

MATHEMATICS · JEE MAIN

Probability — Basic

Chapter-wise previous year questions, with answer key

66

PYQS

2020–2025

PAPERS

4

TOPICS

Classical Probability

Addition Theorem

Sample Space and Events

Mutually Exclusive Events

- 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.

Practise this chapter online with instant answer checking: prepwiser.in/learn · No signup needed to browse

Classical Probability · 55 PYQs

Q1 JEE Main 2025 · 4 Apr · Shift 1

The probability, of forming a 12 persons committee from 4 engineers, 2 doctors and 10 professors containing at least 3 engineers and at least 1 doctor, is

- (A) $\frac{129}{182}$ (B) $\frac{17}{26}$
(C) $\frac{19}{26}$ (D) $\frac{103}{182}$

Step-by-step solution ► [prepwiser.in/questions/m2S--7_gTa](https://www.prepwiser.in/questions/m2S--7_gTa)

Q2 JEE Main 2025 · 2 Apr · Shift 1

Three distinct numbers are selected randomly from the set $\{1, 2, 3, \dots, 40\}$. If the probability, that the selected numbers are in an increasing G.P., is $\frac{m}{n}$, $\gcd(m, n) = 1$, then $m + n$ is equal to _____.

Numerical answer — enter the value.

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

Q3 JEE Main 2025 · 28 Jan · Shift 1

Two number k_1 and k_2 are randomly chosen from the set of natural numbers. Then, the probability that the value of $i^{k_1} + i^{k_2}$, ($i = \sqrt{-1}$) is non-zero, equals

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

Step-by-step solution ► [prepwiser.in/questions/2v0wlKobG5](https://www.prepwiser.in/questions/2v0wlKobG5)

Q4 JEE Main 2025 · 28 Jan · Shift 2

Let S be the set of all the words that can be formed by arranging all the letters of the word GARDEN. From the set S , one word is selected at random. The probability that the selected word will NOT have vowels in alphabetical order is:

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

Step-by-step solution ► [prepwiser.in/questions/Jcg9jBakLP](https://www.prepwiser.in/questions/Jcg9jBakLP)

Q5 JEE Main 2025 · 24 Jan · Shift 1

A and B alternately throw a pair of dice. A wins if he throws a sum of 5 before B throws a sum of 8, and B wins if he throws a sum of 8 before A throws a sum of 5. The probability, that A wins if A makes the first throw, is

- (A) $\frac{8}{19}$ (B) $\frac{9}{19}$
(C) $\frac{8}{17}$ (D) $\frac{9}{17}$

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

Q6 JEE Main 2025 · 24 Jan · Shift 2

Let $A = [a_{ij}]$ be a square matrix of order 2 with entries either 0 or 1. Let E be the event that A is an invertible matrix. Then the probability $P(E)$ is :

- (A) $\frac{3}{8}$ (B) $\frac{1}{8}$
(C) $\frac{3}{16}$ (D) $\frac{5}{8}$

Step-by-step solution ► [prepwiser.in/questions/KXKh1zpN3_](https://www.prepwiser.in/questions/KXKh1zpN3_)

Q7 JEE Main 2025 · 23 Jan · Shift 1

One die has two faces marked 1, two faces marked 2, one face marked 3 and one face marked 4. Another die has one face marked 1, two faces marked 2, two faces marked 3 and one face marked 4. The probability of getting the sum of numbers to be 4 or 5, when both the dice are thrown together, is

- (A) $\frac{2}{3}$ (B) $\frac{3}{5}$
(C) $\frac{4}{9}$ (D) $\frac{1}{2}$

Step-by-step solution ► [prepwiser.in/questions/gR5w4dyx8-](https://www.prepwiser.in/questions/gR5w4dyx8-)

Q8 JEE Main 2024 · 9 Apr · Shift 2

If an unbiased dice is rolled thrice, then the probability of getting a greater number in the i^{th} roll than the number obtained in the $(i - 1)^{\text{th}}$ roll, $i = 2, 3$, is equal to

- (A) $5/54$ (B) $2/54$
(C) $1/54$ (D) $3/54$

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

Q9 JEE Main 2024 · 9 Apr · Shift 1

Let a, b and c denote the outcome of three independent rolls of a fair tetrahedral die, whose four faces are marked 1, 2, 3, 4. If the probability that $ax^2 + bx + c = 0$ has all real roots is $\frac{m}{n}$, $\gcd(m, n) = 1$, then $m + n$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/j21vrk5J2Q](https://www.prepwiser.in/questions/j21vrk5J2Q)

