Systems of Linear Inequalities

Algebra 1 •Section 6.5

Name: _____	Date: _____	Score: _____ / 12

Quick Review and Helpful Hints

A system asks for values that satisfy every relationship at the same time. The solution may be one point, no point, or infinitely many points, depending on how the graphs or equations meet.

▷ **Example:** Solve $y = x + 4$ and $y = 10$.
Work: Substitute 10 for y: $10 = x + 4$, so $x = 6$. The solution is the point where both equations agree.

★ **Answer:** $(6, 10)$

Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Does $(0, 0)$ satisfy $y > x + 2$?

2. Does $(3, 5)$ satisfy $y \leq 2x$?

3. Boundary for $y < -x + 4$: solid or dashed?

4. Boundary for $y \geq 3x - 1$: solid or dashed?

5. Which side is shaded for $y \leq x - 5$?

6. Does $(2, 1)$ satisfy both $y < x + 1$ and $y \geq -x + 2$?

7. Does $(4, 0)$ satisfy $x + y \leq 3$?

8. Graphically, what is the solution to a system of linear inequalities?

9. Test $(0, 0)$ in $2x + y \leq 6$.

10. Test $(5, 2)$ in $x - 2y > 0$.

Word Problems

11. A club can spend at most $\$100$ on shirts s and hats h: shirts cost $\$8$, hats $\$5$. Write the inequality.

12. A theater needs at least 60 total seats from rows r and balcony seats b. Write the inequality.

Answer Keys

1. No
2. Yes
3. Dashed
4. Solid
5. Below the line
6. Yes
7. No
8. The overlapping shaded region
9. True
10. True
11. $8s + 5h \leq 100$
12. $r + b \geq 60$

Step-by-Step Explanations

1. Drop the point in: it claims $0 > 2$, which just isn't true — so the origin sits outside.
2. Plug it in and you get $5 \leq 6$ — true, so this point belongs to the solution.
3. A strict $<$ leaves the line itself out, so draw it dashed to show those points don't count.
4. The little line under $\geq$ means equal is allowed, so the boundary is part of the answer — draw it solid.
5. You want y no bigger than the line, and smaller y-values live underneath — so shade down there.
6. Test it in each: $1 < 3$ checks out and $1 \geq 0$ does too, so the point clears both rules.
7. Adding gives $4 + 0 = 4$, but 4 is bigger than 3 — so this point misses the region.
8. Each inequality shades its own zone; the answer is where those shadings stack up together.
9. The origin makes the left side 0, and $0 \leq 6$ holds easily — so it's a winner.
10. Work it out: $5 - 2(2) = 1$, and $1 > 0$ is true — the point satisfies the inequality.
11. Each item costs price times count, and ät most $\$100$čaps the total — so the sum stays ≤ 100.
12. Ät leastšets a floor, not a ceiling: the seats together have to reach 60 or climb past it.

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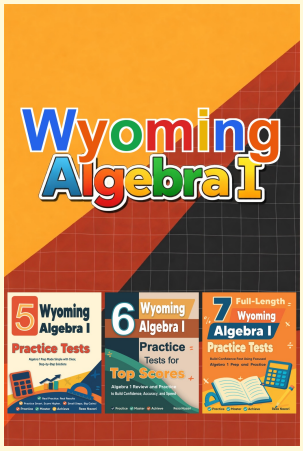

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