Plot Linear Inequality Regions: Boundary Lines and Test-Point Checks

Original tasks 1, 2, 3 / complete keys

Task 1

Graph $y \geq -x + 2$. State the boundary line style, choose a test point, and describe the shaded region.

Answer: Boundary line $y = -x + 2$ is solid because the inequality is $\geq$. Test point (0,0): $0 \geq -0 + 2$ gives $0 \geq 2$, false. Shade the side not containing (0,0), which is above the solid line.

Reason: The symbol $\geq$ means points on the line are included, so the line is solid. The test point (0,0) is not on the line. Substituting gives a false statement, so shade the opposite side from (0,0).

Check: Check (0,3): $3 \geq -0 + 2$ is $3 \geq 2$ true, so it should be inside. Check (0,0): $0 \geq 2$ false, so it should be outside. Confirm shading matches.

Task 2

Graph $2x + y < 4$. Find the boundary line by intercepts, state the line style, and use a test point to decide shading.

Answer: Boundary line $2x + y = 4$ passes through (2,0) and (0,4). Draw a dashed line because the inequality is $<$. Test point (0,0): $2(0) + 0 < 4$ gives $0 < 4$, true. Shade the side containing (0,0), which is below the dashed line.

Reason: The strict inequality $<$ requires a dashed boundary. The intercepts give two easy points. The origin is not on the line, and substitution is true, so shade toward the origin.

Check: Check (0,0) inside: $0 < 4$ true. Check (3,0) outside: $6 + 0 < 4$ is $6 < 4$ false. Confirm the shaded side contains (0,0) and not (3,0).

Task 3

Graph $y > 3$. State the boundary line, line style, test point, and shaded region.

Answer: Boundary line $y = 3$ is a horizontal line. Draw it dashed because the inequality is $>$. Test point (0,0): $0 > 3$ is false. Shade the side not containing (0,0), which is above the dashed line.

Reason: The inequality $y > 3$ includes all points with y-coordinate greater than 3. The line $y = 3$ is not included, so it is dashed. The origin has $y = 0$, which is not greater than 3, so shade above.

Check: Check (0,4): $4 > 3$ true, so inside. Check (0,2): $2 > 3$ false, so outside. Confirm shading is above the dashed line.

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Original tasks 4 / complete keys

Task 4

Graph $x \leq -1$. State the boundary line, line style, test point, and shaded region.

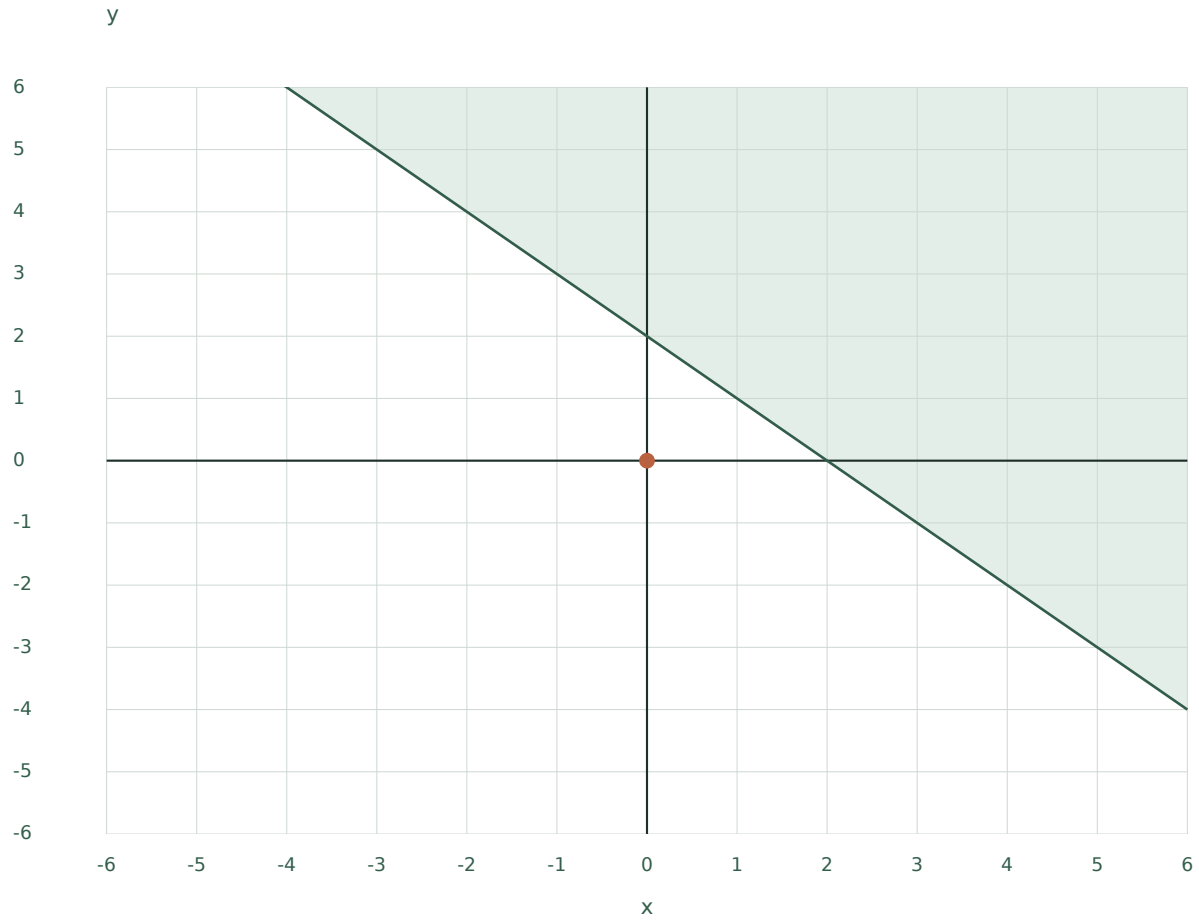
Answer: Boundary line $x = -1$ is a vertical line. Draw it solid because the inequality is $\leq$. Test point (0,0): $0 \leq -1$ is false. Shade the side not containing (0,0), which is to the left of the solid line.

