

Algebra 1 • Unit 4 Worksheet

Linear Inequalities and Systems

Name: _____

Date: _____

Part A • One-Variable Inequalities

1. Solve and graph each inequality on a number line.

a. $3x - 7 \geq 11$

b. $-2x + 5 < 13$

c. In (b), what step required FLIPPING the inequality sign? Why?

2. Mia is saving for a \$400 phone. She has \$80 saved and earns \$25 per week from chores.

a. Write an inequality for the number of weeks w until she has AT LEAST \$400.

b. Solve it. How many full weeks must she save? _____ weeks

c. Why is the answer a whole number even though w from algebra is real-valued?

Part B • Reasoning About Inequality Solutions

3. Decide whether each value satisfies the inequality $2x - 5 \leq 7$. Show your check.

a. $x = 0$: Yes No Check:

b. $x = 6$: Yes No Check:

c. $x = 7$: Yes No Check:

d. Describe the SET of all x that satisfy the inequality, in words and using inequality notation.

4. Diego claims that the inequality $-3x > 9$ has the solution $x > -3$.

a. Test his claim by trying $x = 0$ (does 0 satisfy $-3x > 9$?). What does this tell you?

b. Find Diego's error. State the correct solution.

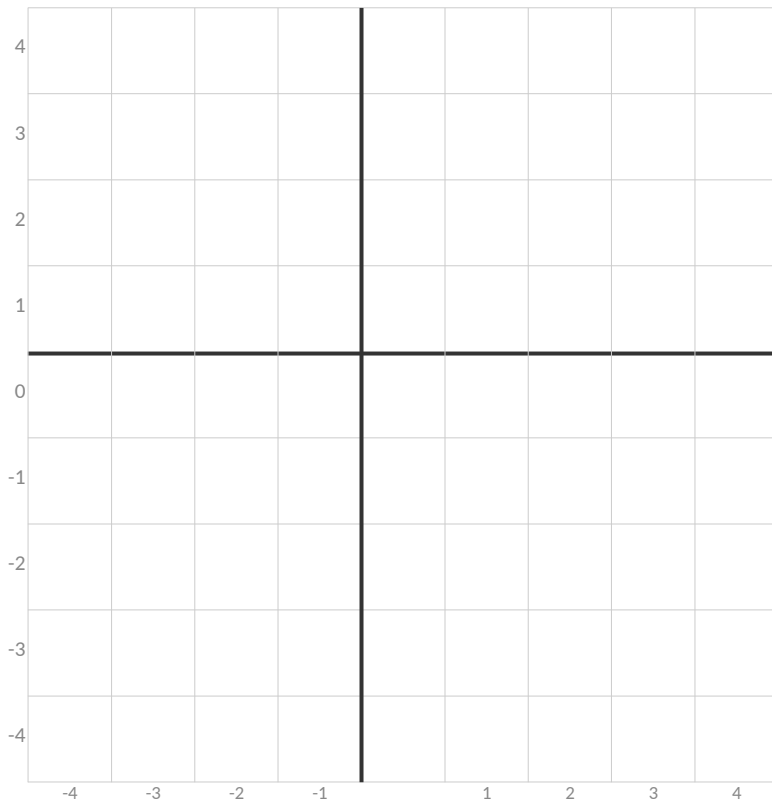
Part C • Two-Variable Inequalities

5. Consider the inequality $y > 2x - 1$.

a. Should the boundary line be SOLID or DASHED? Why?

b. Is the point $(0, 0)$ in the solution set? Test it.

c. Sketch the solution region on the grid below.



6. Write a two-variable inequality whose solution region is the shaded area BELOW the line $y = (1/2)x + 3$ (line included).

Inequality: _____

Part D • Modeling with Inequalities

7. A school is hosting a fundraiser. Adult tickets cost \$10, student tickets cost \$4. They want to raise AT LEAST \$1200.

a. Write an inequality in terms of a (adult tickets) and s (student tickets) that captures the goal.

b. List THREE realistic ticket combinations that meet the goal.

c. Could (50, 200) work? Yes No Show your check.

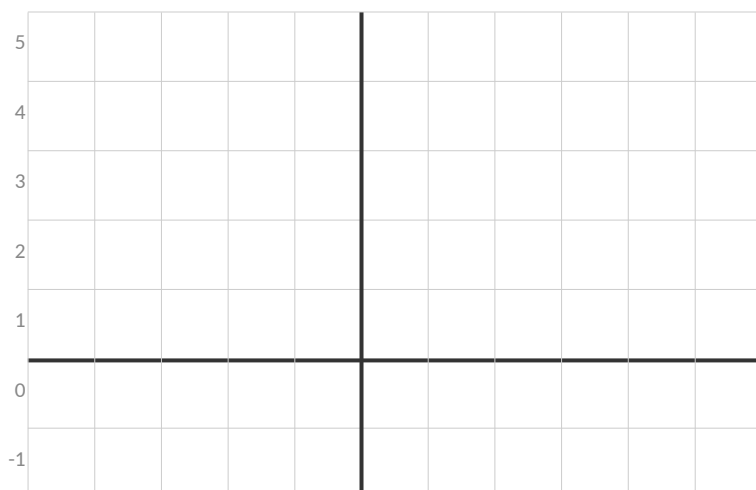
d. Are there any IMPLICIT constraints (besides the inequality you wrote) that real ticket numbers must satisfy?

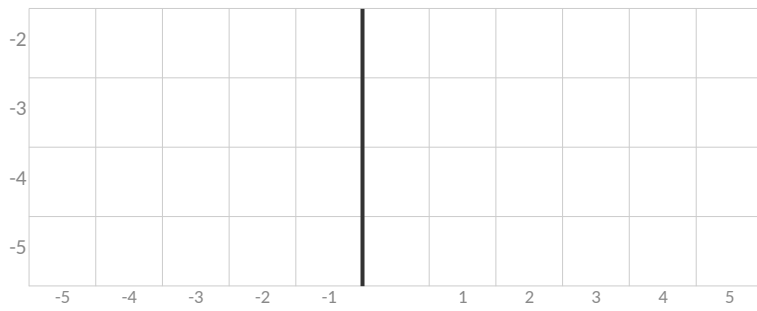
Part E • Systems of Inequalities

8. Graph the system on the grid: $y \leq x + 2$ AND $y > -x + 1$.

a. Identify two points that ARE solutions and two that are NOT.

b. Why is the OVERLAPPING region the solution? What does it represent?





9. A bakery needs to make at least 60 baked goods in a day. Bread takes 30 minutes per loaf, muffins take 10 minutes per batch. They have AT MOST 600 minutes of oven time.

a. Let b = loaves of bread, m = batches of muffins. Write a system of inequalities (including non-negativity).

b. Could they make 10 loaves of bread and 50 batches of muffins? Check ALL inequalities.

c. Could they make 40 loaves and 30 batches? Why or why not?

Part F • Error Analysis and Synthesis

10. Priya solved $-4(x - 1) > 12$ like this:

a. Test $x = 0$ in the ORIGINAL inequality. Does it satisfy $-4(x-1) > 12$?

b. Identify Priya's error and give the correct solution.

$$-4x + 4 > 12 \rightarrow -4x > 8 \rightarrow x > -2$$

11. Synthesize: For a system of TWO inequalities in two variables, describe what each of these would LOOK like on a graph.

a. An empty solution set (no overlap):

b. A solution set that's a single point:

c. A solution set that's an unbounded region:

d. A solution set that's a bounded triangle (you'd need at least how many inequalities?):
