Graphing Quadratic Inequalities Worksheet

A graphing quadratic inequalities worksheet for Algebra I and II: draw the parabola, decide dashed or solid, then shade the half of the plane that actually works — 20 practice problems and a full answer key.

By Berke Sahbazoglu · 6,000+ hours & 200+ students tutored · 10+ years teaching Algebra I & II · BS Biochemistry (Washington University in St. Louis), MS Bioinformatics (UMGC) · Burke Tutoring in Fremont

Published July 29, 2026 · Last updated July 29, 2026 · Every answer checked for accuracy before publishing · burketutoringinfremont.com

A quadratic inequality is a parabola that got greedy. Instead of one curve, you get a whole region — half the plane, more or less — and your job is to say which half. Three steps, every single time.

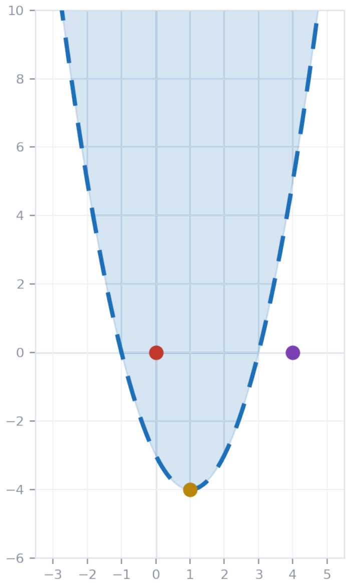
1. DRAW THE BOUNDARY	2. DASHED OR SOLID	3. TEST A POINT
$y = ax^2 + bx + c$	**< > dashed · ≤ ≥ solid**	**try (0, 0)**
Swap the inequality sign for an equals sign. Plot the vertex, then two more points.	The line under the sign means the curve counts. No line, no curve.	True → shade that side. False → shade the other one.

THE THREE MISTAKES THAT COST POINTS

1. Drawing the curve solid on a strict inequality (or dashed on ≤/≥). Look at the sign one more time before you shade.
2. Testing a point that sits on the curve — it won't tell you anything. Move one unit and try again.
3. Shading “up” out of habit on a downward-opening parabola. The sign decides the shading direction, not which way the arch points.

Worked Example

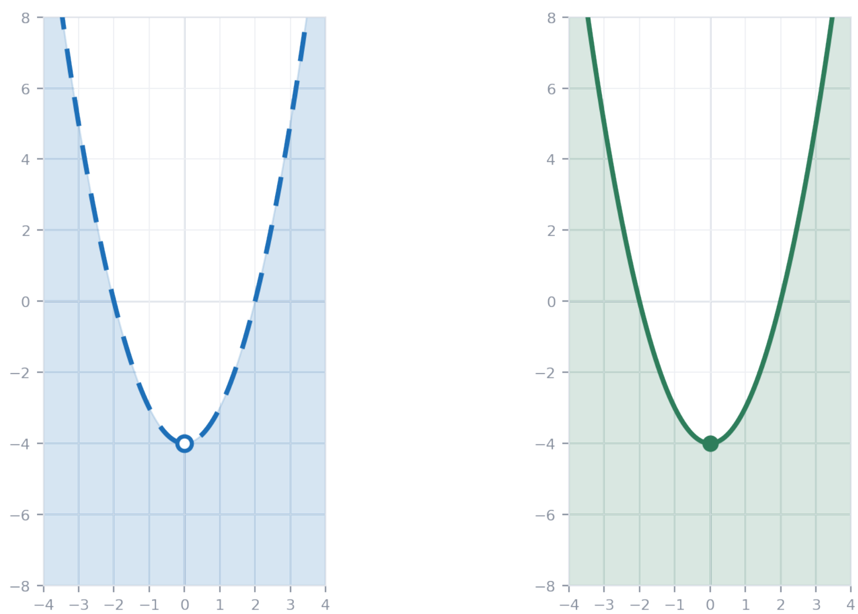
Take **$y > x^2 - 2x - 3$**. It factors to $(x - 3)(x + 1)$, so the curve crosses at –1 and 3, with vertex (1, –4). The sign is a plain >, so the curve is dashed. Test the origin: $0 > -3$ is true, so the origin's side gets the shading.



