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/BX2ET1hqm6](https://www.prepwisser.in/questions/BX2ET1hqm6)

Q14 JEE Main 2023 · 8 Apr · Shift 1

The number of arrangements of the letters of the word "INDEPENDENCE" in which all the vowels always occur together is :

(A) 16800

(B) 14800

(C) 18000

(D) 33600

[Step-by-step solution ► prepwiser.in/questions/Vi_mntc7Nb](https://www.prepwiser.in/questions/Vi_mntc7Nb)

Q15 JEE Main 2023 · 8 Apr · Shift 2

If the number of words, with or without meaning, which can be made using all the letters of the word MATHEMATICS in which C and S do not come together, is $(6!)k$, then k is equal to :

(A) 5670

(B) 1890

(C) 2835

(D) 945

[Step-by-step solution ► prepwiser.in/questions/7y2cnF_tps](https://www.prepwiser.in/questions/7y2cnF_tps)

Q16 JEE Main 2023 · 6 Apr · Shift 2

The number of 4-letter words, with or without meaning, each consisting of 2 vowels and 2 consonants, which can be formed from the letters of the word UNIVERSE without repetition is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/Ao-k8P-Qcm](https://www.prepwiser.in/questions/Ao-k8P-Qcm)

Q17 JEE Main 2023 · 1 Feb · Shift 1

The number of words, with or without meaning, that can be formed using all the letters of the word ASSASSINATION so that the vowels occur together, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/xNshZaGS6O](https://www.prepwiser.in/questions/xNshZaGS6O)

Q18 JEE Main 2023 · 1 Feb · Shift 2

The total number of six digit numbers, formed using the digits 4, 5, 9 only and divisible by 6, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/0reaFnyXJn](https://www.prepwiser.in/questions/0reaFnyXJn)

Q19 JEE Main 2023 · 31 Jan · Shift 2

If ${}^{2n+1}P_{n-1} : {}^{2n-1}P_n = 11 : 21$,

then $n^2 + n + 15$ is equal to :

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/K0U8JqcXhw](https://www.prepwiser.in/questions/K0U8JqcXhw)

Q20 JEE Main 2023 · 30 Jan · Shift 2

The number of seven digits odd numbers, that can be formed using all the

seven digits 1, 2, 2, 2, 3, 3, 5 is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/yIv_YnQbOk](https://www.prepwiser.in/questions/yIv_YnQbOk)

Q21 JEE Main 2023 · 29 Jan · Shift 1

If all the six digit numbers $x_1 x_2 x_3 x_4 x_5 x_6$ with $0 < x_1 < x_2 < x_3 < x_4 < x_5 < x_6$ are arranged in the increasing order, then the sum of the digits in the 72th number is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/nrE6diFUad](https://www.prepwiser.in/questions/nrE6diFUad)

Q22 JEE Main 2023 · 24 Jan · Shift 2

The number of integers, greater than 7000 that can be formed, using the digits 3, 5, 6, 7, 8 without repetition is :

- (A) 48 (B) 120
(C) 168 (D) 220

[Step-by-step solution ► prepwiser.in/questions/HZHhSUxYbc](https://www.prepwiser.in/questions/HZHhSUxYbc)

Q23 JEE Main 2022 · 29 Jul · Shift 2

The number of natural numbers lying between 1012 and 23421 that can be formed using the digits 2, 3, 4, 5, 6 (repetition of digits is not allowed) and divisible by 55 is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/nTOx3X1PdD](https://www.prepwiser.in/questions/nTOx3X1PdD)

Q24 JEE Main 2022 · 25 Jul · Shift 2

The number of bijective functions $f : \{1, 3, 5, 7, \dots, 99\} \rightarrow \{2, 4, 6, 8, \dots, 100\}$, such that $f(3) \geq f(9) \geq f(15) \geq f(21) \geq \dots \geq f(99)$, is _____.

- (A) ${}^{50}P_{17}$ (B) ${}^{50}P_{33}$
(C) $33! \times 17!$ (D) $\frac{50!}{2}$

[Step-by-step solution ► prepwiser.in/questions/ecQIPuUqVh](https://www.prepwiser.in/questions/ecQIPuUqVh)

Q25 JEE Main 2022 · 29 Jun · Shift 1

Let $b_1 b_2 b_3 b_4$ be a 4-element permutation with $b_i \in \{1, 2, 3, \dots, 100\}$ for $1 \leq i \leq 4$ and $b_i \neq b_j$ for $i \neq j$, such that either b_1, b_2, b_3 are consecutive integers or b_2, b_3, b_4 are consecutive integers. Then the number of such permutations $b_1 b_2 b_3 b_4$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/VvCG_TCiCd](https://www.prepwiser.in/questions/VvCG_TCiCd)

