

Nonlinear Systems, Systems of Inequalities, and Linear Programming

Systems beyond lines, feasible regions, graphing systems of inequalities, optimization, and modeling constraints.

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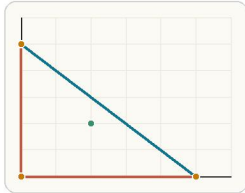
32 main 2-up grid 12 pages visible side quests

Completion Reward



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1. In linear programming, what is the feasible region?



In linear programming, feasible points are exactly the points that satisfy every constraint simultaneously.

- A. The set of points that satisfy all constraints.
- B. The objective function only.
- C. The line with greatest slope.
- D. The x-axis region only.

1.3. In linear programming, the feasible region is:

- A. the overlap of all constraints
- B. the objective function only
- C. every point on the x-axis
- D. the point with largest coordinates

1.1. What boundary line goes with $y \geq 2x - 3$?

- A. $y = 2x - 3$
- B. $x = 2y - 3$
- C. $y = 2x + 3$
- D. $x = -3$

1.4. Does $(1, 4)$ satisfy $y \leq x + 3$?

- A. yes
- B. no
- C. only if x is negative
- D. not enough information

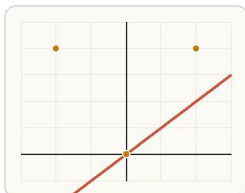
1.2. On an inequality graph, shading represents:

- A. points that satisfy the inequality
- B. the x-intercepts only
- C. points that are undefined
- D. just the boundary line

1.5. A boundary line for $y > 3x - 1$ should be:

- A. solid
- B. dashed
- C. vertical
- D. hidden

2. What does it mean to solve a nonlinear system?



Even when one graph is curved, solving the system still means finding points that satisfy every equation together.

- A. Find points that satisfy every equation, even when one graph is curved.
- B. Only find x-intercepts.
- C. Rewrite every equation as linear.
- D. Solve each equation separately and ignore overlap.

2.3. If $y = x$ and $x^2 + y^2 = 18$, what is the positive x-value of intersection?

- A. 2
- B. 3
- C. 4
- D. 9

2.1. A solution to a nonlinear system is:

- A. a point satisfying both equations
- B. the slope of the nonlinear graph
- C. always the origin
- D. only an x-intercept

2.4. For $y = x^2$ and $y = 4$, what do you solve to find intersections?

- A. $x^2 = 4$
- B. $x + 4 = 0$
- C. $2x = 4$
- D. $x^2 + 4 = 0$

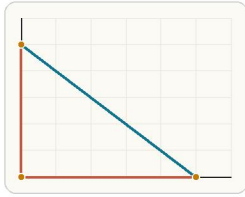
2.2. To solve $y = x$ and $x^2 + y^2 = 18$, a good first step is to:

- A. substitute $y = x$ into the second equation
- B. differentiate both equations
- C. graph only the circle
- D. take the square root first

2.5. If a line touches a parabola at exactly one point, the system has:

- A. 0 solutions
- B. 1 solution
- C. 2 solutions
- D. infinitely many solutions

3. Where do maxima or minima usually occur in a linear-programming feasible region?



For a polygonal feasible region, test the objective function at the corner points to find extrema.

- A. At the center of the feasible region
- B. At every point equally
- C. At a vertex of the feasible region
- D. Always on the y-axis

3.3. If $P = 3x + 2y$, what is P at $(4, 1)$?

- A. 10
- B. 12
- C. 14
- D. 16

4. What does the objective function do in linear programming?

- A. It defines the feasible region.
- B. It replaces the constraints.
- C. It lists the x-intercepts.
- D. It measures the quantity you want to maximize or minimize.

4.3. If $P = 3x + 2y$, what is P at $(4, 1)$?

- A. 10
- B. 12
- C. 14
- D. 16

5. What does shading represent on an inequality graph?

- A. The set of points that satisfy the inequality.
- B. Only the axis of symmetry.
- C. The determinant region.
- D. The set of points on the boundary line only.

