CBSE · CLASS 12 · MATHEMATICS

CBSE Class 12 Mathematics Important Questions 2027

69 question patterns that repeated across past papers · the years show every time each was asked

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Relations and Functions

1. Check reflexive/symmetric/transitive for a defined relation

Asked 5× · Board 2023, Board 2024, Board 2026, Sample 2026 · 1/3/5 marks

A relation R is defined on Z, the set of integers, as R = {(x, y) : |x - y| is divisible by a prime number 'p', x, y in Z} check whether R is an equivalence relation or not.

2. Determine/prove whether a function is one-one and onto

Asked 4× · Board 2024, Board 2025, Board 2026, Sample 2025 · 1/2/5 marks

A function f: R - {3/5} -> R - {3/5} is defined as f(x) = (3x + 2)/(5x - 3). Show that f is one-one and onto.

3. Smallest equivalence relation / pairs to add for equivalence

Asked 2× · Board 2025, Sample 2025 · 1/2 marks

[On the set A = {1, 2, 3}, R_2 = {(1, 2), (1, 3), (3, 2)}.] What pairs should be added to the relation R_2 to make it an equivalence relation?

Inverse Trigonometric Functions

4. Evaluate a composite inverse-trig numeric expression

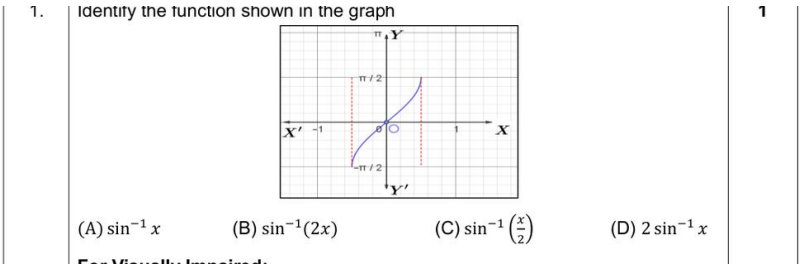
Asked 5× · Board 2023, Board 2024, Board 2025, Board 2026, Sample 2026 · 1/2 marks

Evaluate: $\tan(\sin^{-1} 1 - \cos^{-1}(-1/2))$

5. Identify an inverse-trig function / its inverse from a graph

Asked 3× · Board 2025, Sample 2025, Sample 2026 · 1 marks

Identify the function shown in the graph [graph of an inverse trigonometric function with range from -pi/2 to pi/2 and domain shown between -1 and 1]. (A) $\sin^{-1} x$ (B) $\sin^{-1}(2x)$ (C) $\sin^{-1}(x/2)$ (D) $2 \sin^{-1} x$



6. Range of a scaled inverse-trig function

Asked 2× · Board 2023, Board 2026 · 1 marks

If $2\cos^{-1} x = y$, then
(A) $0 <= y <= pi$
(B) $-pi <= y <= pi$
(C) $0 <= y <= 2pi$
(D) $-pi <= y <= 0$

Matrices

7. Order/conformability conditions for matrix products

Asked 3× · Board 2025, Sample 2025, Sample 2026 · 1 marks

If for three matrices $A = [a_{ij}]_{m\times4}$, $B = [b_{ij}]_{n\times3}$ and $C = [c_{ij}]_{p\times q}$, products AB and AC both are defined and are square matrices of same order, then value of m, n, p and q are: (A) m = q = 3 and n = p = 4 (B) m = 2, q = 3 and n = p = 4 (C) m = q = 4 and n = p = 3 (D) m = 4, p = 2 and n = q = 3

8. Find unknown entries of a skew-symmetric matrix

Asked 2× · Sample 2025, Sample 2026 · 1 marks

If the matrix A = [[0, r, -2], [3, p, t], [q, -4, 0]] is skew-symmetric, then value of (q+t)/(p+r) is.... (A) -2 (B) 0 (C) 1 (D) 2