Q26 JEE Main 2022 · 28 Jun · Shift 1

The total number of 5-digit numbers, formed by using the digits 1, 2, 3, 5, 6, 7 without repetition, which are multiple of 6, is :

- (A) 36 (B) 48
(C) 60 (D) 72

[Step-by-step solution ► prepwiser.in/questions/QeB0IFSuv2](https://www.prepwiser.in/questions/QeB0IFSuv2)

Q27 JEE Main 2022 · 25 Jun · Shift 2

The total number of three-digit numbers, with one digit repeated exactly two times, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/IhCjzClenM](https://www.prepwiser.in/questions/IhCjzClenM)

Q28 JEE Main 2022 · 24 Jun · Shift 2

The number of 7-digit numbers which are multiples of 11 and are formed using all the digits 1, 2, 3, 4, 5, 7 and 9 is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/vNuAs0MKbl](https://www.prepwiser.in/questions/vNuAs0MKbl)

Q29 JEE Main 2021 · 31 Aug · Shift 1

The number of six letter words (with or without meaning), formed using all the letters of the word 'VOWELS', so that all the consonants never come together, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/V37JZbXOmQ](https://www.prepwiser.in/questions/V37JZbXOmQ)

Q30 JEE Main 2021 · 26 Aug · Shift 1

If

$${}^1P_1 + 2 \cdot {}^2P_2 + 3 \cdot {}^3P_3 + \dots + 15 \cdot {}^{15}P_{15} = {}^rP_r - s, 0 \leq s \leq 1$$

, then ${}^{r+s}C_{r-s}$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/62GMFli4kn](https://www.prepwiser.in/questions/62GMFli4kn)

Q31 JEE Main 2021 · 18 Mar · Shift 1

The sum of all the 4-digit distinct numbers that can be formed with the digits 1, 2, 2 and 3 is :

(A) 26664

(B) 122664

(C) 122234

(D) 22264

[Step-by-step solution ► prepwiser.in/questions/n4HuYECHlr](https://www.prepwiser.in/questions/n4HuYECHlr)

Q32 JEE Main 2021 · 25 Feb · Shift 1

The total number of numbers, lying between 100 and 1000 that can be formed with the digits 1, 2, 3, 4, 5, if the repetition of digits is not allowed and numbers are divisible by either 3 or 5, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/V9iqDq0aul](https://www.prepwiser.in/questions/V9iqDq0aul)

Q33 JEE Main 2020 · 6 Sep · Shift 1

Two families with three members each and one family with four members are to be seated in a row. In how many ways can they be seated so that the same family members are not separated?

(A) $2! 3! 4!$

(B) $(3!)^3 \cdot (4!)$

(C) $3! (4!)^3$

(D) $(3!)^2 \cdot (4!)$

[Step-by-step solution ► prepwiser.in/questions/vZeeJ3f9K5](https://www.prepwiser.in/questions/vZeeJ3f9K5)

Q34 JEE Main 2020 · 6 Sep · Shift 2

The number of words (with or without meaning) that can be formed from all the letters of the word "LETTER" in which vowels never come together is _____ .

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/1NDz0yTPrz](https://www.prepwiser.in/questions/1NDz0yTPrz)

Q35 JEE Main 2020 · 5 Sep · Shift 1

The number of words, with or without meaning, that can be formed by taking 4 letters at a time from the letters of the word 'SYLLABUS' such that two letters are distinct and two letters are alike, is :

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/IRX5b3-KuD](https://www.prepwiser.in/questions/IRX5b3-KuD)

Q36 JEE Main 2020 · 8 Jan · Shift 2

The number of 4 letter words (with or without meaning) that can be formed from the eleven letters of the word 'EXAMINATION' is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/34VtwvXFKh](https://www.prepwiser.in/questions/34VtwvXFKh)

Q37 JEE Main 2020 · 7 Jan · Shift 1

Total number of 6-digit numbers in which only and all the five digits 1, 3, 5, 7 and 9 appear, is :

(A) $\frac{5}{2} (6!)$

(B) $6!$

(C) 5^6

(D) $\frac{1}{2} (6!)$

[Step-by-step solution ► prepwiser.in/questions/RcI4kgO4tT](https://www.prepwiser.in/questions/RcI4kgO4tT)

Combinations · 31 PYQs

Q38 JEE Main 2025 · 8 Apr · Shift 2

There are 12 points in a plane, no three of which are in the same straight line, except 5 points which are collinear. Then the total number of triangles that can be formed with the vertices at any three of these 12 points is