Q10 JEE Main 2024 · 6 Apr · Shift 2

If three letters can be posted to any one of the 5 different addresses, then the probability that the three letters are posted to exactly two addresses is :

- (A) $\frac{18}{25}$ (B) $\frac{12}{25}$
(C) $\frac{6}{25}$ (D) $\frac{4}{25}$

Step-by-step solution ► [prepwiser.in/questions/MDID7yriXR](https://www.prepwiser.in/questions/MDID7yriXR)

Q11 JEE Main 2024 · 5 Apr · Shift 2

The coefficients a, b, c in the quadratic equation $ax^2 + bx + c = 0$ are from the set $\{1, 2, 3, 4, 5, 6\}$. If the probability of this equation having one real root bigger than the other is p, then $216p$ equals :

- (A) 38 (B) 76
(C) 57 (D) 19

Step-by-step solution ► [prepwiser.in/questions/aBn4aF1WxA](https://www.prepwiser.in/questions/aBn4aF1WxA)

Q12 JEE Main 2024 · 5 Apr · Shift 1

The coefficients a, b, c in the quadratic equation $ax^2 + bx + c = 0$ are chosen from the set $\{1, 2, 3, 4, 5, 6, 7, 8\}$. The probability of this equation having repeated roots is :

(A) $\frac{1}{128}$

(B) $\frac{1}{64}$

(C) $\frac{3}{256}$

(D) $\frac{3}{128}$

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

Q13 JEE Main 2024 · 31 Jan · Shift 2

A coin is biased so that a head is twice as likely to occur as a tail. If the coin is tossed 3 times, then the probability of getting two tails and one head is

(A) $\frac{1}{9}$

(B) $\frac{2}{9}$

(C) $\frac{1}{27}$

(D) $\frac{2}{27}$

[Step-by-step solution ► prepwiser.in/questions/Xsxah2W1pD](https://www.prepwiser.in/questions/Xsxah2W1pD)

Q14 JEE Main 2024 · 31 Jan · Shift 1

Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each drawing. Then the probability, that first drawn marble is red and second drawn marble is white, is

(A) $\frac{4}{25}$

(B) $\frac{2}{3}$

(C) $\frac{2}{25}$

(D) $\frac{4}{75}$

[Step-by-step solution ► prepwiser.in/questions/1PmzJnF6jx](https://www.prepwiser.in/questions/1PmzJnF6jx)

Q15 JEE Main 2024 · 30 Jan · Shift 1

Two integers x and y are chosen with replacement from the set $\{0, 1, 2, 3, \dots, 10\}$. Then the probability that $|x - y| > 5$, is :

(A) $\frac{31}{121}$

(B) $\frac{60}{121}$

(C) $\frac{62}{121}$

(D) $\frac{30}{121}$

[Step-by-step solution ► prepwiser.in/questions/8DhH1YdHRe](https://www.prepwiser.in/questions/8DhH1YdHRe)

Q16 JEE Main 2024 · 29 Jan · Shift 1

A fair die is thrown until 2 appears. Then the probability, that 2 appears in even number of throws, is

(A) $\frac{5}{11}$

(B) $\frac{5}{6}$

(C) $\frac{1}{6}$

(D) $\frac{6}{11}$

[Step-by-step solution ► prepwiser.in/questions/Ob2RkdPzLN](https://www.prepwiser.in/questions/Ob2RkdPzLN)

Q17 JEE Main 2024 · 27 Jan · Shift 2

An urn contains 6 white and 9 black balls. Two successive draws of 4 balls are made without replacement. The probability, that the first draw gives all white balls and the second draw gives all black balls, is :

(A) $\frac{3}{256}$

(B) $\frac{5}{256}$

(C) $\frac{3}{715}$

(D) $\frac{5}{715}$

[Step-by-step solution ► prepwiser.in/questions/mC73zj_Uxr](https://www.prepwiser.in/questions/mC73zj_Uxr)

Q18 JEE Main 2023 · 15 Apr · Shift 1

A bag contains 6 white and 4 black balls. A die is rolled once and the number of balls equal to the number obtained on the die are drawn from the bag at random. The probability that all the balls drawn are white is :