Determinants

9. Adjoint determinant identities

Asked 4× · Board 2023, Board 2025, Sample 2025, Sample 2026 · 1 marks

If A is a square matrix of order 4 and |adj A| = 27, then A (adj A) is equal to (A) 3 (B) 9 (C) 3 I (D) 9 I

10. Solve a 3x3 linear system by matrix inverse method

Asked 4× · Board 2023, Board 2024, Board 2026, Sample 2026 · 5 marks

If A = [[0,2,1],[-2,-1,-2],[1,-1,0]], find A^{-1} and use it to solve the following system of equations: -2y + z = 7, 2x - y - z = 8, x - 2y = 10

11. Evaluate a given 2x2 determinant

Asked 2× · Board 2024, Sample 2026 · 1 marks

Value of the determinant |[cos 67°, sin 67°], [sin 23°, cos 23°]| is (A) 0 (B) 1/2 (C) sqrt(3)/2 (D) 1

12. Word problem modelled as a linear system (matrix method)

Asked 2× · Board 2025, Sample 2025 · 5 marks

A school wants to allocate students into three clubs: Sports, Music and Drama, under following conditions: The number of students in Sports club should be equal to the sum of the number of students in Music and Drama club. The number of students in Music club should be 20 more than half the number of students in Sports club. The total number of students to be allocated in all three clubs are 180. Find the number of students allocated to different clubs, using matrix method.

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13. Determinant of scaled/inverse/similar matrix

Asked 2× · Board 2023, Sample 2025 · 1 marks

If A and B are non-singular matrices of same order with det(A) = 5, then det($B^{-1}AB)^2$ is equal to
(A) 5
(B) 5^2
(C) 5^4
(D) 5^5

Continuity and Differentiability

14. Examine continuity/differentiability of a given function

Asked 4× · Board 2024, Board 2025, Board 2026, Sample 2025 · 1/2 marks

Check whether function f(x) defined as f(x) = { |x - 3|/(2(x - 3)), x < 3 ; (x - 6)/6, x >= 3 } is continuous at x = 3 or not?

15. Find parameter for a piecewise function to be continuous

Asked 3× · Board 2023, Board 2025, Sample 2026 · 1 marks

If a function defined by f(x) = { kx + 1, x <= pi ; cos x, x > pi } is continuous at x = pi, then the value of k is (A) pi (B) -1/pi (C) 0 (D) -2/pi

16. Implicit differentiation to find dy/dx

Asked 3× · Board 2025, Board 2026 · 2/5 marks

If sqrt(3)($x^2 + y^2$) = 4xy, then find dy/dx at (1/2, sqrt(3)/2).

17. Second derivative of a parametric pair

Asked 2× · Board 2025, Sample 2026 · 3/5 marks

If x = a(theta - sin theta), y = a(1 - cos theta) find d^2y/dx^2.

18. Prove a relation involving the second derivative

Asked 2× · Board 2026, Sample 2025 · 5 marks

If x = cos t, y = cos mt, prove that (1 - x^2) d^2y/dx^2 - x dy/dx + m^2 y = 0.

19. Derivative of a composite/product function evaluated at a point (MCQ)

Asked 2× · Board 2024, Sample 2026 · 1 marks

If f(x) = x $\tan^{-1}$ x, then f'(1) is equal to (A) pi/4 - 1/2 (B) pi/4 + 1/2 (C) -pi/4 - 1/2 (D) -pi/4 + 1/2

20. Derivative of one function with respect to another function

Asked 2× · Board 2025, Sample 2025 · 2 marks

Differentiate $2^{\cos^2 x}$ w.r.t $\cos^2 x$.