Reason: The inequality $x \leq -1$ includes all points with x-coordinate less than or equal to -1. The line $x = -1$ is included, so it is solid. The origin has $x = 0$, which is not ≤ -1, so shade left.

Check: Check (-2,0): $-2 \leq -1$ true, so inside. Check (0,0): $0 \leq -1$ false, so outside. Confirm shading is to the left of the solid line.

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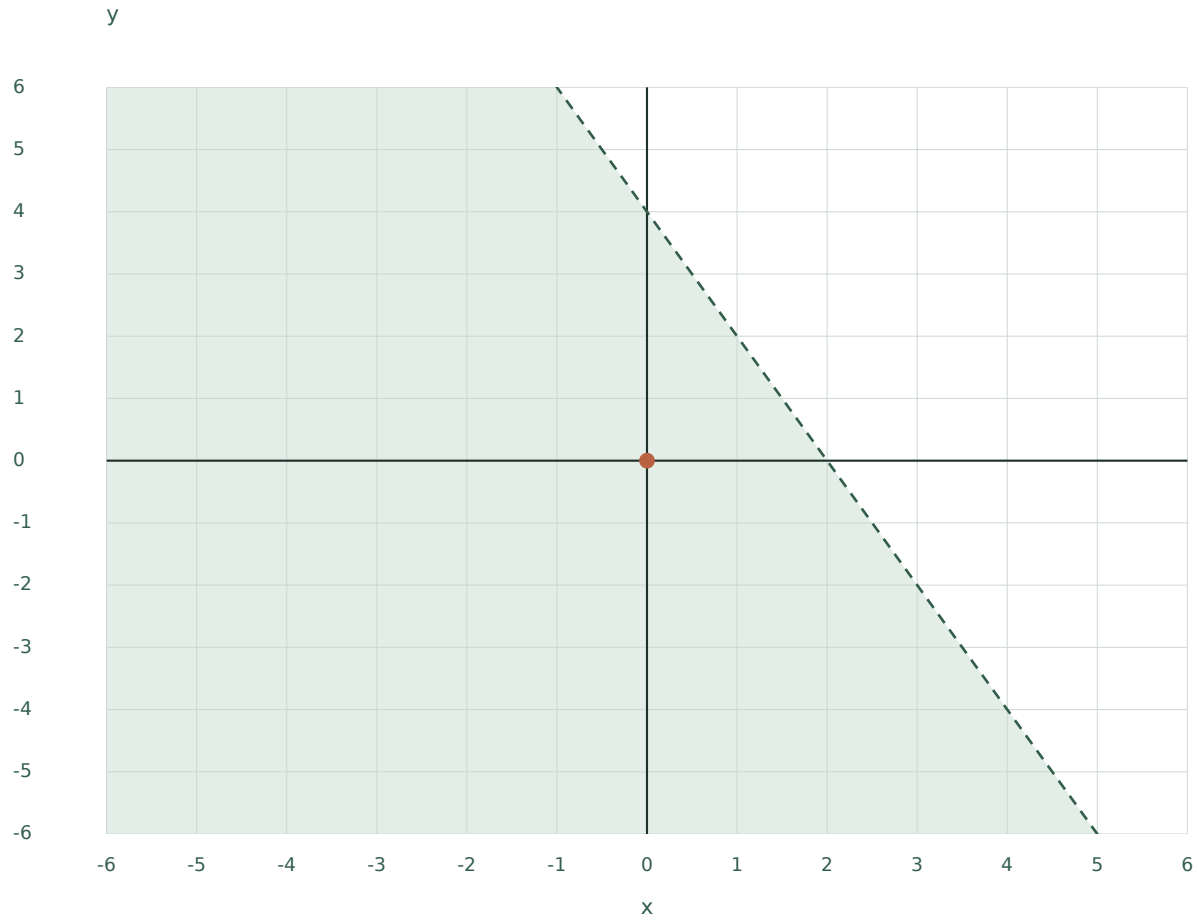
Task 1 / graph key