5.3. In linear programming, the feasible region is:

- A. the overlap of all constraints
- B. the objective function only
- C. every point on the x-axis
- D. the point with largest coordinates

3.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

3.4. If $C = 5x + y$, what is C at $(2, 6)$?

- A. 11
- B. 14
- C. 16
- D. 20

4.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

4.4. If $C = 5x + y$, what is C at $(2, 6)$?

- A. 11
- B. 14
- C. 16
- D. 20

5.1. What boundary line goes with $y \geq 2x - 3$?

- A. $y = 2x - 3$
- B. $x = 2y - 3$
- C. $y = 2x + 3$
- D. $x = -3$

5.4. Does $(1, 4)$ satisfy $y \leq x + 3$?

- A. yes
- B. no
- C. only if x is negative
- D. not enough information

3.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

3.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

4.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

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- A. test the vertices in the objective function
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- D. average all shaded points

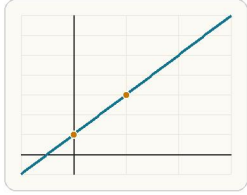
5.2. On an inequality graph, shading represents:

- A. points that satisfy the inequality
- B. the x-intercepts only
- C. points that are undefined
- D. just the boundary line

5.5. A boundary line for $y > 3x - 1$ should be:

- A. solid
- B. dashed
- C. vertical
- D. hidden

6. What boundary line goes with $y \leq 2x + 1$?



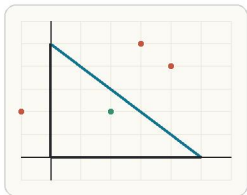
The boundary line of an inequality graph comes from changing the inequality sign to equality.

- A. $y = 2x + 1$
- B. $y = -2x + 1$
- C. $x = 2y + 1$
- D. $y = 1$

6.3. In linear programming, the feasible region is:

- A. the overlap of all constraints
- B. the objective function only
- C. every point on the x-axis
- D. the point with largest coordinates

7. Which point satisfies $x \geq 0$, $y \geq 0$, and $x + y \leq 5$?



A feasible point must stay in the first quadrant and lie on or below $x + y = 5$.

- A. (4, 4)
- B. (-1, 2)
- C. (3, 5)
- D. (2, 2)

7.3. In linear programming, the feasible region is:

- A. the overlap of all constraints
- B. the objective function only
- C. every point on the x-axis
- D. the point with largest coordinates

6.1. What boundary line goes with $y \geq 2x - 3$?

- A. $y = 2x - 3$
- B. $x = 2y - 3$
- C. $y = 2x + 3$
- D. $x = -3$

6.4. Does (1, 4) satisfy $y \leq x + 3$?

- A. yes
- B. no
- C. only if x is negative
- D. not enough information

7.1. What boundary line goes with $y \geq 2x - 3$?

- A. $y = 2x - 3$
- B. $x = 2y - 3$
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- D. $x = -3$

7.4. Does (1, 4) satisfy $y \leq x + 3$?

- A. yes
- B. no
- C. only if x is negative
- D. not enough information

6.2. On an inequality graph, shading represents:

- A. points that satisfy the inequality
- B. the x-intercepts only
- C. points that are undefined
- D. just the boundary line

6.5. A boundary line for $y > 3x - 1$ should be:

- A. solid
- B. dashed
- C. vertical
- D. hidden

7.2. On an inequality graph, shading represents:

- A. points that satisfy the inequality
- B. the x-intercepts only
- C. points that are undefined
- D. just the boundary line

7.5. A boundary line for $y > 3x - 1$ should be:

- A. solid
- B. dashed
- C. vertical
- D. hidden

8. What is the best first step to solve $y = x$ and $x^2 + y^2 = 18$?

- A. Substitute x for y in the second equation.
- B. Graph the first equation only.
- C. Take the square root of 18 first and stop.
- D. Subtract x from both equations.

8.1. A solution to a nonlinear system is:

- A. a point satisfying both equations
- B. the slope of the nonlinear graph
- C. always the origin
- D. only an x -intercept

8.2. To solve $y = x$ and $x^2 + y^2 = 18$, a good first step is to:

- A. substitute $y = x$ into the second equation
- B. differentiate both equations
- C. graph only the circle
- D. take the square root first

8.3. If $y = x$ and $x^2 + y^2 = 18$, what is the positive x -value of intersection?

- A. 2
- B. 3
- C. 4
- D. 9

8.4. For $y = x^2$ and $y = 4$, what do you solve to find intersections?

- A. $x^2 = 4$
- B. $x + 4 = 0$
- C. $2x = 4$
- D. $x^2 + 4 = 0$

8.5. If a line touches a parabola at exactly one point, the system has:

- A. 0 solutions
- B. 1 solution
- C. 2 solutions
- D. infinitely many solutions

9. A student says a feasible region can ignore one constraint if the point looks close enough. What is the mistake?

- A. Only the objective matters.
- B. Only x -constraints matter.
- C. Graphs are only rough sketches.
- D. A feasible point must satisfy every constraint.