21. Check differentiability of a modulus function at a point

Asked 2× · Board 2024, Sample 2025 · 1/2 marks

Assertion-Reason based question. Select the correct answer from the options: (A) Both (A) and (R) are true and (R) is the correct explanation of (A). (B) Both (A) and (R) are true but (R) is not the correct explanation of (A). (C) (A) is true but (R) is false. (D) (A) is false but (R) is true.
Assertion (A): Consider the function defined as f(x) = |x| + |x - 1|, x in R. Then f(x) is not differentiable at x = 0 and x = 1.
Reason (R): Suppose f be defined and continuous on (a,b) and c in (a,b), then f(x) is not differentiable at x = c if $\lim_{h->0^-}$ (f(c+h)-f(c))/h != $\lim_{h->0^+}$ (f(c+h)-f(c))/h.

22. Logarithmic differentiation of y = (f(x))^(g(x))

Asked 2× · Board 2024, Sample 2025 · 2/3 marks

Differentiate the following function with respect to x: $(\cos x)^x$; (where x in (0, pi/2)).

Applications of Derivatives

23. Optimization word problem: model a quantity and maximize it (volume/area/revenue/profit)

Asked 14× · Board 2025, Board 2026, Sample 2025, Sample 2026 · 1/2 marks

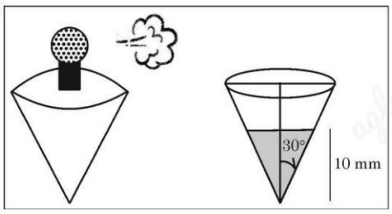
[An online delivery company in a city has 5000 subscribers and collects annual subscription fees of Rs 300 per subscriber for unlimited free deliveries. The company wishes to increase the annual subscription fee. It is predicted that, for every increase of Rs 1, ten subscribers will discontinue. Assume that the company increased the annual fee by Rs x.] How many subscribers will discontinue after an increase of Rs x in annual fee?

24. Related rates in a conical/spherical vessel (volume rate to radius/height/surface rate)

Asked 6× · Board 2023, Board 2026, Sample 2026 · 1/2/3 marks

A room freshner bottle in the shape of an inverted cone sprays the perfume at regular intervals such that volume of the perfume in the bottle decreases at the steady rate of 1 mm^3/min. Find the rate at which level of perfume is dropping at an instant when level of perfume in the bottle is 10 mm, if the semi-vertical angle of conical bottle is pi/6.

perfume is dropping at an instant when level of perfume in the bottle is 10 mm, if the semi-vertical angle of conical bottle is $\frac{\pi}{6}$. **2**



25. Find intervals of increase/decrease of a given function

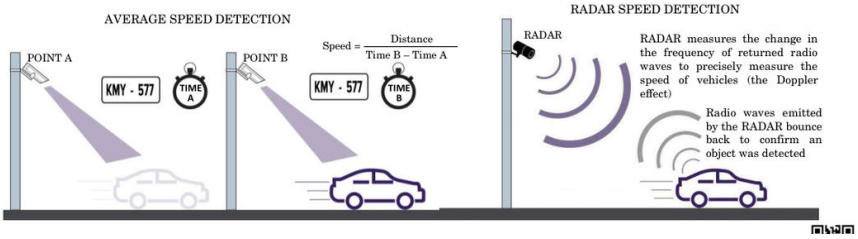
Asked 4× · Board 2025, Board 2026, Sample 2025, Sample 2026 · 1/2 marks

[An online delivery company in a city has 5000 subscribers and collects annual subscription fees of Rs 300 per subscriber for unlimited free deliveries. The company wishes to increase the annual subscription fee. It is predicted that, for every increase of Rs 1, ten subscribers will discontinue. Assume that the company increased the annual fee by Rs x.] Find the sub-intervals of (0, 5000) in which R(x) is increasing and decreasing.

26. Related rates with a right triangle (angle of elevation / string length)

Asked 4× · Board 2024, Sample 2025 · 1/2/3 marks

[case context] The traffic police has installed Over Speed Violation Detection (OSVD) system at various locations in a city. These cameras can capture a speeding vehicle from a distance of 300 m and even function in the dark. A camera is installed on a pole at the height of 5 m. It detects a car travelling away from the pole at the speed of 20 m/s. At any point, x m away from the base of the pole, the angle of elevation of the speed camera from the car C is theta.
(i) Express theta in terms of height of the camera installed on the pole and x.