- (A) $\frac{1}{4}$ (B) $\frac{9}{50}$
(C) $\frac{1}{5}$ (D) $\frac{11}{50}$

[Step-by-step solution ► prepwisar.in/questions/L36IUeabk6](https://www.prepwisar.in/questions/L36IUeabk6)

Q19 JEE Main 2023 · 12 Apr · Shift 1

A fair $n(n > 1)$ faces die is rolled repeatedly until a number less than n appears. If the mean of the number of tosses required is $\frac{n}{9}$, then n is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/alo3AqvxCr](https://www.prepwisar.in/questions/alo3AqvxCr)

Q20 JEE Main 2023 · 11 Apr · Shift 1

Let

$$S = \{M = [a_{ij}], a_{ij} \in \{0, 1, 2\}, 1 \leq i, j \leq 2\}$$

be a sample space and $A = \{M \in S : M \text{ is invertible}\}$ be an event. Then $P(A)$ is equal to :

- (A) $\frac{47}{81}$ (B) $\frac{49}{81}$
(C) $\frac{50}{81}$ (D) $\frac{16}{27}$

[Step-by-step solution ► prepwisar.in/questions/T6rKULewW5](https://www.prepwisar.in/questions/T6rKULewW5)

Q21 JEE Main 2023 · 10 Apr · Shift 1

Let N denote the sum of the numbers obtained when two dice are rolled. If the probability that $2^N < N!$ is $\frac{m}{n}$, where m and n are coprime, then $4m - 3n$ is equal to :

- (A) 12 (B) 6
(C) 8 (D) 10

[Step-by-step solution ► prepwisar.in/questions/Nt-TNGCl7u](https://www.prepwisar.in/questions/Nt-TNGCl7u)

Q22 JEE Main 2023 · 6 Apr · Shift 2

Three dice are rolled. If the probability of getting different numbers on the three dice is $\frac{p}{q}$, where p and q are co-prime, then $q - p$ is equal to :

- (A) 3 (B) 4
(C) 1 (D) 2

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

Q23 JEE Main 2023 · 30 Jan · Shift 1

If an unbiased die, marked with $-2, -1, 0, 1, 2, 3$ on its faces, is thrown five times, then the probability that the product of the outcomes is positive, is :

- (A) $\frac{27}{288}$ (B) $\frac{521}{2592}$
(C) $\frac{440}{2592}$ (D) $\frac{881}{2592}$

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

Q24 JEE Main 2023 · 30 Jan · Shift 2

A bag contains six balls of different colours. Two balls are drawn in succession with replacement. The probability that both the balls are of the same colour is p . Next four balls are drawn in succession with replacement and the probability that exactly three balls are of the same colour is q . If $p : q = m : n$, where m and n are coprime, then $m + n$ is equal to :

Numerical answer — enter the value.

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

Q25 JEE Main 2023 · 29 Jan · Shift 1

Fifteen football players of a club-team are given 15 T-shirts with their names written on the backside. If the players pick up the T-shirts randomly, then the probability that at least 3 players pick the correct T-shirt is :

- (A) $\frac{1}{6}$ (B) $\frac{2}{15}$
(C) $\frac{5}{24}$ (D) 0.08

[Step-by-step solution ► prepwiser.in/questions/bCaP7xijc0](https://www.prepwiser.in/questions/bCaP7xijc0)

Q26 JEE Main 2023 · 25 Jan · Shift 2

Let N be the sum of the numbers appeared when two fair dice are rolled and let the probability that $N - 2, \sqrt{3N}, N + 2$ are in geometric progression be $\frac{k}{48}$. Then the value of k is :

- (A) 8 (B) 16
(C) 2 (D) 4

[Step-by-step solution ► prepwiser.in/questions/JiT9Mo0X](https://www.prepwiser.in/questions/JiT9Mo0X)

Q27 JEE Main 2023 · 25 Jan · Shift 1

Let M be the maximum value of the product of two positive integers when their sum is 66. Let the sample space $S = \{x \in \mathbb{Z} : x(66 - x) \geq \frac{5}{9}M\}$ and the event $A = \{x \in S : x \text{ is a multiple of } 3\}$. Then $P(A)$ is equal to :

- (A) $\frac{1}{3}$ (B) $\frac{1}{5}$
(C) $\frac{7}{22}$ (D) $\frac{15}{44}$

[Step-by-step solution ► prepwiser.in/questions/OMsDEW8WxV](https://www.prepwiser.in/questions/OMsDEW8WxV)

