Graphing Linear Inequalities Foldable: Boundary Lines and Test-Point Shading

Original tasks 1, 2, 3 / complete keys

Task 1

Graph $y \geq 3x - 2$. Identify the boundary line style, a test point, and the shaded half-plane.

Answer: Solid boundary through (0,-2) and (1,1). Test (0,0): $0 \geq -2$ is true, so shade the half-plane containing the origin, above the line.

Reason: The symbol $\geq$ includes the boundary, so the line is solid. The test point (0,0) is not on the line and makes the inequality true, so the origin side is shaded.

Check: Substitute (0,0) into $y \geq 3x - 2$: $0 \geq -2$ is true. Substitute a point on the other side, such as (0,-3): $-3 \geq -2$ is false. The shading matches.

Task 2

Graph $y < -x + 1$. Identify the boundary line style, a test point, and the shaded half-plane.

Answer: Dashed boundary through (0,1) and (1,0). Test (0,0): $0 < 1$ is true, so shade the half-plane containing the origin, below the line.

Reason: The symbol $<$ excludes the boundary, so the line is dashed. The origin is not on the line and satisfies the inequality, so the origin side is shaded.

Check: Substitute (0,0): $0 < 1$ is true. Substitute (0,2): $2 < 1$ is false. The shaded side contains (0,0) and not (0,2).

Task 3

Graph $2x + y \leq 4$. Identify the boundary line style, a test point, and the shaded half-plane.

Answer: Solid boundary through (0,4) and (2,0). Test (0,0): $0 \leq 4$ is true, so shade the half-plane containing the origin, below the line.

Reason: The symbol $\leq$ includes the boundary, so the line is solid. Rewriting as $y \leq -2x + 4$ confirms the slope is -2. The origin satisfies the inequality, so the origin side is shaded.

Check: Substitute (0,0): $0 \leq 4$ is true. Substitute (3,0): $6 \leq 4$ is false. The shading matches the test results.

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Original tasks 4 / complete keys

Task 4

Graph y > 0.5x + 2. Identify the boundary line style, a test point, and the shaded half-plane.