27. Absolute maximum/minimum of a polynomial on a closed interval

Asked 3× · Board 2025, Board 2026 · 1/5 marks

The least value of $f(x) = x^3 - 12x$, x in [0, 3] is
(A) -16
(B) -9
(C) 0
(D) 16

Integrals

28. Evaluate an integral by substitution

Asked 7× · Board 2022, Board 2024, Board 2025, Board 2026, Sample 2025, Sample 2026 · 1/2/3 marks

If integral $3ax/(b^2 + c^2 x^2)\, dx = A \log |b^2 + c^2 x^2| + K$, then the value of A is
(A) 3a
(B) $3a/(2b^2)$
(C) $3a/(b^2 c^2)$
(D) $3a/(2c^2)$

29. Integrate a rational function using partial fractions

Asked 5× · Board 2022, Board 2023, Board 2024, Board 2026, Sample 2026 · 3/5 marks

Find: integral $x^2/((x^2 + 9)(x^2 + 16))\, dx$

30. Evaluate a definite integral using the a-x property (King's rule)

Asked 4× · Board 2022, Board 2023, Sample 2025, Sample 2026 · 3/4/5 marks

Evaluate: integral from 0 to 1 of $\log(1+x)/(1+x^2)\, dx$

31. Special integral via f + f' recognition

Asked 3× · Board 2025, Sample 2025, Sample 2026 · 2/3 marks

Find: integral $(x-3)/(x-1)^3\, e^x\, dx$

32. Definite integral of a modulus function (evaluate/interpret)

Asked 2× · Board 2025, Sample 2026 · 1/3 marks

Sketch the graph $y = |x + 1|$. Evaluate integral from -4 to 2 of $|x + 1|\, dx$. What does the value of this integral represent on the graph?

33. Odd-function / periodic definite integral equal to zero

Asked 2× · Board 2026, Sample 2025 · 1 marks

The value of $\int_{-1}^{1} x^3/(x^2 + 2|x| + 1)\, dx$ is
(A) 0
(B) log 2
(C) 2 log 2
(D) (1/2) log 2

34. Theory MCQ on properties of definite integrals

Asked 2× · Board 2024, Sample 2026 · 1 marks

If $f(a+b-x) = f(x)$, then integral a to b of $x\, f(x)\, dx$ is equal to (A) $(a+b)/2$ integral a to b $f(b-x)\, dx$ (B) $(a+b)/2$ integral a to b $f(a-x)\, dx$ (C) $(b-a)/2$ integral a to b $f(x)\, dx$ (D) $(a+b)/2$ integral a to b $f(x)\, dx$

35. Evaluate a definite integral (direct/substitution)

Asked 3× · Board 2023, Board 2024, Board 2025 · 1/3/5 marks

Evaluate: $\int_0^{pi/4} dx/(\cos^3 x\, \text{sqrt}(2 \sin 2x))$

36. Integration by parts of a single/product inverse-trig or log function

Asked 3× · Board 2022, Board 2023, Board 2026 · 1/3 marks

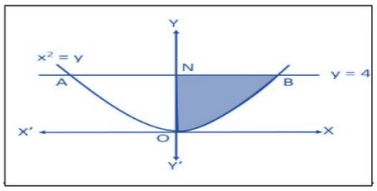
Evaluate: $\int_0^1 x \tan^{-1} x \, dx$.

Applications of the Integrals

37. Area bounded by a parabola and a line/ordinate

Asked 5× · Board 2022, Board 2025, Sample 2025, Sample 2026 · 1/2/3/4 marks

Find out the area of shaded region in the enclosed figure [region bounded by the parabola $x^2 = y$ and the line $y = 4$, shaded between the y-axis and the parabola].



*Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e.