Q28 JEE Main 2023 · 24 Jan · Shift 1

Let N denote the number that turns up when a fair die is rolled. If the probability that the system of equations

$$x + y + z = 1$$

$$2x + Ny + 2z = 2$$

$$3x + 3y + Nz = 3$$

has unique solution is $\frac{k}{6}$, then the sum of value of k and all possible values of N is :

- (A) 18 (B) 21
(C) 20 (D) 19

[Step-by-step solution ► prepwiser.in/questions/8xxyBPHX4Q](https://www.prepwiser.in/questions/8xxyBPHX4Q)

Q29 JEE Main 2022 · 29 Jul · Shift 1

Let $S = \{1, 2, 3, \dots, 2022\}$. Then the probability, that a randomly chosen number n from the set S such that $\text{HCF}(n, 2022) = 1$, is :

- (A) $\frac{128}{1011}$ (B) $\frac{166}{1011}$
(C) $\frac{127}{337}$ (D) $\frac{112}{337}$

[Step-by-step solution ► prepwisser.in/questions/Xc99ksibZY](https://www.prepwisser.in/questions/Xc99ksibZY)

Q30 JEE Main 2022 · 27 Jul · Shift 1

Let S be the sample space of all five digit numbers. If p is the probability that a randomly selected number from S , is a multiple of 7 but not divisible by 5, then $9p$ is equal to :

- (A) 1.0146 (B) 1.2085
(C) 1.0285 (D) 1.1521

[Step-by-step solution ► prepwisser.in/questions/X1Waa7KjDx](https://www.prepwisser.in/questions/X1Waa7KjDx)

Q31 JEE Main 2022 · 25 Jul · Shift 1

If the numbers appeared on the two throws of a fair six faced die are α and β , then the probability that $x^2 + \alpha x + \beta > 0$, for all $x \in \mathbf{R}$, is :

- (A) $\frac{17}{36}$ (B) $\frac{4}{9}$
(C) $\frac{1}{2}$ (D) $\frac{19}{36}$

[Step-by-step solution ► prepwisser.in/questions/8XpHqx8fZQ](https://www.prepwisser.in/questions/8XpHqx8fZQ)

Q32 JEE Main 2022 · 29 Jun · Shift 1

The probability that a randomly chosen 2×2 matrix with all the entries from the set of first 10 primes, is singular, is equal to :

- (A) $\frac{133}{10^4}$ (B) $\frac{18}{10^3}$
(C) $\frac{19}{10^3}$ (D) $\frac{271}{10^4}$

[Step-by-step solution ► prepwisser.in/questions/5NW3FEMu4W](https://www.prepwisser.in/questions/5NW3FEMu4W)

Q33 JEE Main 2022 · 28 Jun · Shift 2

The probability that a randomly chosen one-one function from the set $\{a, b, c, d\}$ to the set $\{1, 2, 3, 4, 5\}$ satisfies $f(a) + 2f(b) - f(c) = f(d)$ is :

- (A) $\frac{1}{24}$ (B) $\frac{1}{40}$
(C) $\frac{1}{30}$ (D) $\frac{1}{20}$

[Step-by-step solution ► prepwisser.in/questions/Bwqc-WV2xH](https://www.prepwisser.in/questions/Bwqc-WV2xH)

Q34 JEE Main 2022 · 27 Jun · Shift 2

Let $S = \{E_1, E_2, \dots, E_8\}$ be a sample space of a random experiment such that $P(E_n) = \frac{n}{36}$ for every $n = 1, 2, \dots, 8$. Then the number of elements in the set $\{A \subseteq S : P(A) \geq \frac{4}{5}\}$ is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/ijwGackS9J](https://www.prepwisser.in/questions/ijwGackS9J)

Q35 JEE Main 2022 · 26 Jun · Shift 2

If the probability that a randomly chosen 6-digit number formed by using digits 1 and 8 only is a multiple of 21 is p , then $96p$ is equal to _____.

Numerical answer — enter the value.