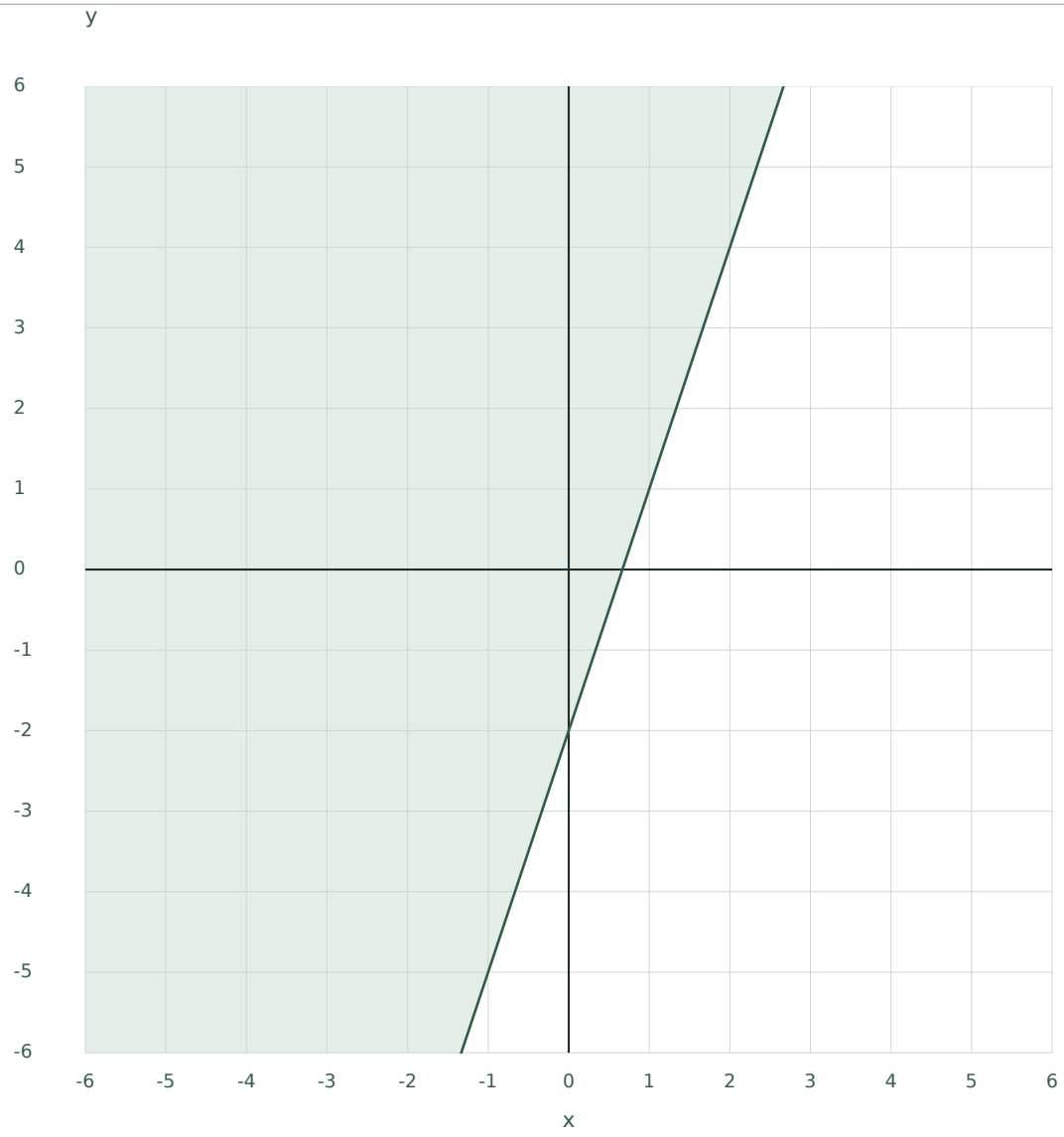
Answer: Dashed boundary through (0,2) and (2,3). Test (0,0): 0 > 2 is false, so shade the half-plane not containing the origin, above the line.

Reason: The symbol > excludes the boundary, so the line is dashed. The origin makes the inequality false, so the opposite side is shaded.

Check: Substitute (0,0): 0 > 2 is false. Substitute (0,3): 3 > 2 is true. The shaded side contains (0,3) and not (0,0).