9.1. What boundary line goes with $y \geq 2x - 3$?

- A. $y = 2x - 3$
- B. $x = 2y - 3$
- C. $y = 2x + 3$
- D. $x = -3$

9.2. On an inequality graph, shading represents:

- A. points that satisfy the inequality
- B. the x -intercepts only
- C. points that are undefined
- D. just the boundary line

9.3. In linear programming, the feasible region is:

- A. the overlap of all constraints
- B. the objective function only
- C. every point on the x -axis
- D. the point with largest coordinates

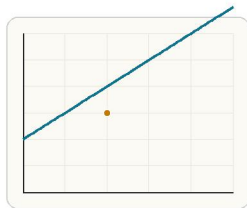
9.4. Does $(1, 4)$ satisfy $y \leq x + 3$?

- A. yes
- B. no
- C. only if x is negative
- D. not enough information

9.5. A boundary line for $y > 3x - 1$ should be:

- A. solid
- B. dashed
- C. vertical
- D. hidden

10. Does the point $(2, 3)$ satisfy $y \leq x + 2$? Answer 1 for yes and 0 for no.



Check whether the point falls on or below the line $y = x + 2$.

10.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

10.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y -intercept only

10.3. If $P = 3x + 2y$, what is P at $(4, 1)$?

- A. 10
- B. 12
- C. 14
- D. 16

10.4. If $C = 5x + y$, what is C at $(2, 6)$?

- A. 11
- B. 14
- C. 16
- D. 20

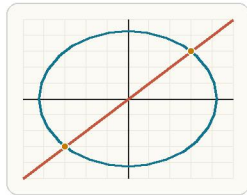
10.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

11. Does the point (4, 1) satisfy $y \geq x - 1$? Answer 1 for yes and 0 for no.

- A. 10
- B. 12
- C. 14
- D. 16

12. For $y = x$ and $x^2 + y^2 = 18$, find the positive x-value of an intersection point. Answer with a number.



Shared points satisfy both the line and the circle.

12.3. If $P = 3x + 2y$, what is P at (4, 1)?

- A. 10
- B. 12
- C. 14
- D. 16

13. For $y = x$ and $x^2 + y^2 = 18$, find the positive y-value of an intersection point. Answer with a number.

13.3. If $P = 3x + 2y$, what is P at (4, 1)?

- A. 10
- B. 12
- C. 14
- D. 16

11.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

11.4. If $C = 5x + y$, what is C at (2, 6)?

- A. 11
- B. 14
- C. 16
- D. 20

12.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

12.4. If $C = 5x + y$, what is C at (2, 6)?

- A. 11
- B. 14
- C. 16
- D. 20

13.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

13.4. If $C = 5x + y$, what is C at (2, 6)?

- A. 11
- B. 14
- C. 16
- D. 20

11.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

11.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

12.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

12.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

13.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

13.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

14. Evaluate $P = 3x + 2y$ at the point (4, 1). Answer with a number.

- A. 10
- B. 12
- C. 14
- D. 16

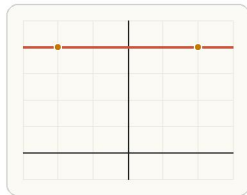
14.3. If $P = 3x + 2y$, what is P at (4, 1)?

15. Evaluate $C = 5x + y$ at the point (2, 6). Answer with a number.

- A. 10
- B. 12
- C. 14
- D. 16

15.3. If $P = 3x + 2y$, what is P at (4, 1)?

16. For $y = x^2$ and $y = 4$, find the positive x-value of intersection. Answer with a number.



Intersections occur where both graphs share the same y-value.