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

Q36 JEE Main 2022 · 24 Jun · Shift 2

In an examination, there are 10 true-false type questions. Out of 10, a student can guess the answer of 4 questions correctly with probability $\frac{3}{4}$ and the remaining 6 questions correctly with probability $\frac{1}{4}$. If the probability that the student guesses the answers of exactly 8 questions correctly out of 10 is $\frac{27k}{4^{10}}$, then k is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/WN2FnNMGdw](https://www.prepwiser.in/questions/WN2FnNMGdw)

Q37 JEE Main 2021 · 31 Aug · Shift 2

Let $S = \{1, 2, 3, 4, 5, 6\}$. Then the probability that a randomly chosen onto function g from S to S satisfies $g(3) = 2g(1)$ is :

(A) $\frac{1}{10}$

(B) $\frac{1}{15}$

(C) $\frac{1}{5}$

(D) $\frac{1}{30}$

[Step-by-step solution ► prepwiser.in/questions/2xM6pIDqPD](https://www.prepwiser.in/questions/2xM6pIDqPD)

Q38 JEE Main 2021 · 31 Aug · Shift 1

An electric instrument consists of two units. Each unit must function independently for the instrument to operate. The probability that the first unit functions is 0.9 and that of the second unit is 0.8. The instrument is switched on and it fails to operate. If the probability that only the first unit failed and second unit is functioning is p , then $98p$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/i65IHSXgRd](https://www.prepwiser.in/questions/i65IHSXgRd)

Q39 JEE Main 2021 · 27 Aug · Shift 1

When a certain biased die is rolled, a particular face occurs with probability $\frac{1}{6} - x$ and its opposite face occurs with probability $\frac{1}{6} + x$. All other faces occur with probability $\frac{1}{6}$. Note that opposite faces sum to 7 in any die. If $0 < x < \frac{1}{6}$, and the probability of obtaining total sum = 7, when such a die is rolled twice, is $\frac{13}{96}$, then the value of x is :

(A) $\frac{1}{16}$

(B) $\frac{1}{8}$

(C) $\frac{1}{9}$

(D) $\frac{1}{12}$

[Step-by-step solution ► prepwiser.in/questions/hFnYwA3_Fo](https://www.prepwiser.in/questions/hFnYwA3_Fo)

Q40 JEE Main 2021 · 27 Aug · Shift 2

Each of the persons A and B independently tosses three fair coins. The probability that both of them get the same number of heads is :

(A) $\frac{1}{8}$

(B) $\frac{5}{8}$

(C) $\frac{5}{16}$

(D) 1

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

Q41 JEE Main 2021 · 26 Aug · Shift 2

Two fair dice are thrown. The numbers on them are taken as λ and μ , and a system of linear equations

$$x + y + z = 5$$

$$x + 2y + 3z = \mu$$

$$x + 3y + \lambda z = 1$$

is constructed. If p is the probability that the system has a unique solution and q is the probability that the system has no solution, then :

(A) $p = \frac{1}{6}$ and $q = \frac{1}{36}$

(B) $p = \frac{5}{6}$ and $q = \frac{5}{36}$

(C) $p = \frac{5}{6}$ and $q = \frac{1}{36}$

(D) $p = \frac{1}{6}$ and $q = \frac{5}{36}$

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

Q42 JEE Main 2021 · 27 Jul · Shift 1

The probability that a randomly selected 2-digit number belongs to the set $\{n \in \mathbb{N} : (2^n - 2) \text{ is a multiple of } 3\}$ is equal to :

(A) $\frac{1}{6}$

(B) $\frac{2}{3}$

(C) $\frac{1}{2}$

(D) $\frac{1}{3}$

[Step-by-step solution](#) ► [prepwiser.in/questions/INnDuOLR1q](https://www.prepwiser.in/questions/INnDuOLR1q)

Q43 JEE Main 2021 · 25 Jul · Shift 1

Let 9 distinct balls be distributed among 4 boxes, B_1, B_2, B_3 and B_4 . If the probability that B_3 contains exactly 3 balls is $k\left(\frac{3}{4}\right)^9$ then k lies in the set :

(A) $\{x \in \mathbb{R} : |x - 3| < 1\}$

(B) $\{x \in \mathbb{R} : |x - 2| \leq 1\}$

(C) $\{x \in \mathbb{R} : |x - 1| < 1\}$

(D) $\{x \in \mathbb{R} : |x - 5| \leq 1\}$

[Step-by-step solution](#) ► [prepwiser.in/questions/J0L-9YeHqF](https://www.prepwiser.in/questions/J0L-9YeHqF)

Q44 JEE Main 2021 · 22 Jul · Shift 2

Four dice are thrown simultaneously and the numbers shown on these dice are recorded in 2×2 matrices. The probability that such formed matrix have all different entries and are non-singular, is :