38. Area of a region involving a circle

Asked 5× · Board 2022, Board 2026 · 1/2/4 marks

[Roundabouts are often made on busy roads to ease the traffic and avoid red lights. One such round-about is made such that equation representing its boundary is given by $C_1 : x^2 + y^2 = 64$. There is a circular pond with a fountain in the middle of the roundabout whose equation is given by $C_2 : x^2 + y^2 = 4$.] Represent the given equations C_1 and C_2 with the help of a diagram.



One such round-about is made such that equation representing its

39. Area between a curve and the x-axis (modulus/trigonometric curve)

Asked 3× · Board 2025, Board 2026, Sample 2025 · 1/3/5 marks

The area bounded by the curve $y = x|x|$, x-axis and the ordinates $x = -1$ and $x = 1$ is given by

(A) 0

(B) 1/3

(C) 2/3

(D) 4/3

Differential Equations

40. Solve a homogeneous differential equation (general/particular)

Asked 4× · Board 2023, Board 2024, Board 2026, Sample 2026 · 3/5 marks

Find the general solution of the following differential equation: $x^2 \, dy/dx = x^2 + xy + y^2$

41. Solve a variables-separable differential equation

Asked 3× · Board 2023, Board 2026, Sample 2025 · 1/3 marks

Find the particular solution of the differential equation $xy \, dy/dx = (x + 2)(y + 2)$, given that $y(1) = -1$.

42. Find order and/or degree of a differential equation

Asked 4× · Board 2022, Board 2023, Board 2024, Board 2026 · 1/2 marks

The order and degree of the differential equation $d/dx(e^y) = 0$ respectively are
(A) 0, 1
(B) 1, 1
(C) 2, 1
(D) 1, not defined

43. Solve a linear differential equation via integrating factor

Asked 3× · Board 2022, Board 2023, Sample 2026 · 3/5 marks

Solve the differential equation: $y + d/dx(xy) = x(\sin x + x)$

44. Find the integrating factor (MCQ)

Asked 3× · Board 2024, Board 2025, Board 2026 · 1 marks

The integrating factor of differential equation $R\,dx/dy + Px = Q$ where P, Q, R are functions of y is
(A) $e^{\text{integral } (P/Q)\, dy}$
(B) $e^{\text{integral } P\, dy}$
(C) $e^{\text{integral } (P/R)\, dy}$
(D) $e^{\text{integral } (P/R)\, dx}$

45. Conceptual MCQ on homogeneity

Asked 2× · Board 2025, Sample 2025 · 1 marks

Which of the following is not a homogeneous function of x and y? (A) $y^2 - xy$ (B) $x - 3y$ (C) $\sin^2(y/x) + y/x$ (D) $\tan x - \sec y$

Vectors

46. Angle between two vectors (dot-product / magnitude conditions)

Asked 4× · Board 2022, Board 2025, Sample 2025 · 1/2/3 marks

If $a + b + c = 0$, $|a| = \sqrt{37}$, $|b| = 3$ and $|c| = 4$, then angle between b and c is (A) pi/6 (B) pi/4 (C) pi/3 (D) pi/2

47. Find the scalar making two vectors perpendicular

Asked 3× · Board 2023, Board 2026, Sample 2025 · 1/2 marks

The value of p for which vectors $i\hat{} + 2j\hat{} + 3k\hat{}$ and $2i\hat{} - pj\hat{} + k\hat{}$ are perpendicular to each other is
(A) 0
(B) 1
(C) 5/2
(D) -5/2

48. Area of a parallelogram from its diagonals

Asked 3× · Board 2022, Board 2025, Sample 2025 · 2/3 marks

The diagonals of a parallelogram are given by vector $a = 2i\hat{} - j\hat{} + k\hat{}$ and vector $b = i\hat{} + 3j\hat{} - k\hat{}$. Find the area of the parallelogram.

