LESSON MAKER PRO

Inequality Pathways

Solve, graph, and interpret linear inequality solutions.

GRADE 8 · 8.PFA.5

8.PFA.5 "The student will write and solve multistep linear inequalities in one variable, including problems in context that require the solution of a multistep linear inequality in one variable..."

NAME _____ DATE _____

SOLVE AND SHOW

Use properties of equality to simplify both sides of an inequality. Expand parentheses, combine like terms, and isolate x. If you multiply or divide by a negative number, reverse the inequality sign, then show the solution with an open or closed point and a ray on a number line.

WORKED EXAMPLE

Solve 3(x - 4) + 5 <= 2x + 9. Then graph the solution on the printed number line.

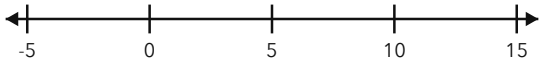


1. Expand: 3x - 12 + 5 <= 2x + 9
2. Combine like terms: 3x - 7 <= 2x + 9
3. Subtract 2x: x - 7 <= 9
4. Add 7: x <= 16

Answer: x <= 16. Plot a closed point at 16 and shade to the left.

PRACTICE 6 problems

1 Solve 5x - 8 > 17. Graph the solution on the printed number line.



ANSWER _____

2 Solve -7(x + 8) >= 6x - 39.

ANSWER _____

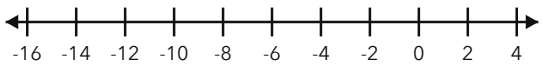
3 Solve (2/3)x + 11 < (1/6)x + 15.

ANSWER _____

4 Solve 6(2x - 1) - 4 < 5(x + 2) + 7.

ANSWER _____

5 Solve -6(x + 7) + 8 <= 4x + 26. Graph the solution on the printed number line.



ANSWER _____

6 Which values from -4, 2, and 6 are in the solution set of 5x + 7 <= 2x + 22? List the values and show one substitution that checks one selected value.

ANSWER _____

APPLY IT Show your work

1 A gaming club has $18 in its fund. It earns $4 for each game night it hosts, then spends $6 on posters. The club wants to have no more than $40 after these changes. Write and solve an inequality for x, the number of game nights. Interpret the solution.

WORK SPACE

ANSWER _____

2 Two phone plans use x for the number of gigabytes of data. Plan A is modeled by 4(x + 3) + 12 dollars. Plan B is modeled by 6x + 2 dollars. Write and solve an inequality to find when Plan A costs no more than Plan B. Interpret the solution.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Solve (3/4)(8x - 12) - 5 > 2(x + 9) + 7. State the endpoint and direction for its number-line graph. Then explain why 10 is in the solution set but 9 is not.

WORK SPACE AND ANSWER

ANSWER KEY

Inequality Pathways

GRADE 8 · 8.PFA.5

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve 5x - 8 > 17. Graph the solution on the printed number line.	**x > 5. Plot an open point at 5 and shade to the right.**
2	Solve -7(x + 8) >= 6x - 39.	**x <= -17/13**
3	Solve (2/3)x + 11 < (1/6)x + 15.	**x < 8**
4	Solve 6(2x - 1) - 4 < 5(x + 2) + 7.	**x < 27/7**
5	Solve -6(x + 7) + 8 <= 4x + 26. Graph the solution on the printed number line.	**x >= -6. Plot a closed point at -6 and shade to the right.**
6	Which values from -4, 2, and 6 are in the solution set of 5x + 7 <= 2x + 22? List the values and show one substitution that checks one selected value.	**-4 and 2. For example, x = 2 gives 5(2) + 7 <= 2(2) + 22, so 17 <= 26.**

PART 2 · APPLY IT

1. **18 + 4x - 6 <= 40; x <= 7. The club can host at most 7 game nights.** Combine the starting money and poster cost to get 4x + 12 <= 40. Solve for x, then use whole-number game nights.
2. **4(x + 3) + 12 <= 6x + 2; x >= 11. Plan A costs no more than Plan B for 11 or more gigabytes.** Expand Plan A to get 4x + 24 <= 6x + 2. Subtract 4x and 2, then divide by 2.

CHALLENGE

x > 39/4. Use an open point at 39/4 and shade to the right. Since 10 > 39/4, 10 is a solution. Since 9 < 39/4, 9 is not a solution.

Accept equivalent inequality forms and correctly graphed rays with the required open or closed endpoint. For contextual answers, accept x <= 7 only when the student also recognizes that game nights must be whole numbers.