(A) $\frac{45}{162}$

(B) $\frac{21}{81}$

(C) $\frac{22}{81}$

(D) $\frac{43}{162}$

[Step-by-step solution](#) ► [prepwiser.in/questions/8GrV-ny25y](https://www.prepwiser.in/questions/8GrV-ny25y)

Q45 JEE Main 2021 · 20 Jul · Shift 1

Words with or without meaning are to be formed using all the letters of the word EXAMINATION. The probability that the letter M appears at the fourth position in any such word is :

(A) $\frac{1}{66}$

(B) $\frac{1}{11}$

(C) $\frac{1}{9}$

(D) $\frac{2}{11}$

[Step-by-step solution](#) ► [prepwiser.in/questions/d6h1NCzxVt](https://www.prepwiser.in/questions/d6h1NCzxVt)

Q46 JEE Main 2021 · 17 Mar · Shift 1

Two dice are rolled. If both dice have six faces numbered 1, 2, 3, 5, 7 and 11, then the probability that the sum of the numbers on the top faces is less than or equal to 8 is :

- (A) $\frac{4}{9}$ (B) $\frac{1}{2}$
(C) $\frac{5}{12}$ (D) $\frac{17}{36}$

Step-by-step solution ► [prepwiser.in/questions/39gEYB_BLf](https://www.prepwiser.in/questions/39gEYB_BLf)

Q47 JEE Main 2021 · 16 Mar · Shift 2

Let A denote the event that a 6-digit integer formed by 0, 1, 2, 3, 4, 5, 6 without repetitions, be divisible by 3. Then probability of event A is equal to :

- (A) $\frac{4}{9}$ (B) $\frac{9}{56}$
(C) $\frac{11}{27}$ (D) $\frac{3}{7}$

Step-by-step solution ► [prepwiser.in/questions/kY1xibOvMR](https://www.prepwiser.in/questions/kY1xibOvMR)

Q48 JEE Main 2021 · 25 Feb · Shift 2

Let A be a set of all 4-digit natural numbers whose exactly one digit is 7. Then the probability that a randomly chosen element of A leaves remainder 2 when divided by 5 is :

- (A) $\frac{2}{9}$ (B) $\frac{1}{5}$
(C) $\frac{122}{297}$ (D) $\frac{97}{297}$

Step-by-step solution ► [prepwiser.in/questions/c0RK9iK-CY](https://www.prepwiser.in/questions/c0RK9iK-CY)

Q49 JEE Main 2021 · 25 Feb · Shift 1

The coefficients a, b and c of the quadratic equation, $ax^2 + bx + c = 0$ are obtained by throwing a dice three times. The probability that this equation has equal roots is :

- (A) $\frac{1}{72}$ (B) $\frac{5}{216}$
(C) $\frac{1}{36}$ (D) $\frac{1}{54}$

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

Q50 JEE Main 2021 · 24 Feb · Shift 2

The probability that two randomly selected subsets of the set $\{1, 2, 3, 4, 5\}$ have exactly two elements in their intersection, is :

- (A) $\frac{135}{2^9}$ (B) $\frac{65}{2^8}$
(C) $\frac{65}{2^7}$ (D) $\frac{35}{2^7}$

Step-by-step solution ► [prepwiser.in/questions/O9-hOda5Nj](https://www.prepwiser.in/questions/O9-hOda5Nj)

Q51 JEE Main 2020 · 6 Sep · Shift 1

Out of 11 consecutive natural numbers if three numbers are selected at random (without repetition), then the probability that they are in A.P. with positive common difference, is :

- (A) $\frac{10}{99}$ (B) $\frac{5}{33}$
(C) $\frac{15}{101}$ (D) $\frac{5}{101}$

Step-by-step solution ► [prepwiser.in/questions/qQb6s2owzv](https://www.prepwiser.in/questions/qQb6s2owzv)

Q52 JEE Main 2020 · 4 Sep · Shift 2

In a game two players A and B take turns in throwing a pair of fair dice starting with player A and total of scores on the two dice, in each throw is noted. A wins the game if he throws total a of 6 before B throws a total of 7 and B wins the game if he throws a total of 7 before A throws a total of six. The game stops as soon as either of the players wins. The probability of A winning the game is :

- (A) $\frac{5}{6}$ (B) $\frac{5}{31}$
 (C) $\frac{31}{61}$ (D) $\frac{30}{61}$

Step-by-step solution ► [prepwiser.in/questions/4pp1viYH9j](https://www.prepwiser.in/questions/4pp1viYH9j)

Q53 JEE Main 2020 · 4 Sep · Shift 1

The probability of a man hitting a target is $\frac{1}{10}$. The least number of shots required, so that the probability of his hitting the target at least once is greater than $\frac{1}{4}$, is _____.