49. Vector of a given magnitude along/opposite a given direction

Asked 3× · Board 2023, Board 2025, Board 2026 · 2 marks

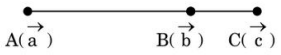
Find the vector of magnitude 14 in the direction of QP, where P and Q are the points (1, 3, 2) and (-1, 0, 8) respectively.

50. Collinearity of points and section-formula ratio

Asked 3× · Board 2023, Board 2025, Board 2026 · 1/2/3 marks

Position vectors of the points A, B and C as shown in the figure below are a->, b-> and c-> respectively. (A, B, C are collinear points shown in that order on a line.) If AC-> = (5/4) AB->, express c-> in terms of a-> and b->.

below are $\vec{a}$, $\vec{b}$ and $\vec{c}$ respectively.

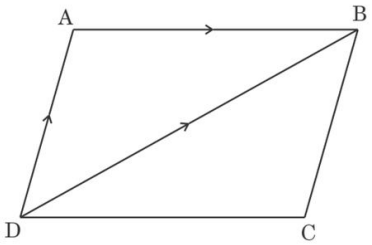


51. Area of a parallelogram/figure from two adjacent sides via cross product

Asked 2× · Board 2024, Sample 2026 · 2 marks

In the given figure, ABCD is a parallelogram. If AB-> = 2i^ - 4j^ + 5k^ and DB-> = 3i^ - 6j^ + 2k^, then find AD-> and hence find the area of parallelogram ABCD.

parallelogram ABCD.



Three-dimensional Geometry

52. Shortest distance / relationship between two lines in space

Asked 4× · Board 2022, Board 2025, Board 2026, Sample 2025 · 3/5 marks

Check whether the lines given by (x - 1)/2 = (y - 2)/3 = (z - 3)/4 and (x - 4)/5 = (y - 1)/2 = z are parallel or not. If parallel, find the distance between them, otherwise find their point of intersection, if the lines are intersecting.

53. Image (foot of perpendicular reflection) of a point in a line

Asked 3× · Board 2024, Board 2025, Sample 2025 · 5 marks

Find the image A' of the point A(1, 6, 3) in the line x/1 = (y - 1)/2 = (z - 2)/3. Also, find the equation of the line joining A and A'.

54. Direction cosines and the $\cos^2$ sum identity

Asked 3× · Board 2023, Board 2024 · 1 marks

If the direction cosines of a line are sqrt(3) k, sqrt(3) k, sqrt(3) k, then the value of k is :
(A) +/- 1
(B) +/- sqrt(3)
(C) +/- 3
(D) +/- 1/3

55. Perpendicularity/angle between two given lines

Asked 2× · Board 2023, Board 2026 · 1/2 marks

Assertion (A): Lines given by x = py + q, z = ry + s and x = p'y + q', z = r'y + s' are perpendicular to each other when pp' + rr' = 1.
Reason (R): Two lines $r = a_1 + \text{lambda } b_1$ and $r = a_2 + \text{mu } b_2$ are perpendicular to each other if $b_1 . b_2 = 0$.
(A) Both Assertion (A) and Reason (R) are true and the Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true and Reason (R) is false.
(D) Assertion (A) is false and Reason (R) is true.

56. Point on a line at a given distance from a fixed point

Asked 2× · Board 2023, Board 2025 · 5 marks

Find a point P on the line (x + 5)/1 = (y + 3)/4 = (z - 6)/(-9) such that its distance from point Q(2, 4, -1) is 7 units. Also, find the equation of line joining P and Q.

57. Equation of a line through two points (two-point form)

Asked 2× · Board 2022, Board 2023 · 1/2 marks

Assertion (A) : Equation of a line passing through the points (1, 2, 3) and (3, -1, 3) is (x-3)/2 = (y+1)/3 = (z-3)/0.
Reason (R) : Equation of a line passing through points (x_1, y_1, z_1), (x_2, y_2, z_2) is given by $(x-x_1)/(x_2-x_1) = (y-y_1)/(y_2-y_1) = (z-z_1)/(z_2-z_1)$.
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true and Reason (R) is false.
(d) Assertion (A) is false and Reason (R) is true.