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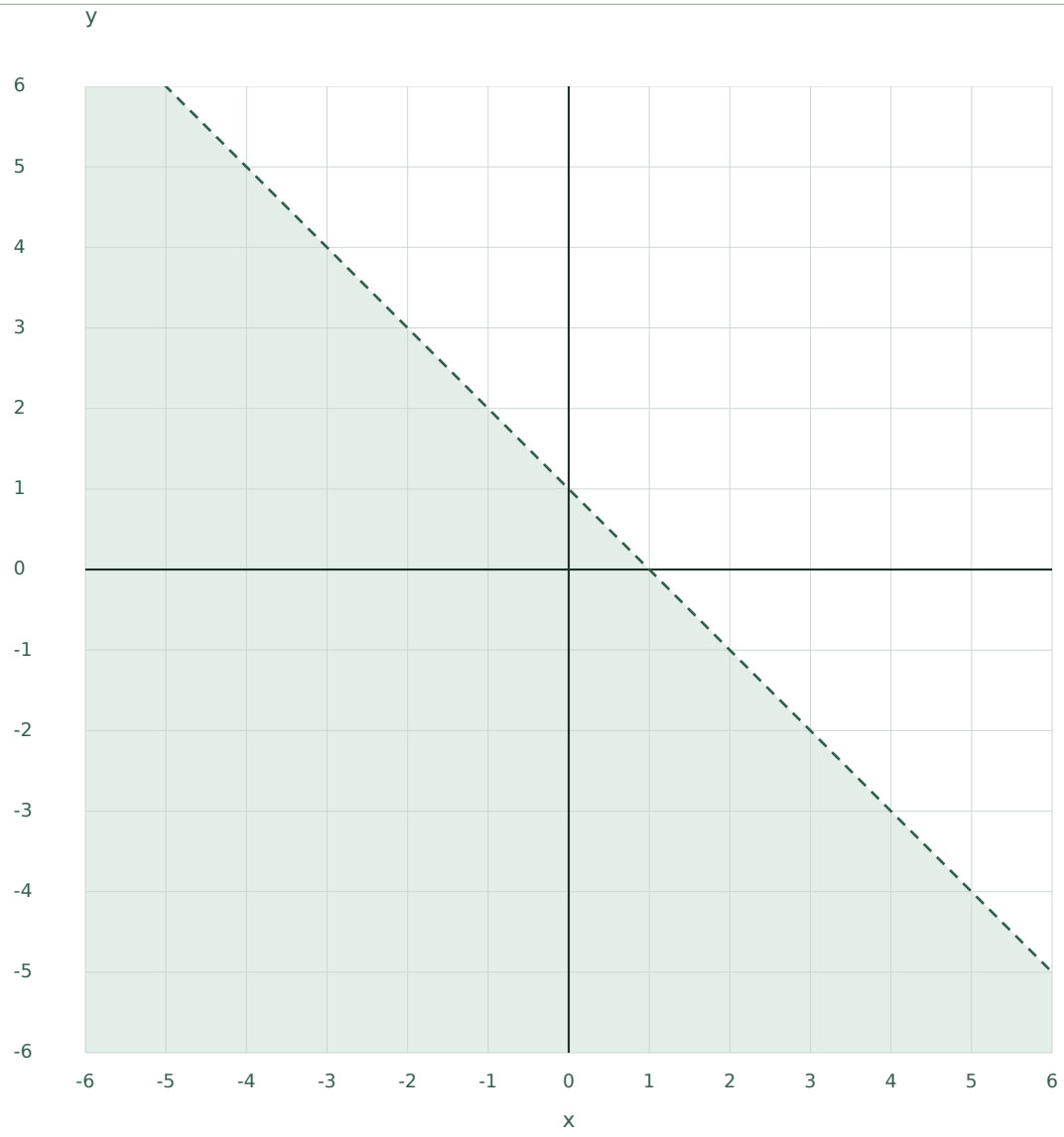
Task 1 / complete graph key



Shading shows the solution half-plane; boundary style follows the original comparison.