Numerical answer — enter the value.

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

Q54 JEE Main 2020 · 3 Sep · Shift 2

The probability that a randomly chosen 5-digit number is made from exactly two digits is :

- (A) $\frac{150}{10^4}$ (B) $\frac{134}{10^4}$
 (C) $\frac{121}{10^4}$ (D) $\frac{135}{10^4}$

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

Q55 JEE Main 2020 · 9 Jan · Shift 2

If 10 different balls are to be placed in 4 distinct boxes at random, then the probability that two of these boxes contain exactly 2 and 3 balls is :

- (A) $\frac{965}{2^{11}}$ (B) $\frac{965}{2^{10}}$
 (C) $\frac{945}{2^{11}}$ (D) $\frac{945}{2^{10}}$

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

Addition Theorem · 6 PYQs

Q56 JEE Main 2024 · 1 Feb · Shift 2

Let Ajay will not appear in JEE exam with probability $p = \frac{2}{7}$, while both Ajay and Vijay will appear in the exam with probability $q = \frac{1}{5}$. Then the probability, that Ajay will appear in the exam and Vijay will not appear is :

- (A) $\frac{9}{35}$ (B) $\frac{3}{35}$
 (C) $\frac{24}{35}$ (D) $\frac{18}{35}$

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

Q57 JEE Main 2024 · 29 Jan · Shift 2

An integer is chosen at random from the integers 1, 2, 3, ..., 50. The probability that the chosen integer is a multiple of atleast one of 4, 6 and 7 is

- (A) $\frac{8}{25}$ (B) $\frac{9}{50}$
 (C) $\frac{14}{25}$ (D) $\frac{21}{50}$

Step-by-step solution ► [prepwiser.in/questions/RrLJ6O5rtN](https://www.prepwiser.in/questions/RrLJ6O5rtN)

Q58 JEE Main 2021 · 20 Jul · Shift 2

Let A, B and C be three events such that the probability that exactly one of A and B occurs is $(1 - k)$, the probability that exactly one of B and C occurs is $(1 - 2k)$, the probability that exactly one of C and A occurs is $(1 - k)$ and the probability of all A, B and C occur simultaneously is k^2 , where $0 < k < 1$. Then the probability that at least one of A, B and C occur is :

- (A) greater than $\frac{1}{8}$ but less than $\frac{1}{4}$
- (B) greater than $\frac{1}{2}$
- (C) greater than $\frac{1}{4}$ but less than $\frac{1}{2}$
- (D) exactly equal to $\frac{1}{2}$

Step-by-step solution ► prepwiser.in/questions/QcB2NGznzV

Q59 JEE Main 2020 · 6 Sep · Shift 2

The probabilities of three events A, B and C are given by

$$P(A) = 0.6, P(B) = 0.4 \text{ and } P(C) = 0.5.$$

$$\text{If } P(A \cup B) = 0.8, P(A \cap C) = 0.3, P(A \cap B \cap C) = 0.2, P(B \cap C) = \beta$$

and $P(A \cup B \cup C) = \alpha$, where $0.85 \leq \alpha \leq 0.95$, then β lies in the interval :

- | | |
|------------------|------------------|
| (A) [0.35, 0.36] | (B) [0.20, 0.25] |
| (C) [0.25, 0.35] | (D) [0.36, 0.40] |

Step-by-step solution ► prepwiser.in/questions/Zf6lUdOvBW

Q60 JEE Main 2020 · 5 Sep · Shift 1

A survey shows that 73% of the persons working in an office like coffee, whereas 65% like tea. If x denotes the percentage of them, who like both coffee and tea, then x cannot be :

- | | |
|--------|--------|
| (A) 63 | (B) 36 |
| (C) 54 | (D) 38 |

Step-by-step solution ► prepwiser.in/questions/cYcizNMRJm

Q61 JEE Main 2020 · 8 Jan · Shift 2

Let A and B be two events such that the probability that exactly one of them occurs is $\frac{2}{5}$ and the probability that A or B occurs is $\frac{1}{2}$, then the probability of both of them occur together is :