16.3. If $P = 3x + 2y$, what is P at (4, 1)?

- A. 10
- B. 12
- C. 14
- D. 16

14.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

14.4. If $C = 5x + y$, what is C at (2, 6)?

- A. 11
- B. 14
- C. 16
- D. 20

15.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

15.4. If $C = 5x + y$, what is C at (2, 6)?

- A. 11
- B. 14
- C. 16
- D. 20

16.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

16.4. If $C = 5x + y$, what is C at (2, 6)?

- A. 11
- B. 14
- C. 16
- D. 20

14.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

14.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

15.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

15.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

16.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

16.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

17. For $y = x^2$ and $y = 4$, find the negative x-value of intersection. Answer with a number.

17.3. If $P = 3x + 2y$, what is P at (4, 1)?

- A. 10
- B. 12
- C. 14
- D. 16

18. Evaluate $P = 3x + 2y$ at (0, 5). Answer with a number.

18.3. If $P = 3x + 2y$, what is P at (4, 1)?

- A. 10
- B. 12
- C. 14
- D. 16

19. Evaluate $P = 3x + 2y$ at (5, 0). Answer with a number.

19.3. If $P = 3x + 2y$, what is P at (4, 1)?

- A. 10
- B. 12
- C. 14
- D. 16

17.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

17.4. If $C = 5x + y$, what is C at (2, 6)?

- A. 11
- B. 14
- C. 16
- D. 20

18.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

18.4. If $C = 5x + y$, what is C at (2, 6)?

- A. 11
- B. 14
- C. 16
- D. 20

19.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

19.4. If $C = 5x + y$, what is C at (2, 6)?

- A. 11
- B. 14
- C. 16
- D. 20

17.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

17.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

18.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
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- A. test the vertices in the objective function
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19.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

19.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

20. Which is larger: P at (0, 5) or P at (5, 0) for $P = 3x + 2y$? Enter the larger value. Answer with a number.

20.3. If $P = 3x + 2y$, what is P at (4, 1)?

- A. 10
- B. 12
- C. 14
- D. 16

21. Does (1, 4) satisfy $x + y \leq 5$? Answer 1 for yes and 0 for no.

21.3. In linear programming, the feasible region is:

- A. the overlap of all constraints
- B. the objective function only
- C. every point on the x-axis
- D. the point with largest coordinates

22. For $y = x^2$ and $x = 3$, what is y? Answer with a number.

22.3. If $y = x$ and $x^2 + y^2 = 18$, what is the positive x-value of intersection?

- A. 2
- B. 3
- C. 4
- D. 9

20.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

20.4. If $C = 5x + y$, what is C at (2, 6)?

- A. 11
- B. 14
- C. 16
- D. 20

21.1. What boundary line goes with $y \geq 2x - 3$?

- A. $y = 2x - 3$
- B. $x = 2y - 3$
- C. $y = 2x + 3$
- D. $x = -3$

21.4. Does (1, 4) satisfy $y \leq x + 3$?

- A. yes
- B. no
- C. only if x is negative
- D. not enough information

22.1. A solution to a nonlinear system is:

- A. a point satisfying both equations
- B. the slope of the nonlinear graph
- C. always the origin
- D. only an x-intercept

22.4. For $y = x^2$ and $y = 4$, what do you solve to find intersections?

- A. $x^2 = 4$
- B. $x + 4 = 0$
- C. $2x = 4$
- D. $x^2 + 4 = 0$

20.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y-intercept only

20.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

21.2. On an inequality graph, shading represents:

- A. points that satisfy the inequality
- B. the x-intercepts only
- C. points that are undefined
- D. just the boundary line

21.5. A boundary line for $y > 3x - 1$ should be:

- A. solid
- B. dashed
- C. vertical
- D. hidden

22.2. To solve $y = x$ and $x^2 + y^2 = 18$, a good first step is to:

- A. substitute $y = x$ into the second equation
- B. differentiate both equations
- C. graph only the circle
- D. take the square root first

22.5. If a line touches a parabola at exactly one point, the system has:

- A. 0 solutions
- B. 1 solution
- C. 2 solutions
- D. infinitely many solutions

23. For $y = 0$ and $x^2 + y^2 = 16$, what is the positive x -value? Answer with a number.

- A. 2
- B. 3
- C. 4
- D. 9

24. For $y = 0$ and $x^2 + y^2 = 16$, what is the negative x -value? Answer with a number.

24.3. If $y = x$ and $x^2 + y^2 = 18$, what is the positive x -value of intersection?

- A. 2
- B. 3
- C. 4
- D. 9

25. Evaluate $C = 2x + 7y$ at $(3, 2)$. Answer with a number.

25.3. If $P = 3x + 2y$, what is P at $(4, 1)$?

- A. 10
- B. 12
- C. 14
- D. 16

23.1. A solution to a nonlinear system is:

- A. a point satisfying both equations
- B. the slope of the nonlinear graph
- C. always the origin
- D. only an x -intercept