Color	Piece
Blue dashed / shading	$y = x^2 - 2x - 3$ and its solutions
Gold	vertex (1, –4)
Red	(0, 0): $0 > -3$ ✓
Purple	(4, 0): $0 > 5$ ✗

Dashed or Solid

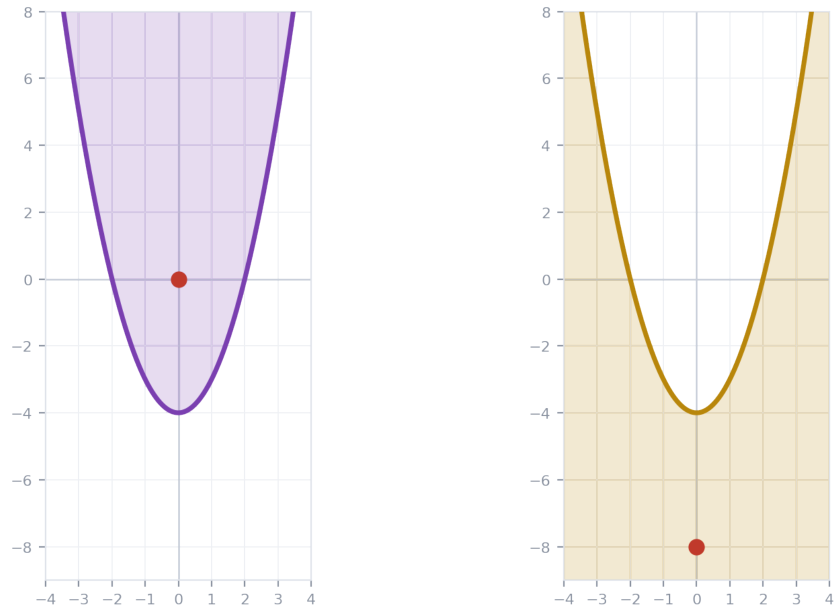
If the sign has a line under it, the boundary is part of the answer — draw it solid. No line, no curve: draw it dashed. That's the whole rule.



Left: $y < x^2 - 4$, dashed, open dot at (0, –4). Right: $y \le x^2 - 4$, solid, filled dot at (0, –4).

Which Side to Shade

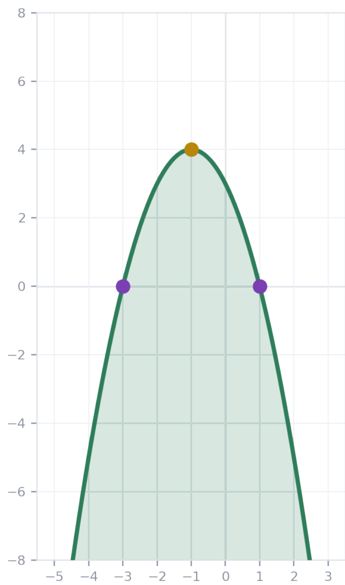
Pick a point off the curve, plug it in. True: shade that side. False: shade the other side. Shortcut — y > shades above, y < shades below, regardless of which way the parabola opens — but test a point on the homework, since the shortcut breaks when y isn't isolated.



Same boundary $y = x^2 - 4$ both times. Left: $y \geq x^2 - 4$, test (0,0) true, shade above. Right: $y \leq x^2 - 4$, test (0,–8) true, shade below.

Going Backwards: Writing the Inequality From a Graph

Same three steps, reversed. Read the vertex, find a, check the line style, then check the shading.



Read	Get
Gold vertex	(–1, 4)
Purple points	(–3, 0) and (1, 0)
Solid curve	≤ or ≥
Shaded below	$y \leq -(x + 1)^2 + 4$

The vertex form is $y = a(x + 1)^2 + 4$. Since the curve passes through (1, 0): $0 = 4a + 4$, so $a = -1$.

