SmartKalike

CBSE Class 12 · Maths

Linear Programming

10 most probable questions for Boards 2027

Q1. 0.5 marks · Very short answer

For a feasible region with corner points (0,0),(2,0),(0,3) and objective function Z=2x+y, evaluate Z at the corner points and give the point where its maximum occurs.

Answer

At (0, 0): Z = 2(0) + 0 = 0
At (2, 0): Z = 2(2) + 0 = 4
At (0, 3): Z = 2(0) + 3 = 3
∴ Maximum value is 4 at (2, 0).

Q2. 1 mark · Multiple choice

For the constraints x+y≤5, x≥0, y≥0, which point is an infeasible solution?
(A) (1,2)
(B) (0,5)
(C) (3,3)
(D) (2,2)

Answer

(C) (3, 3) — it violates x + y ≤ 5, so it is an infeasible solution.

Q3. 2 marks · Short answer

For the constraints x+y≤6, x≥0, y≥0, determine whether (2,3) and (4,3) belong to the feasible region, checking all the constraints.

Answer

(2, 3):
2 + 3 = 5 ≤ 6
2 ≥ 0, 3 ≥ 0
∴ (2, 3) belongs to the feasible region.

(4, 3):
4 + 3 = 7 > 6
4 ≥ 0, 3 ≥ 0
∴ (4, 3) does not belong to the feasible region.

Q4. 3 marks · Medium answer

The feasible region has corner points (0,0),(4,0),(0,3), and the objective function is Z=2x+3y. Evaluate Z at each corner point and find the optimal feasible solution when Z is to be maximised.

Answer

$Z = 2x + 3y$
At (0, 0): $Z = 2(0) + 3(0) = 0$
At (4, 0): $Z = 2(4) + 3(0) = 8$
At (0, 3): $Z = 2(0) + 3(3) = 9$
$\therefore$ Maximum value of Z is 9 at (0, 3).

Q5. 5 marks · Long answer

Define constraints in a linear programming problem and distinguish non-negative restrictions from other constraints. Define an optimisation problem and state how a linear programming problem is related to it. (5 marks)

Answer

1. Meaning — Constraints: linear inequalities, equations or restrictions on the variables of a linear programming problem; non-negative restrictions: constraints requiring the variables to be non-negative.
2. Form — Other constraints may be linear inequalities or equations, such as $5x + y \leq 100$; non-negative restrictions are expressed as $x \geq 0$ and $y \geq 0$.
3. Purpose — Other constraints limit the permitted values of the variables according to the problem; non-negative restrictions ensure that the variables cannot take negative values.
4. Optimisation problem — An optimisation problem seeks to maximise or minimise a linear function subject to constraints determined by a set of linear inequalities.
5. Relation — An optimisation problem may involve maximisation or minimisation; a linear programming problem is a special type of optimisation problem in which a linear objective function is subject to linear constraints and non-negative variables.

Q6. 0.5 marks · Very short answer

Find the intersection point of the boundary lines x+y=5 and x-y=1; this point is a corner point of the feasible region when both boundaries are active.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/linear-programming

Q7. 1 mark · Multiple choice

For an unbounded feasible region, which statement about the objective function is correct?
(A) A maximum and minimum must both exist.
(B) An optimum may not exist; if it does, it occurs at a corner point.
(C) An optimum can occur only away from corner points.
(D) The feasible region must be empty.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/linear-programming

Q8. 2 marks · Short answer

A bounded feasible region has corner points (0,0),(4,0),(0,3). Evaluate Z=2x-y at all three points and find its maximum and minimum values.

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Q9. 3 marks · Medium answer

For the system $x \geq 0$, $y \geq 0$, $x+y \leq 8$, find the intercepts of the boundary line and use them to determine whether the feasible region is bounded.

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Q10. 5 marks · Long answer

Explain how the corner-point method determines the maximum and minimum of an objective function $Z=ax+by$ when the feasible region is bounded. For an unbounded feasible region, state the half-plane tests used to confirm a candidate maximum M and a candidate minimum m. (5 marks)

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