Red dot marks the chosen test point (0,0), not an assertion that it belongs to the solution. Boundary style and shaded side follow the comparison.

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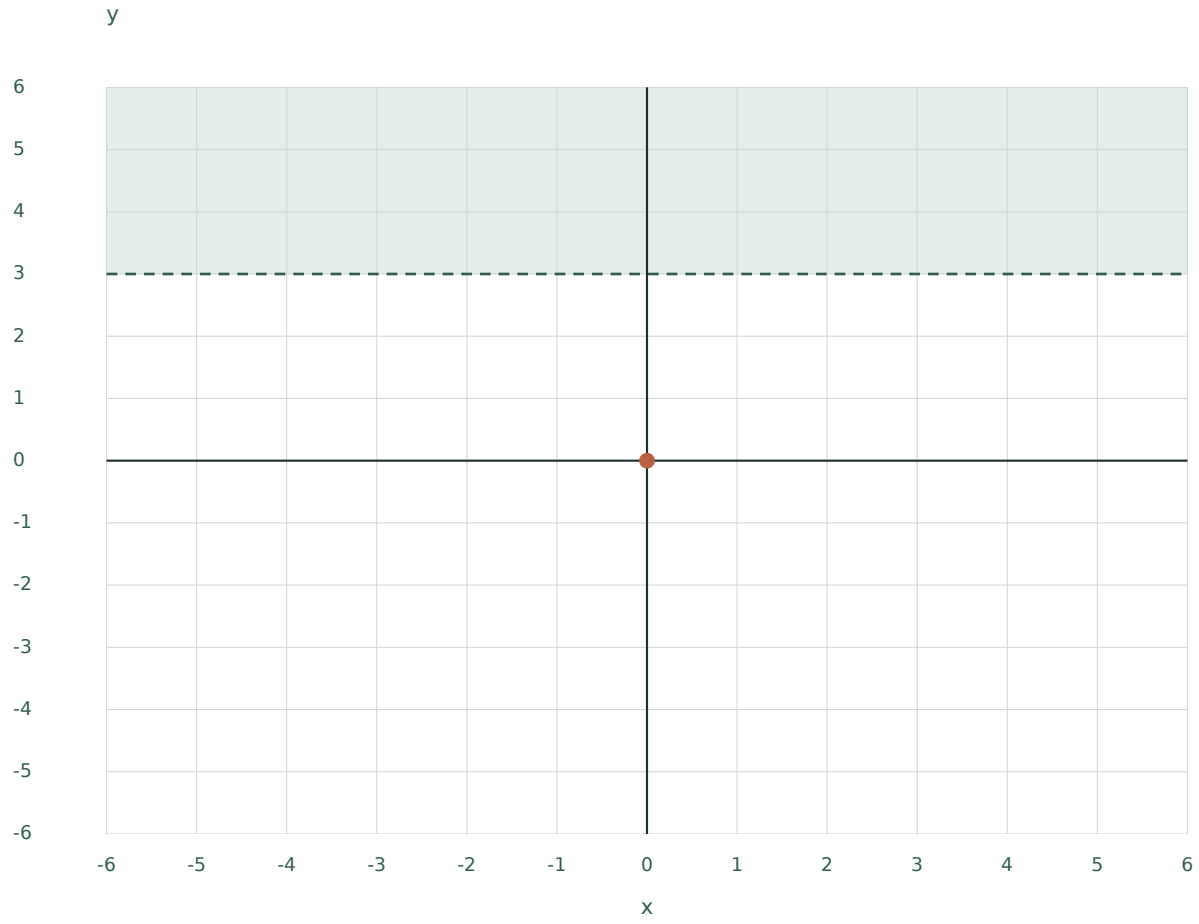
Task 2 / graph key



Red dot marks the chosen test point (0,0), not an assertion that it belongs to the solution. Boundary style and shaded side follow the comparison.