Practice Problems: Graphing Quadratic Inequalities

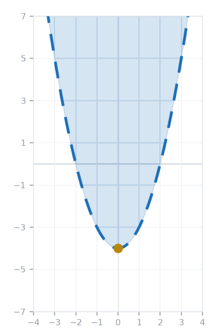
Part A gives you the inequality and wants the graph. Part B gives you the graph and wants the inequality. For Part A, state the vertex, whether the curve is dashed or solid, and which region you shaded — then sketch it.

Part A — graph the inequality

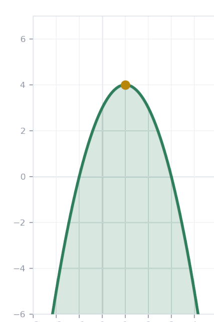
1. $y > x^2 - 4$
2. $y \le x^2 + 2x - 3$
3. $y < -x^2 + 4$
4. $y \ge (x - 2)^2 - 1$
5. $y < x^2 - 6x + 5$
6. $y \ge -(x + 1)^2 + 4$
7. $y > x^2 - 2x$
8. $y \le -x^2 - 4x - 3$
9. $y < (x + 3)^2 - 2$
10. $y \ge 2x^2 - 8x + 6$

Part B — write the inequality, then answer the question

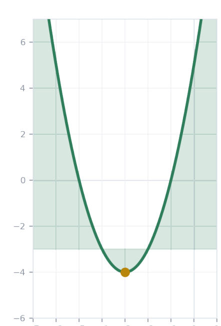
11. Write the inequality shown.



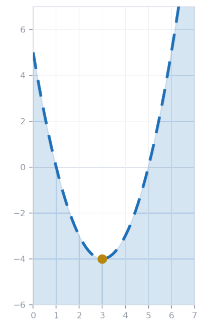
12. Write the inequality shown.



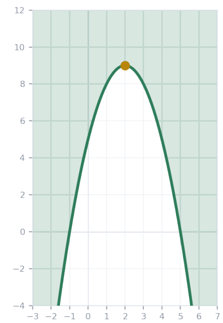
13. Write the inequality shown.



14. Write the inequality shown.



15. Write the inequality shown.



16. Is (1, –2) a solution of $y < x^2 - 3$? Show the check.

17. Is (0, 0) a solution of $y \geq (x - 1)^2 - 3$? Show the check.

18. A graph shows the parabola $y = x^2 - 4$ drawn solid, with the origin inside the shaded region. Write the inequality.

19. A sprinkler sprays an arc shaped like $y = -0.5(x - 4)^2 + 8$, and everything at or below the arc gets watered. Write the inequality, then decide whether a plant at (2, 4) gets wet.

20. Which of $y > x^2$ and $y \geq x^2$ has (2, 4) as a solution? Explain in one line.

Answer Key

Part A

1. $y > x^2 - 4$

Vertex (0, –4), crosses at ±2. Strict >, so dashed. Test (0,0): $0 > -4$ is true.

Dashed · shade the region containing the origin — inside the parabola

2. $y \le x^2 + 2x - 3$

Factors to $(x+3)(x-1)$: crosses at –3 and 1, vertex (–1, –4). Solid. Test (0,0): $0 \le -3$ is false.

Solid · shade below the curve, away from the origin

3. $y < -x^2 + 4$

Opens down from (0,4), crossing at ±2. Dashed. Test (0,0): $0 < 4$ is true.

Dashed · shade everything below the curve, including the origin

4. $y \ge (x - 2)^2 - 1$

Vertex (2, –1), crossing at 1 and 3. Solid. Test (0,0): $0 \ge 3$ is false.

Solid · shade above the curve — the inside of the parabola

5. $y < x^2 - 6x + 5$

$(x-1)(x-5)$: roots 1 and 5, vertex (3, –4). Dashed. Test (0,0): $0 < 5$ is true.