(A) 230

(B) 210

(C) 200

(D) 220

[Step-by-step solution ► prepwiser.in/questions/Vrv84gDGHG](https://www.prepwiser.in/questions/Vrv84gDGHG)

Q39 JEE Main 2025 · 7 Apr · Shift 1

From a group of 7 batsmen and 6 bowlers, 10 players are to be chosen for a team, which should include at least 4 batsmen and at least 4 bowlers. One batsman and one bowler who are captain and vice-captain respectively of the team should be included. Then the total number of ways such a selection can be made, is

- (A) 145 (B) 165
(C) 155 (D) 135

Step-by-step solution ► [prepwiser.in/questions/vhhrIO4cXQ](https://www.prepwiser.in/questions/vhhrIO4cXQ)

Q40 JEE Main 2025 · 7 Apr · Shift 1

For $n \geq 2$, let S_n denote the set of all subsets of $\{1, 2, \dots, n\}$ with no two consecutive numbers. For example $\{1, 3, 5\} \in S_6$, but $\{1, 2, 4\} \notin S_6$. Then $n(S_5)$ is equal to _____

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/xrh26yg4Zr](https://www.prepwiser.in/questions/xrh26yg4Zr)

Q41 JEE Main 2025 · 7 Apr · Shift 2

Let p be the number of all triangles that can be formed by joining the vertices of a regular polygon P of n sides and q be the number of all quadrilaterals that can be formed by joining the vertices of P . If $p + q = 126$, then the eccentricity of the ellipse $\frac{x^2}{16} + \frac{y^2}{n} = 1$ is :

- (A) $\frac{1}{\sqrt{2}}$
(B) $\frac{1}{2}$
(C) $\frac{\sqrt{7}}{4}$
(D) $\frac{3}{4}$

Step-by-step solution ► [prepwiser.in/questions/obiLVGH2Vr](https://www.prepwiser.in/questions/obiLVGH2Vr)

Q42 JEE Main 2025 · 22 Jan · Shift 1

From all the English alphabets, five letters are chosen and are arranged in alphabetical order. The total number of ways, in which the middle letter is 'M', is :

- (A) 6084 (B) 5148
(C) 14950 (D) 4356

Step-by-step solution ► [prepwiser.in/questions/ksXWMDynOK](https://www.prepwiser.in/questions/ksXWMDynOK)

Q43 JEE Main 2024 · 8 Apr · Shift 2

The number of ways five alphabets can be chosen from the alphabets of the word MATHEMATICS, where the chosen alphabets are not necessarily distinct, is equal to:

- (A) 179 (B) 177
(C) 175 (D) 181

Step-by-step solution ► [prepwiser.in/questions/3qASTdR_Xq](https://www.prepwiser.in/questions/3qASTdR_Xq)

Q44 JEE Main 2024 · 6 Apr · Shift 1

The number of triangles whose vertices are at the vertices of a regular octagon but none of whose sides is a side of the octagon is

- (A) 56 (B) 16
(C) 24 (D) 48

[Step-by-step solution ► prepwiser.in/questions/SH_xNe5k0p](https://www.prepwiser.in/questions/SH_xNe5k0p)

Q45 JEE Main 2024 · 4 Apr · Shift 2

There are 4 men and 5 women in Group A, and 5 men and 4 women in Group B. If 4 persons are selected from each group, then the number of ways of selecting 4 men and 4 women is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/qaoE2yYiUV](https://www.prepwiser.in/questions/qaoE2yYiUV)

Q46 JEE Main 2024 · 1 Feb · Shift 1

The number of elements in the set $S = \{(x, y, z) : x, y, z \in \mathbf{Z}, x + 2y + 3z = 42, x, y, z \geq 0\}$ equals _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/Q1g2UHxD5m](https://www.prepwiser.in/questions/Q1g2UHxD5m)

Q47 JEE Main 2024 · 31 Jan · Shift 2

If for some m, n ; ${}^6C_m + 2({}^6C_{m+1}) + {}^6C_{m+2} > {}^8C_3$ and ${}^{n-1}P_3 : {}^nP_4 = 1 : 8$, then ${}^nP_{m+1} + {}^{n+1}C_m$ is equal to

- (A) 380 (B) 376
(C) 372 (D) 384

[Step-by-step solution ► prepwiser.in/questions/gRSKbEVmAT](https://www.prepwiser.in/questions/gRSKbEVmAT)

Q48 JEE Main 2024 · 30 Jan · Shift 2

In an examination of Mathematics paper, there are 20 questions of equal marks and the question paper is divided into three sections : A, B and C . A student is required to attempt total 15 questions taking at least 4 questions from each section. If section A has 8 questions, section B has 6 questions and section C has 6 questions, then the total number of ways a student can select 15 questions is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/sHKRmgc8gK](https://www.prepwiser.in/questions/sHKRmgc8gK)