Linear Programming

58. Solve an LPP graphically (maximise/minimise over a feasible region)

Asked 5× · Board 2023, Board 2024, Board 2025, Board 2026, Sample 2026 · 3 marks

Solve the following linear programming problem graphically: Minimize Z = 13x - 15y Subject to constraints x + y <= 7, 2x - 3y + 6 >= 0, x >= 0, y >= 0

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59. Evaluate Z at given corner points to locate max/min

Asked 4× · Board 2023, Board 2025, Board 2026, Sample 2025 · 1 marks

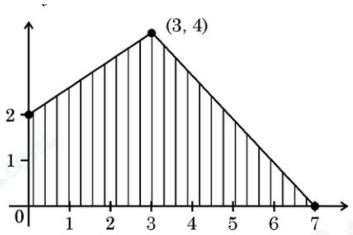
The feasible region of a linear programming problem with objective function Z = 5x + 7y is shown below [feasible region is the shaded polygon with corner points (0, 0), (0, 2), (3, 4) and (7, 0)]. The maximum value of Z - minimum value of Z is

(A) 8

(B) 29

(C) 35

(D) 43

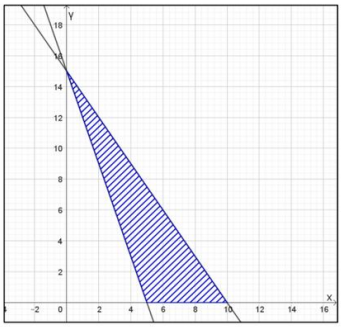


The maximum value of Z – minimum value of Z is

60. Alternate optima: objective attains optimum at more than one point

Asked 2× · Sample 2025, Sample 2026 · 1/3 marks

The feasible region of a linear programming problem is bounded but the objective function attains its minimum value at more than one point. One of the points is (5,0). Then one of the other possible points at which the objective function attains its minimum value is (A) (2,9) (B) (6,6) (C) (4,7) (D) (0,0)



Then one of the other possible points at which the objective function attains its minimum value is

(A) (2,9) (B) (6,6) (C) (4,7) (D) (0,0)

61. Existence of optimal value for bounded vs unbounded regions (theory)

Asked 2× · Board 2025, Sample 2025 · 1 marks

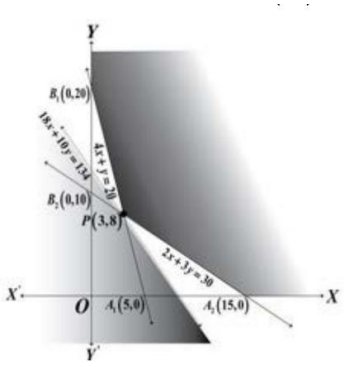
A linear programming problem (LPP) along with the graph of its constraints is shown below. The corresponding objective function is: Z = 18x + 10y, which has to be minimized. The smallest value of the objective function Z is 134 and is obtained at the corner point (3,8). (Corner points B1(0,20), B2(0,10), P(3,8), A1(5,0), A2(15,0); constraints 18x+10y=134, 4x+y=20, 2x+3y=30.) (Note: The figure is not to scale.) The optimal solution of the above linear programming problem _____.

(A) does not exist as the feasible region is unbounded.

(B) does not exist as the inequality 18x + 10y < 134 does not have any point in common with the feasible region.

(C) exists as the inequality 18x + 10y > 134 has infinitely many points in common with the feasible region.

(D) exists as the inequality 18x + 10y < 134 does not have any point in common with the feasible region.



(Note: *The figure is not to scale.*)

The optimal solution of the above linear programming problem _____.