23.4. For $y = x^2$ and $y = 4$, what do you solve to find intersections?

- A. $x^2 = 4$
- B. $x + 4 = 0$
- C. $2x = 4$
- D. $x^2 + 4 = 0$

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- B. $x + 4 = 0$
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- D. $x^2 + 4 = 0$

25.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
- C. the midpoint of the feasible region
- D. the slope of every constraint

25.4. If $C = 5x + y$, what is C at $(2, 6)$?

- A. 11
- B. 14
- C. 16
- D. 20

23.2. To solve $y = x$ and $x^2 + y^2 = 18$, a good first step is to:

- A. substitute $y = x$ into the second equation
- B. differentiate both equations
- C. graph only the circle
- D. take the square root first

23.5. If a line touches a parabola at exactly one point, the system has:

- A. 0 solutions
- B. 1 solution
- C. 2 solutions
- D. infinitely many solutions

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25.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
- C. every boundary point
- D. the y -intercept only

25.5. Once you know the feasible region, what should you do next in a basic linear-programming problem?

- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

26. State the region for points that satisfy both $x \geq 0$ and $y \geq 0$. Answer with a region name.

26.3. If $P = 3x + 2y$, what is P at (4, 1)?

- A. 10
- B. 12
- C. 14
- D. 16

27. Solve $y = x^2$ and $y = 9$. Answer in the form $x = \dots$

27.3. If $P = 3x + 2y$, what is P at (4, 1)?

- A. 10
- B. 12
- C. 14
- D. 16

28. State the boundary line for $y > -x + 5$. Answer as an equation.

28.3. In linear programming, the feasible region is:

- A. the overlap of all constraints
- B. the objective function only
- C. every point on the x-axis
- D. the point with largest coordinates

26.1. In linear programming, the objective function tells you:

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28.1. What boundary line goes with $y \geq 2x - 3$?

- A. $y = 2x - 3$
- B. $x = 2y - 3$
- C. $y = 2x + 3$
- D. $x = -3$

28.4. Does (1, 4) satisfy $y \leq x + 3$?

- A. yes
- B. no
- C. only if x is negative
- D. not enough information

26.2. A linear-programming maximum usually occurs at:

- A. the center of the feasible region
- B. a vertex of the feasible region
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- A. test the vertices in the objective function
- B. differentiate every boundary
- C. ignore the constraints
- D. average all shaded points

28.2. On an inequality graph, shading represents:

- A. points that satisfy the inequality
- B. the x-intercepts only
- C. points that are undefined
- D. just the boundary line

28.5. A boundary line for $y > 3x - 1$ should be:

- A. solid
- B. dashed
- C. vertical
- D. hidden

29. Write the objective value expression for profit $P = 4x + 3y$. Answer in the form $P = \dots$

29.3. If $P = 3x + 2y$, what is P at $(4, 1)$?

- A. 10
- B. 12
- C. 14
- D. 16

30. Solve $y = x^2$ and $y = x^2$. Answer in the form $y = \dots$

30.3. If $y = x$ and $x^2 + y^2 = 18$, what is the positive x -value of intersection?

- A. 2
- B. 3
- C. 4
- D. 9

31. State the region satisfying $x \geq 0$ and $y \geq 0$. Answer with a region name.

31.3. In linear programming, the feasible region is:

- A. the overlap of all constraints
- B. the objective function only
- C. every point on the x -axis
- D. the point with largest coordinates

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30.1. A solution to a nonlinear system is:

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- B. the slope of the nonlinear graph
- C. always the origin
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30.4. For $y = x^2$ and $y = 4$, what do you solve to find intersections?

- A. $x^2 = 4$
- B. $x + 4 = 0$
- C. $2x = 4$
- D. $x^2 + 4 = 0$

31.1. What boundary line goes with $y \geq 2x - 3$?

- A. $y = 2x - 3$
- B. $x = 2y - 3$
- C. $y = 2x + 3$
- D. $x = -3$

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31.5. A boundary line for $y > 3x - 1$ should be:

- A. solid
- B. dashed
- C. vertical
- D. hidden

32. Which strategy is best for maximizing $P = 3x + 2y$ on a polygonal feasible region?

- A. Average all feasible points.
- B. Check only the y-intercept.
- C. Evaluate P at each vertex.
- D. Use the largest x-value automatically.

32.1. In linear programming, the objective function tells you:

- A. what quantity to maximize or minimize
- B. which line to erase
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- D. the slope of every constraint

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