Q49 JEE Main 2023 · 11 Apr · Shift 1

The number of triplets (x, y, z) , where x, y, z are distinct non negative integers satisfying $x + y + z = 15$, is :

- (A) 136 (B) 80
(C) 92 (D) 114

[Step-by-step solution ► prepwiser.in/questions/-FpLzw3RPY](https://www.prepwiser.in/questions/-FpLzw3RPY)

Q50 JEE Main 2023 · 10 Apr · Shift 1

Some couples participated in a mixed doubles badminton tournament. If the number of matches played, so that no couple played in a match, is 840, then the total number of persons, who participated in the tournament, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/-D-tFc_D2-](#)

Q51 JEE Main 2023 · 6 Apr · Shift 1

If ${}^{2n}C_3 : {}^nC_3 = 10 : 1$, then the ratio $(n^2 + 3n) : (n^2 - 3n + 4)$ is :

(A) 27 : 11

(B) 2 : 1

(C) 35 : 16

(D) 65 : 37

[Step-by-step solution ► prepwiser.in/questions/M8uTyMFEH5](#)

Q52 JEE Main 2023 · 25 Jan · Shift 1

Let $S = \{1, 2, 3, 5, 7, 10, 11\}$. The number of non-empty subsets of S that have the sum of all elements a multiple of 3, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/wMQootbCQS](#)

Q53 JEE Main 2023 · 25 Jan · Shift 1

Let x and y be distinct integers where $1 \leq x \leq 25$ and $1 \leq y \leq 25$. Then, the number of ways of choosing x and y , such that $x + y$ is divisible by 5, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/S5pS7UzMi0](#)

Q54 JEE Main 2023 · 25 Jan · Shift 2

Suppose Anil's mother wants to give 5 whole fruits to Anil from a basket of 7 red apples, 5 white apples and 8 oranges. If in the selected 5 fruits, at least 2 oranges, at least one red apple and at least one white apple must be given, then the number of ways, Anil's mother can offer 5 fruits to Anil is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/jEqbLabTbE](#)

Q55 JEE Main 2023 · 24 Jan · Shift 1

A boy needs to select five courses from 12 available courses, out of which 5 courses are language courses. If he can choose at most two language courses, then the number of ways he can choose five courses is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/xRBIszyUd6](#)

Q56 JEE Main 2022 · 29 Jul · Shift 1

The number of matrices of order 3×3 , whose entries are either 0 or 1 and the sum of all the entries is a prime number, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/NhRCF8Y5Ms](#)

Q57 JEE Main 2022 · 28 Jul · Shift 2

A class contains b boys and g girls. If the number of ways of selecting 3 boys and 2 girls from the class is 168, then $b + 3g$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisers.in/questions/gQGR-SdGu6](https://www.prepwisers.in/questions/gQGR-SdGu6)

Q58 JEE Main 2022 · 27 Jun · Shift 1

Five numbers x_1, x_2, x_3, x_4, x_5 are randomly selected from the numbers 1, 2, 3,, 18 and are arranged in the increasing order ($x_1 < x_2 < x_3 < x_4 < x_5$). The probability that $x_2 = 7$ and $x_4 = 11$ is :

(A) $\frac{1}{136}$

(B) $\frac{1}{72}$

(C) $\frac{1}{68}$

(D) $\frac{1}{34}$

[Step-by-step solution ► prepwisers.in/questions/bDCOoInOtx](https://www.prepwisers.in/questions/bDCOoInOtx)

Q59 JEE Main 2022 · 26 Jun · Shift 1

There are ten boys $B_1, B_2, \dots, B_{10}$ and five girls $G_1, G_2, \dots, G_5$ in a class. Then the number of ways of forming a group consisting of three boys and three girls, if both B_1 and B_2 together should not be the members of a group, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisers.in/questions/-lNyS9ny9n](https://www.prepwisers.in/questions/-lNyS9ny9n)

Q60 JEE Main 2022 · 24 Jun · Shift 1

In an examination, there are 5 multiple choice questions with 3 choices, out of which exactly one is correct. There are 3 marks for each correct answer, -2 marks for each wrong answer and 0 mark if the question is not attempted. Then, the number of ways a student appearing in the examination gets 5 marks is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisers.in/questions/bbjVMo28gE](https://www.prepwisers.in/questions/bbjVMo28gE)

Q61 JEE Main 2021 · 25 Jul · Shift 2

If ${}^nP_r = {}^nP_{r+1}$ and ${}^nC_r = {}^nC_{r-1}$, then the value of r is equal to :