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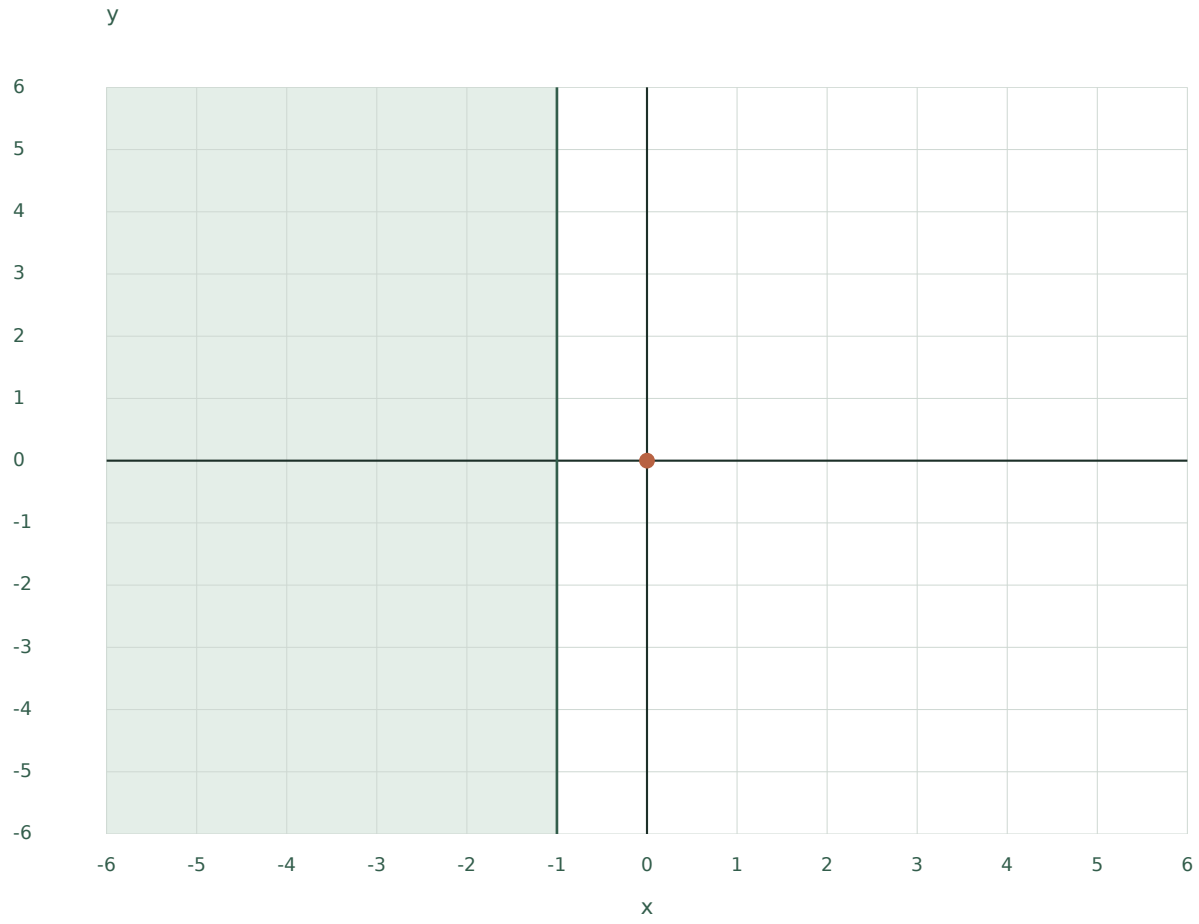
Task 3 / graph key



Red dot marks the chosen test point (0,0), not an assertion that it belongs to the solution. Boundary style and shaded side follow the comparison.

Plot Linear Inequality Regions: Boundary Lines and Test-Point Checks

Task 4 / graph key



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Source rubric / reflection

- [ ] Boundary line is correctly identified from the inequality.
- [ ] Line style matches the inequality symbol: dashed for < or >, solid for ≤ or ≥.
- [ ] A test point not on the boundary line is clearly stated.
- [ ] Substitution into the original inequality is shown and evaluated correctly.
- [ ] Shaded region matches the true/false result of the test point.
- [ ] A check point inside the shaded region makes the inequality true.
- [ ] A check point outside the shaded region makes the inequality false.
- [ ] Graph is labeled with the inequality and axes are clear.

Reflection: What did you check, what did you change, and what will you try next?