Graphing Linear Inequalities Foldable: Boundary Lines and Test-Point Shading

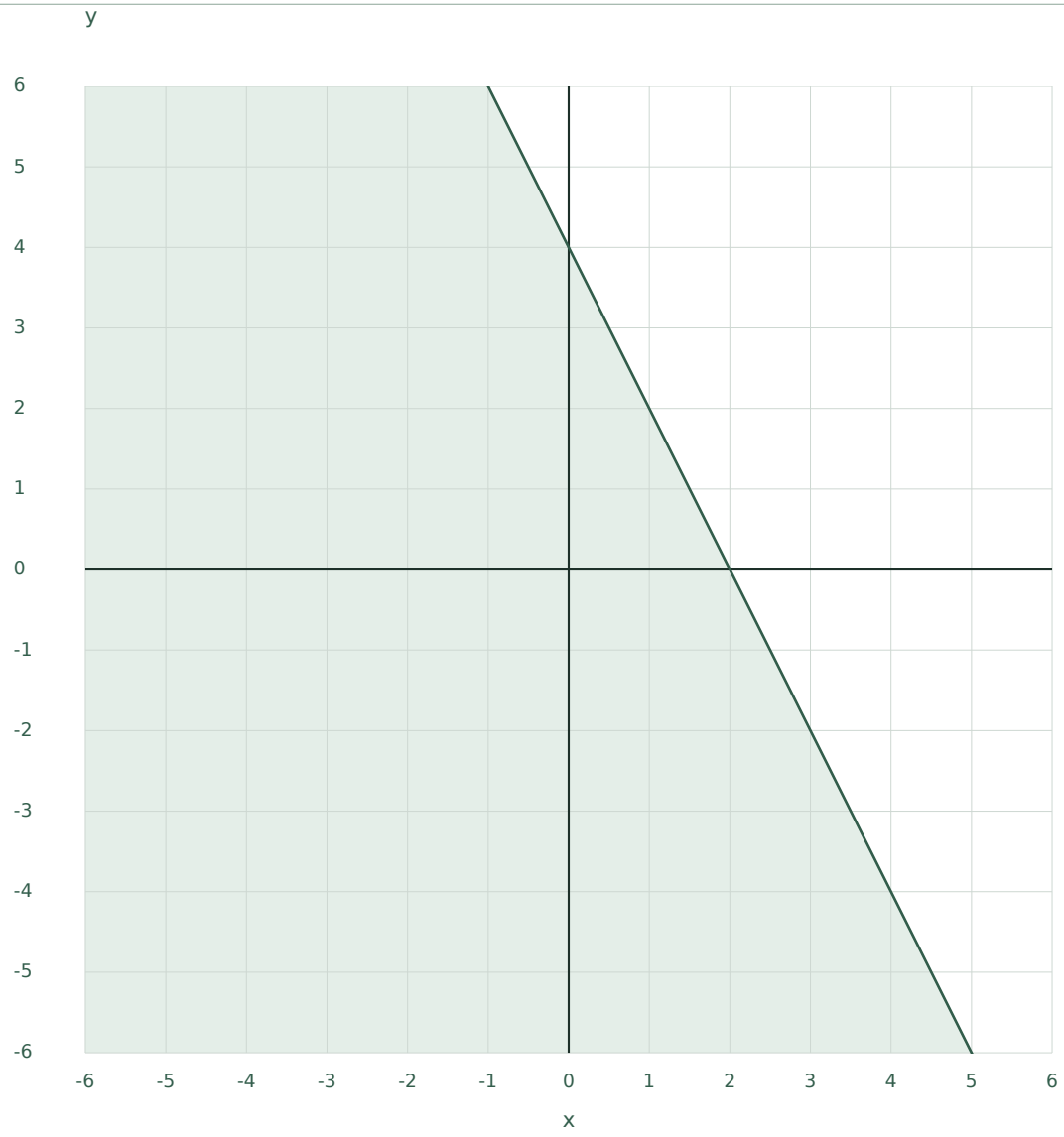
Task 2 / complete graph key



Shading shows the solution half-plane; boundary style follows the original comparison.