(A) 1

(B) 4

(C) 2

(D) 3

[Step-by-step solution ► prepwisers.in/questions/cW0HBai2cT](https://www.prepwisers.in/questions/cW0HBai2cT)

Q62 JEE Main 2021 · 25 Jul · Shift 1

There are 5 students in class 10, 6 students in class 11 and 8 students in class 12. If the number of ways, in which 10 students can be selected from them so as to include at least 2 students from each class and at most 5 students from the total 11 students of class 10 and 11 is $100k$, then k is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisers.in/questions/MH9naKi3wB](https://www.prepwisers.in/questions/MH9naKi3wB)

Q63 JEE Main 2021 · 20 Jul · Shift 1

There are 15 players in a cricket team, out of which 6 are bowlers, 7 are batsman and 2 are wicketkeepers. The number of ways, a team of 11 players be selected from them so as to include at least 4 bowlers, 5 batsman and 1 wicketkeeper, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/Vw3TqRct8w](https://www.prepwiser.in/questions/Vw3TqRct8w)

Q64 JEE Main 2021 · 17 Mar · Shift 1

Team 'A' consists of 7 boys and n girls and Team 'B' has 4 boys and 6 girls. If a total of 52 single matches can be arranged between these two teams when a boy plays against a boy and a girl plays against a girl, then n is equal to :

- | | |
|-------|-------|
| (A) 5 | (B) 2 |
| (C) 4 | (D) 6 |

[Step-by-step solution ► prepwiser.in/questions/z5HcVb_TVg](https://www.prepwiser.in/questions/z5HcVb_TVg)

Q65 JEE Main 2021 · 16 Mar · Shift 2

Consider a rectangle ABCD having 5, 7, 6, 9 points in the interior of the line segments AB, CD, BC, DA respectively. Let α be the number of triangles having these points from different sides as vertices and β be the number of quadrilaterals having these points from different sides as vertices. Then $(\beta - \alpha)$ is equal to :

- | | |
|----------|----------|
| (A) 717 | (B) 795 |
| (C) 1890 | (D) 1173 |

[Step-by-step solution ► prepwiser.in/questions/XB-n-6xjQQ](https://www.prepwiser.in/questions/XB-n-6xjQQ)

Q66 JEE Main 2021 · 24 Feb · Shift 1

A scientific committee is to be formed from 6 Indians and 8 foreigners, which includes at least 2 Indians and double the number of foreigners as Indians. Then the number of ways, the committee can be formed, is :

- | | |
|----------|----------|
| (A) 1050 | (B) 575 |
| (C) 560 | (D) 1625 |

[Step-by-step solution ► prepwiser.in/questions/hT4sUw4ZvS](https://www.prepwiser.in/questions/hT4sUw4ZvS)

Q67 JEE Main 2020 · 4 Sep · Shift 2

A test consists of 6 multiple choice questions, each having 4 alternative answers of which only one is correct. The number of ways, in which a candidate answers all six questions such that exactly four of the answers are correct, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/TOOgXbrfbj](https://www.prepwiser.in/questions/TOOgXbrfbj)

Q68 JEE Main 2020 · 8 Jan · Shift 1

An urn contains 5 red marbles, 4 black marbles and 3 white marbles. Then the number of ways in which 4 marbles can be drawn so that at the most three of them are red is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/wYU0BCFKSL](https://www.prepwiser.in/questions/wYU0BCFKSL)

Q69 JEE Main 2025 · 29 Jan · Shift 1

The number of 6-letter words, with or without meaning, that can be formed using the letters of the word MATHS such that any letter that appears in the word must appear at least twice, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/67RLe20gj1](https://www.prepwiser.in/questions/67RLe20gj1)

Q70 JEE Main 2025 · 29 Jan · Shift 1

Let P be the set of seven digit numbers with sum of their digits equal to 11. If the numbers in P are formed by using the digits 1, 2 and 3 only, then the number of elements in the set P is :

- (A) 164
- (B) 158
- (C) 161
- (D) 173

[Step-by-step solution ► prepwiser.in/questions/KB5TY27M1R](https://www.prepwiser.in/questions/KB5TY27M1R)

Q71 JEE Main 2025 · 28 Jan · Shift 2

The number of natural numbers, between 212 and 999, such that the sum of their digits is 15, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/nYpZBXC-4f](https://www.prepwiser.in/questions/nYpZBXC-4f)

Q72 JEE Main 2024 · 9 Apr · Shift 2

The number of integers, between 100 and 1000 having the sum of their digits equals to 14 , is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/qG2OF9x8z4](https://www.prepwiser.in/questions/qG2OF9x8z4)