62. Nature/degree of the LPP objective function (definition MCQ)

Asked 2× · Board 2024, Board 2026 · 1 marks

The degree of an objective function of a linear programming problem is

(A) 0

(B) 1

(C) 2

(D) Any natural number

63. Count the number of corner points of the feasible region

Asked 2× · Board 2023, Board 2024 · 1 marks

The number of corner points of the feasible region determined by constraints x >= 0, y >= 0, x + y >= 4 is :

(A) 0

(B) 1

(C) 2

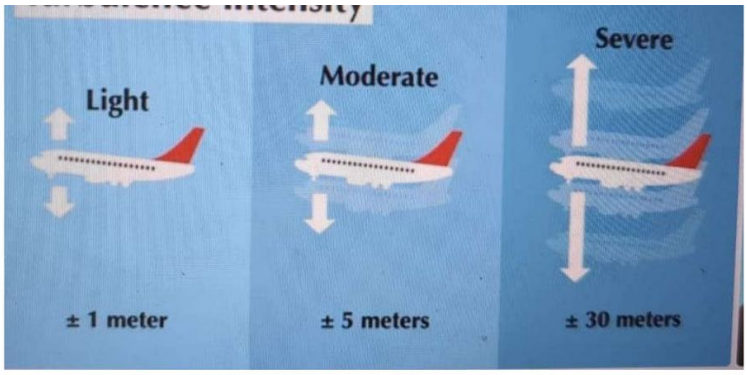
(D) 3

Probability

64. Total probability theorem: find overall probability of an event

Asked 7× · Board 2024, Board 2025, Board 2026, Sample 2025, Sample 2026 · 2/3 marks

[case context] According to recent research, air turbulence has increased in various regions around the world due to climate change. Turbulence makes flights bumpy and often delays the flights. Assume that an airplane observes severe turbulence, moderate turbulence or light turbulence with equal probabilities. Further, the chance of an airplane reaching late to the destination are 55%, 37% and 17% due to severe, moderate and light turbulence respectively. (i) Find the probability that an airplane reached its destination late.



65. Bayes' theorem: find the posterior (reverse) probability of a cause

Asked 4× · Board 2024, Board 2025, Sample 2025, Sample 2026 · 2 marks

[Case Study 3: three groups by screen time - high (>4 hrs) 60%, moderate (2-4 hrs) 30%, low (<2 hrs) 10%; anxiety/low-retention rates 80%, 70%, 30% respectively.] II. A student is selected at random, and he is found to suffer from anxiety and low retention issues. What is the probability that he/she spends screen time more than 4 hours per day?

66. Probability that at least one of independent events occurs

Asked 3× · Board 2022, Sample 2026 · 2/3 marks

Two students Mehul and Rashi are seeking admission in a college. The probability that Mehul is selected is 0.4 and the probability of selection of exactly one of them is 0.5. Chances of selection of them is independent of each other. Find the chances of selection of Rashi. Also find the probability of selection of at least one of them.

67. Independent-events algebra: find P(A), P(B) or a derived probability

Asked 3× · Board 2023, Board 2024, Board 2025 · 1/3 marks

If E and F are two independent events such that P(E) = 2/3, P(F) = 3/7, then P(E/F) is equal to: (A) 1/6 (B) 1/2 (C) 2/3 (D) 7/9

68. Apply the conditional-probability formula to given probability values

Asked 2× · Board 2023, Sample 2025 · 1 marks

For any two events A and B, if $P(A_{bar}) = 1/2$, $P(B_{bar}) = 2/3$ and P(A intersect B) = 1/4, then $P(A_{bar} / B_{bar})$ equals:
(A) 3/8
(B) 8/9
(C) 5/8
(D) 1/4

69. Conditional probability on a die/dice given a stated condition

Asked 2× · Board 2022, Board 2026 · 1/2 marks

Assertion (A): In an experiment of throwing an unbiased die, the probability of getting a prime number given that number appearing on the die being odd is 2/3.
Reason (R): For any two events A and B, P(A|B) = P(A union B)/P(B).
(A) Both Assertion (A) and Reason (R) are true and the Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true and Reason (R) is false.
(D) Assertion (A) is false and Reason (R) is true.

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