Graphing Linear Inequalities Foldable: Boundary Lines and Test-Point Shading

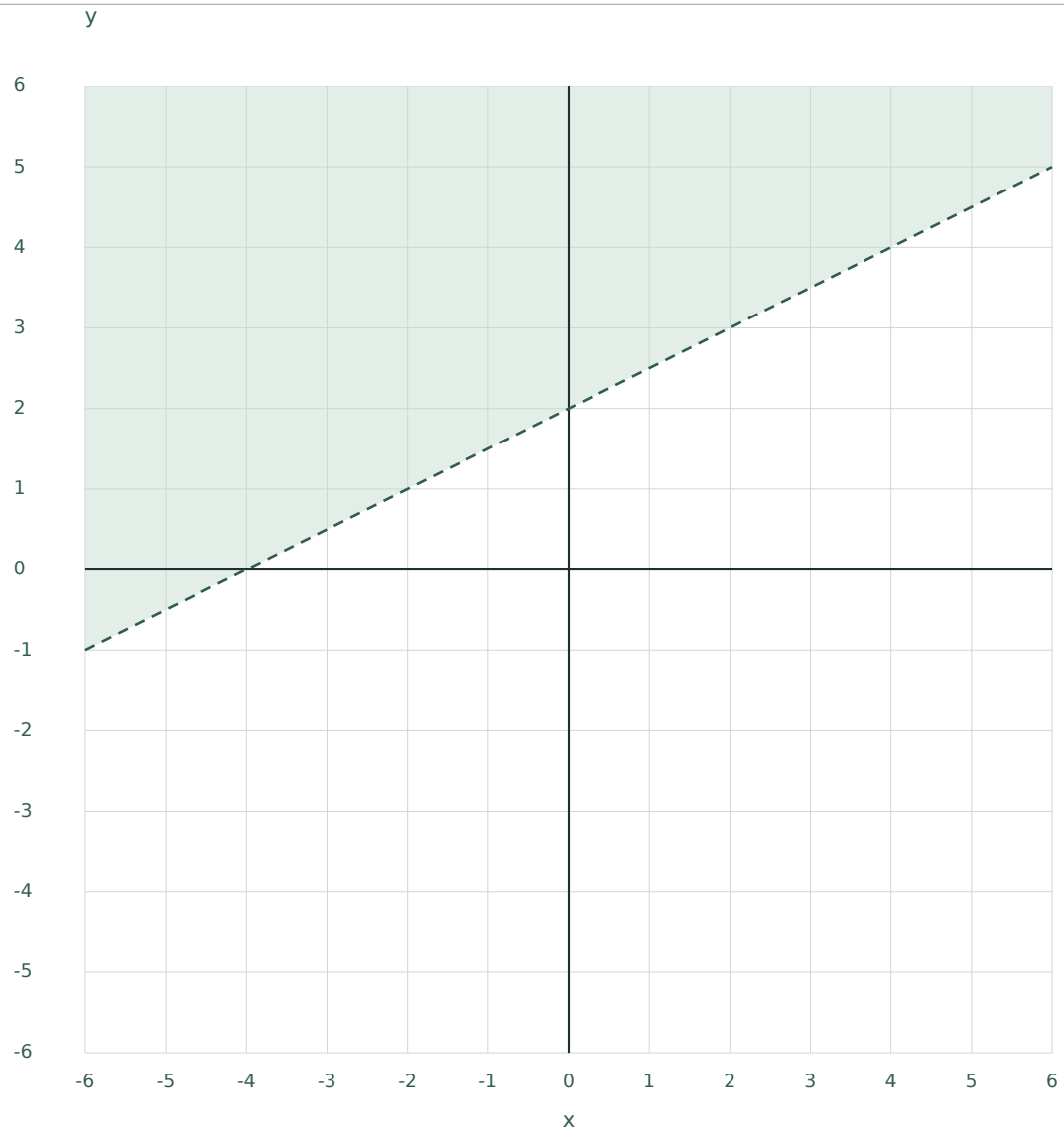
Task 3 / complete graph key



Shading shows the solution half-plane; boundary style follows the original comparison.

Graphing Linear Inequalities Foldable: Boundary Lines and Test-Point Shading

Task 4 / complete graph key



Shading shows the solution half-plane; boundary style follows the original comparison.

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Source rubric / reflection

- [ ] Boundary line is drawn through the correct intercepts with the correct slope.
- [ ] Line style matches the symbol: dashed for $<$ or $>$, solid for $\leq$ or $\geq$.
- [ ] A test point not on the boundary is clearly stated.
- [ ] Substitution into the original inequality is shown and evaluated correctly.
- [ ] Shading is on the half-plane indicated by the test result.
- [ ] Boundary line remains visible after shading.
- [ ] Valid alternative conventions are accepted: any correct test point, any correct pair of intercepts, and reasonable handwriting or line thickness.

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