Q73 JEE Main 2024 · 5 Apr · Shift 2

Let the set $S = \{2, 4, 8, 16, \dots, 512\}$ be partitioned into 3 sets A, B, C with equal number of elements such that $A \cup B \cup C = S$ and

$$A \cap B = B \cap C = A \cap C = \phi$$

. The maximum number of such possible partitions of S is equal to:

- | | |
|----------|----------|
| (A) 1640 | (B) 1520 |
| (C) 1710 | (D) 1680 |

[Step-by-step solution ► prepwiser.in/questions/15RyYxWQYP](https://www.prepwiser.in/questions/15RyYxWQYP)

Q74 JEE Main 2024 · 5 Apr · Shift 1

The number of ways of getting a sum 16 on throwing a dice four times is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/2_gEf3z547](https://www.prepwiser.in/questions/2_gEf3z547)

Q75 JEE Main 2024 · 1 Feb · Shift 1

If n is the number of ways five different employees can sit into four indistinguishable offices where any office may have any number of persons including zero, then n is equal to :

- (A) 47 (B) 53
(C) 51 (D) 43

[Step-by-step solution ► prepwisser.in/questions/vwF-8UTw8w](https://www.prepwisser.in/questions/vwF-8UTw8w)

Q76 JEE Main 2024 · 31 Jan · Shift 2

The number of ways in which 21 identical apples can be distributed among three children such that each child gets at least 2 apples, is

- (A) 130 (B) 136
(C) 142 (D) 406

[Step-by-step solution ► prepwisser.in/questions/G03Gf5W2KN](https://www.prepwisser.in/questions/G03Gf5W2KN)

Q77 JEE Main 2024 · 29 Jan · Shift 2

Number of ways of arranging 8 identical books into 4 identical shelves where any number of shelves may remain empty is equal to

- (A) 18 (B) 16
(C) 12 (D) 15

[Step-by-step solution ► prepwisser.in/questions/GYl-Um7NK1](https://www.prepwisser.in/questions/GYl-Um7NK1)

Q78 JEE Main 2023 · 13 Apr · Shift 1

The number of seven digit positive integers formed using the digits 1, 2, 3 and 4 only and sum of the digits equal to 12 is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/TMcxOU-jIY](https://www.prepwisser.in/questions/TMcxOU-jIY)

Q79 JEE Main 2023 · 6 Apr · Shift 1

The number of ways of giving 20 distinct oranges to 3 children such that each child gets at least one orange is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/IOfDOxSWOt](https://www.prepwisser.in/questions/IOfDOxSWOt)

Q80 JEE Main 2023 · 1 Feb · Shift 2

Number of integral solutions to the equation $x + y + z = 21$, where $x \geq 1, y \geq 3, z \geq 4$, is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/lkTx-JJs5O](https://www.prepwisser.in/questions/lkTx-JJs5O)

Q81 JEE Main 2022 · 26 Jul · Shift 1

The number of 5-digit natural numbers, such that the product of their digits is 36, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/pQHDE6uVWX](https://www.prepwisser.in/questions/pQHDE6uVWX)

Q82 JEE Main 2022 · 28 Jun · Shift 2

The number of ways to distribute 30 identical candies among four children C_1, C_2, C_3 and C_4 so that C_2 receives at least 4 and at most 7 candies, C_3 receives at least 2 and at most 6 candies, is equal to :

- (A) 205 (B) 615
(C) 510 (D) 430

[Step-by-step solution ► prepwisar.in/questions/0ObDicFEtw](https://www.prepwisar.in/questions/0ObDicFEtw)

Q83 JEE Main 2021 · 26 Feb · Shift 1

The number of seven digit integers with sum of the digits equal to 10 and formed by using the digits 1, 2 and 3 only is :

- (A) 35 (B) 42
(C) 82 (D) 77

[Step-by-step solution ► prepwisar.in/questions/HYoVohz1kd](https://www.prepwisar.in/questions/HYoVohz1kd)

Q84 JEE Main 2021 · 25 Feb · Shift 1

The total number of positive integral solutions (x, y, z) such that $xyz = 24$ is :

- (A) 36 (B) 24
(C) 45 (D) 30

[Step-by-step solution ► prepwisar.in/questions/dwTdD2oNIR](https://www.prepwisar.in/questions/dwTdD2oNIR)

Q85 JEE Main 2021 · 24 Feb · Shift 2

The students $S_1, S_2, \dots, S_{10}$ are to be divided into 3 groups A, B and C such that each group has at least one student and the group C has at most 3 students. Then the total number of possibilities of forming such groups is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/dId0qsEMq8](https://www.prepwisar.in/questions/dId0qsEMq8)

Q86 JEE Main 2020 · 3 Sep · Shift 2

The total number of 3-digit numbers, whose sum of digits is 10, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/rUIGOz4mip](https://www.prepwisar.in/questions/rUIGOz4mip)