- | | |
|----------|----------|
| (A) 0.20 | (B) 0.02 |
| (C) 0.01 | (D) 0.10 |

Step-by-step solution ► prepwiser.in/questions/srG-1UX7Zt

Sample Space and Events · 4 PYQs

Q62 JEE Main 2023 · 1 Feb · Shift 2

Two dice are thrown independently. Let A be the event that the number appeared on the 1st die is less than the number appeared on the 2nd die, B be the event that the number appeared on the 1st die is even and that on the second die is odd, and C be the event that the number appeared on the 1st die is odd and that on the 2nd is even. Then :

- (A) A and B are mutually exclusive
- (B) the number of favourable cases of the events A, B and C are 15, 6 and 6 respectively
- (C) B and C are independent
- (D) the number of favourable cases of the event $(A \cup B) \cap C$ is 6

[Step-by-step solution ► prepwisser.in/questions/6vSVVKcxEJ](https://www.prepwisser.in/questions/6vSVVKcxEJ)

Q63 JEE Main 2023 · 29 Jan · Shift 2

Let $S = \{w_1, w_2, \dots\}$ be the sample space associated to a random experiment. Let $P(w_n) = \frac{P(w_{n-1})}{2}, n \geq 2$. Let $A = \{2k + 3l : k, l \in N\}$ and $B = \{w_n : n \in A\}$. Then P(B) is equal to :

- (A) $\frac{3}{32}$
- (B) $\frac{1}{32}$
- (C) $\frac{1}{16}$
- (D) $\frac{3}{64}$

[Step-by-step solution ► prepwisser.in/questions/6eQRQYQvsB](https://www.prepwisser.in/questions/6eQRQYQvsB)

Q64 JEE Main 2023 · 24 Jan · Shift 1

Let Ω be the sample space and $A \subseteq \Omega$ be an event.

Given below are two statements :

(S1) : If $P(A) = 0$, then $A = \phi$

(S2) : If $P(A) = 1$, then $A = \Omega$

Then :

- (A) both (S1) and (S2) are true
- (B) both (S1) and (S2) are false
- (C) only (S2) is true
- (D) only (S1) is true

[Step-by-step solution ► prepwisser.in/questions/4DoN4iAgd1](https://www.prepwisser.in/questions/4DoN4iAgd1)

Q65 JEE Main 2022 · 25 Jun · Shift 2

A biased die is marked with numbers 2, 4, 8, 16, 32, 32 on its faces and the probability of getting a face with mark n is $\frac{1}{n}$. If the die is thrown thrice, then the probability, that the sum of the numbers obtained is 48, is :

- (A) $\frac{7}{2^{11}}$
- (B) $\frac{7}{2^{12}}$
- (C) $\frac{3}{2^{10}}$
- (D) $\frac{13}{2^{12}}$

[Step-by-step solution ► prepwisser.in/questions/sQwI8K9y0K](https://www.prepwisser.in/questions/sQwI8K9y0K)

Mutually Exclusive Events · 1 PYQs

Q66 JEE Main 2022 · 26 Jul · Shift 1

Let E_1, E_2, E_3 be three mutually exclusive events such that

$$P(E_1) = \frac{2+3p}{6}, P(E_2) = \frac{2-p}{8}$$

and $P(E_3) = \frac{1-p}{2}$. If the maximum and minimum values of p are p_1 and p_2 , then $(p_1 + p_2)$ is equal to :

(A) $\frac{2}{3}$

(B) $\frac{5}{3}$

(C) $\frac{5}{4}$

(D) 1

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

Answer key — Probability — Basic

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

1	A	2	2477	3	A	4	B	5	B	6	A	7	D	8	A
9	19	10	B	11	A	12	B	13	B	14	D	15	D	16	A
17	C	18	C	19	10	20	C	21	C	22	B	23	B	24	14
25	D	26	D	27	A	28	C	29	D	30	C	31	A	32	C
33	D	34	19	35	33	36	479	37	A	38	28	39	B	40	C
41	B	42	C	43	A	44	D	45	B	46	D	47	A	48	D
49	B	50	A	51	B	52	D	53	3	54	D	55	D	56	D
57	D	58	B	59	C	60	B	61	D	62	D	63	D	64	B
65	D	66	B												

Want the next chapter?

All Mathematics chapters, every JEE Main PYQ, free with solutions: [prepwisar.in](https://www.prepwisar.in)