Dashed · shade below the curve, including the origin

6. $y \ge -(x + 1)^2 + 4$

Opens down from (–1,4), crossing –3 and 1. Solid. Test (0,0): $0 \ge 3$ is false.

Solid · shade above the curve, away from the origin

7. $y > x^2 - 2x$ — the one with the trap

The origin is ON this curve, so it can't be the test point. Vertex (1,–1), roots 0 and 2. Try (1,0) instead: $0 > -1$ is true.

Dashed · shade inside the parabola, the side containing (1, 0)

8. $y \le -x^2 - 4x - 3$

Factor out –1: $-(x+1)(x+3)$, roots –3 and –1, vertex (–2,1). Solid. Test (0,0): $0 \le -3$ is false.

Solid · shade below the curve, away from the origin

9. $y < (x + 3)^2 - 2$

Vertex (–3,–2); roots are irrational, so plot vertex plus a point each side. Dashed. Test (0,0): $0 < 7$ is true.

Dashed · shade below the curve, including the origin

10. $y \ge 2x^2 - 8x + 6$

$2(x-1)(x-3)$: roots 1 and 3, vertex (2,–2). Solid. Test (0,0): $0 \ge 6$ is false.

Solid · shade above the curve — inside the narrow parabola

Part B

11. Dashed curve, vertex (0, –4), shaded above

Vertex (0,–4), roots ±2, so $a = 1$: boundary $y = x^2 - 4$. Dashed, shading above.

$y > x^2 - 4$

12. Solid downward curve, vertex (1, 4), shaded below

Opens down from (1,4) through (3,0): $0 = 4a + 4$, $a = -1$. Solid, shading below.

$y \le -(x - 1)^2 + 4$, or $y \le -x^2 + 2x + 3$

13. Solid curve, vertex (–3, –4), shaded below

Vertex (–3,–4), roots –5 and –1, $a = 1$. Solid, shading below.

$y \le (x + 3)^2 - 4$, or $y \le x^2 + 6x + 5$

14. Dashed curve, vertex (3, –4), shaded below

Vertex (3,–4), roots 1 and 5: boundary $y = x^2 - 6x + 5$. Dashed, shading below.

$y < x^2 - 6x + 5$

15. Solid downward curve, vertex (2, 9), shaded above

Opens down from (2,9) through (5,0): $0 = 9a + 9$, $a = -1$. Solid, shading above — the region sitting on top of the arch, not the space underneath it.

$y \ge -(x - 2)^2 + 9$, or $y \ge -x^2 + 4x + 5$

16. Is (1, –2) a solution of $y < x^2 - 3$?

At $x = 1$ the boundary sits at $1 - 3 = -2$, and $-2 < -2$ is false. The point is on the curve.

No — it sits exactly on the boundary

17. Is (0, 0) a solution of $y \ge (x - 1)^2 - 3$?

$(0 - 1)^2 - 3 = -2$, and $0 \ge -2$ is true.

Yes

18. Solid $y = x^2 - 4$, origin shaded

Solid means ≤ or ≥. Test the origin: $0 \ge -4$ is true; $0 \le -4$ is not.

$y \ge x^2 - 4$

19. Sprinkler arc — the word problem

At or below means ≤, solid boundary. For the plant: $-0.5(2-4)^2 + 8 = -2 + 8 = 6$, and $4 \le 6$.

$y \le -0.5(x - 4)^2 + 8$ · the plant gets wet

20. $y > x^2$ against $y \ge x^2$, at (2, 4)

$x^2 = 4$ at $x = 2$, so the point is on the parabola. $4 > 4$ is false; $4 \ge 4$ is true.

Only $y \ge x^2$ — the solid boundary is the one that includes its own curve

---

Every answer above was checked for accuracy before publishing, most recently on July 29, 2026. If you spot an error, email burketutoringinfremont@outlook.com or text (510) 453-0350 and it will be corrected.