Fundamental Principle of Counting · 11 PYQs

Q87 JEE Main 2025 · 3 Apr · Shift 1

If the number of seven-digit numbers, such that the sum of their digits is even, is $m \cdot n \cdot 10^n$; $m, n \in \{1, 2, 3, \dots, 9\}$, then $m + n$ is equal to _____

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/ddVSkZoCDX](https://www.prepwisar.in/questions/ddVSkZoCDX)

Q88 JEE Main 2024 · 30 Jan · Shift 1

Let $A = \{1, 2, 3, \dots, 7\}$ and let $P(A)$ denote the power set of A . If the number of functions $f : A \rightarrow P(A)$ such that $a \in f(a), \forall a \in A$ is m^n , m and $n \in \mathbb{N}$ and m is least, then $m + n$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/syOFy_J5b5](https://www.prepwiser.in/questions/syOFy_J5b5)

Q89 JEE Main 2023 · 15 Apr · Shift 1

The total number of three-digit numbers, divisible by 3, which can be formed using the digits 1, 3, 5, 8, if repetition of digits is allowed, is :

- | | |
|--------|--------|
| (A) 21 | (B) 22 |
| (C) 18 | (D) 20 |

[Step-by-step solution ► prepwiser.in/questions/KylMK2newu](https://www.prepwiser.in/questions/KylMK2newu)

Q90 JEE Main 2023 · 13 Apr · Shift 2

Total numbers of 3-digit numbers that are divisible by 6 and can be formed by using the digits 1, 2, 3, 4, 5 with repetition, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/HHdEWd-2xw](https://www.prepwiser.in/questions/HHdEWd-2xw)

Q91 JEE Main 2023 · 30 Jan · Shift 2

The number of ways of selecting two numbers a and $b, a \in \{2, 4, 6, \dots, 100\}$ and $b \in \{1, 3, 5, \dots, 99\}$ such that 2 is the remainder when $a + b$ is divided by 23 is :

- | | |
|---------|---------|
| (A) 186 | (B) 54 |
| (C) 108 | (D) 268 |

[Step-by-step solution ► prepwiser.in/questions/BCHzUEsE11](https://www.prepwiser.in/questions/BCHzUEsE11)

Q92 JEE Main 2022 · 28 Jul · Shift 1

Let S be the set of all passwords which are six to eight characters long, where each character is either an alphabet from $\{A, B, C, D, E\}$ or a number from $\{1, 2, 3, 4, 5\}$ with the repetition of characters allowed. If the number of passwords in S whose at least one character is a number from $\{1, 2, 3, 4, 5\}$ is $\alpha \times 5^6$, then α is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/oqT70GKj8_](https://www.prepwiser.in/questions/oqT70GKj8_)

Q93 JEE Main 2022 · 25 Jul · Shift 1

The total number of functions,

$f : \{1, 2, 3, 4\} \rightarrow \{1, 2, 3, 4, 5, 6\}$ such that $f(1) + f(2) = f(3)$, is equal to :

- | | |
|---------|---------|
| (A) 60 | (B) 90 |
| (C) 108 | (D) 126 |

[Step-by-step solution ► prepwiser.in/questions/8qrrQFR1-Q](https://www.prepwiser.in/questions/8qrrQFR1-Q)

Q94 JEE Main 2022 · 29 Jun · Shift 2

The total number of four digit numbers such that each of first three digits is divisible by the last digit, is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/c-usVI5bRL](https://www.prepwiser.in/questions/c-usVI5bRL)

Q95 JEE Main 2022 · 25 Jun · Shift 1

The number of 3-digit odd numbers, whose sum of digits is a multiple of 7, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/OSiRM0uTLy](https://www.prepwiser.in/questions/OSiRM0uTLy)

Q96 JEE Main 2021 · 31 Aug · Shift 2

The number of 4-digit numbers which are neither multiple of 7 nor multiple of 3 is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/9yg73nBcS3](https://www.prepwiser.in/questions/9yg73nBcS3)

Q97 JEE Main 2021 · 27 Aug · Shift 1

A number is called a palindrome if it reads the same backward as well as forward. For example 285582 is a six digit palindrome. The number of six digit palindromes, which are divisible by 55, is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/HU8r5IdNfP](https://www.prepwiser.in/questions/HU8r5IdNfP)

Rank of a Word · 8 PYQs

Q98 JEE Main 2025 · 3 Apr · Shift 1

All five letter words are made using all the letters A, B, C, D, E and arranged as in an English dictionary with serial numbers. Let the word at serial number n be denoted by W_n . Let the probability $P(W_n)$ of choosing the word W_n satisfy $P(W_n) = 2P(W_{n-1})$, $n > 1$.

If $P(CDBEA) = \frac{2^\alpha}{2^\beta - 1}$, $\alpha, \beta \in \mathbb{N}$, then $\alpha + \beta$ is equal to : _____

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/b1IcMXLWtc](https://www.prepwiser.in/questions/b1IcMXLWtc)

Q99 JEE Main 2024 · 6 Apr · Shift 2

If all the words with or without meaning made using all the letters of the word "NAGPUR" are arranged as in a dictionary, then the word at 315th position in this arrangement is :

(A) NRAPUG

(B) NRAGUP

(C) NRAPGU

(D) NRAGPU

[Step-by-step solution ► prepwiser.in/questions/WHp86zZV_E](https://www.prepwiser.in/questions/WHp86zZV_E)

Q100 JEE Main 2024 · 5 Apr · Shift 2

60 words can be made using all the letters of the word BHBJO, with or without meaning. If these words are written as in a dictionary, then the 50th word is:

(A) OBBJH

(B) HBBJO

(C) OBBHJ

(D) JBBOH

[Step-by-step solution ► prepwiser.in/questions/VUgfkmuIEe](https://www.prepwiser.in/questions/VUgfkmuIEe)

Q101 JEE Main 2024 · 29 Jan · Shift 1

All the letters of the word "GTWENTY" are written in all possible ways with or without meaning and these words are written as in a dictionary. The serial number of the word "GTWENTY" is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/wT9KE2NkdD](https://www.prepwiser.in/questions/wT9KE2NkdD)

Q102 JEE Main 2023 · 13 Apr · Shift 2

All words, with or without meaning, are made using all the letters of the word MONDAY. These words are written as in a dictionary with serial numbers. The serial number of the word MONDAY is :

- | | |
|---------|---------|
| (A) 324 | (B) 328 |
| (C) 326 | (D) 327 |

[Step-by-step solution ► prepwiser.in/questions/CgvkK6R-bF](https://www.prepwiser.in/questions/CgvkK6R-bF)

Q103 JEE Main 2023 · 11 Apr · Shift 2

If the letters of the word MATHS are permuted and all possible words so formed are arranged as in a dictionary with serial numbers, then the serial number of the word THAMS is :

- | | |
|---------|---------|
| (A) 103 | (B) 104 |
| (C) 102 | (D) 101 |

[Step-by-step solution ► prepwiser.in/questions/r3cr4vCu9E](https://www.prepwiser.in/questions/r3cr4vCu9E)

Q104 JEE Main 2023 · 6 Apr · Shift 2

All the letters of the word PUBLIC are written in all possible orders and these words are written as in a dictionary with serial numbers. Then the serial number of the word PUBLIC is :

- | | |
|---------|---------|
| (A) 578 | (B) 576 |
| (C) 580 | (D) 582 |

[Step-by-step solution ► prepwiser.in/questions/wH7sLK3P16](https://www.prepwiser.in/questions/wH7sLK3P16)

Q105 JEE Main 2023 · 29 Jan · Shift 2

The letters of the word OUGHT are written in all possible ways and these words are arranged as in a dictionary, in a series. Then the serial number of the word TOUGH is :

- | | |
|--------|--------|
| (A) 79 | (B) 84 |
| (C) 89 | (D) 86 |

[Step-by-step solution ► prepwiser.in/questions/HdPBAZZdS9](https://www.prepwiser.in/questions/HdPBAZZdS9)

Answer key — Permutations & Combinations

Numbers match the question numbers above. For full working, open the solution link under each question.

1	B	2	D	3	17280	4	D	5	D	6	36	7	C	8	3734
9	C	10	1260	11	44	12	4898	13	26664	14	A	15	A	16	432
17	50400	18	81	19	45	20	240	21	32	22	C	23	6	24	B
25	18915	26	D	27	243	28	576	29	576	30	136	31	A	32	32
33	B	34	120	35	240	36	2454	37	A	38	B	39	C	40	13
41	A	42	B	43	A	44	B	45	5626	46	169	47	C	48	11376
49	D	50	16	51	B	52	43	53	120	54	6860	55	546	56	282
57	17	58	C	59	1120	60	40	61	C	62	238	63	777	64	C
65	A	66	D	67	135	68	490	69	1405	70	C	71	64	72	70
73	D	74	125	75	C	76	B	77	D	78	413	793483638676		80	105
81	180	82	D	83	D	84	D	85	31650	86	54	87	14	88	44
89	B	90	16	91	C	92	7073	93	B	94	1086	95	63	96	5143
97	100	98	183	99	C	100	A	101	553	102	D	103	A	104	D
105	C														

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