LESSON MAKER PRO

Inequality Direction Detectives

Solve, graph, and explain one-variable inequalities.

GRADE 7 · 7.PFA.4

7.PFA.4 "The student will write and solve one- and two-step linear inequalities in one variable, including problems in context, that require the solution of a one- and two-step linear inequality in one variable..."

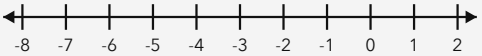
NAME _____ DATE _____

KEEP OR REVERSE?

Solve an inequality like an equation by using inverse operations on both sides. When you multiply or divide both sides by a negative number, reverse the inequality sign. On a number line, use an open circle for < or > and a closed circle for ≤ or ≥.

WORKED EXAMPLE

Solve -3x > 12. Then graph the solution on the number line.



1. Divide both sides by -3.
2. Because you divided by a negative number, reverse > to <.
3. x < -4.
4. Place an open circle at -4 and shade to the left.

Answer: x < -4; open circle at -4, shaded left

PRACTICE 6 problems

1 Solve: x + 5 ≤ 11

ANSWER _____

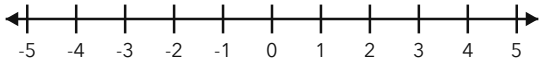
2 Solve: 2x - 7 > 9

ANSWER _____

3 Solve: -2x + 10 > 0

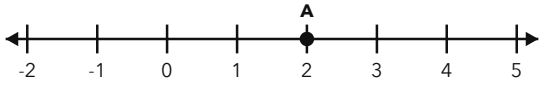
ANSWER _____

4 Graph x ≥ -1 on the number line.



ANSWER _____

5 Point A is shown on the number line. Is A a solution to 2x + 3/2 < 13/2? Show or describe how you know.



ANSWER _____

6 Solve both statements: 7x + 6 = 27 and 7x + 6 < 27. State how their solution sets differ.

ANSWER _____

APPLY IT Show your work

1 A game design club has collected $15. It earns $6 for each sticker pack it sells and needs at least $45 for supplies. Write and solve an inequality for x, the number of sticker packs sold.

WORK SPACE

ANSWER _____

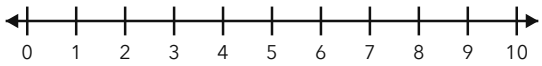
2 At an arcade, entry costs $11 and each game costs $3.50. You have no more than $52 to spend. Write and solve an inequality for x, the number of games you can play.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Solve -5/2x + 7 ≤ -8. Graph the solution on the number line, then explain why the inequality sign changes or does not change.



WORK SPACE AND ANSWER

ANSWER KEY

Inequality Direction Detectives

GRADE 7 · 7.PFA.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve: $x + 5 \leq 11$	**$x \leq 6$**
2	Solve: $2x - 7 > 9$	**$x > 8$**
3	Solve: $-2x + 10 > 0$	**$x < 5$**
4	Graph $x \geq -1$ on the number line.	**Closed circle at -1, shaded right**
5	Point A is shown on the number line. Is A a solution to $2x + 3/2 < 13/2$? Show or describe how you know.	**Yes. A represents 2, and 2(2) + 3/2 = 11/2, which is less than 13/2.**
6	Solve both statements: $7x + 6 = 27$ and $7x + 6 < 27$. State how their solution sets differ.	**Equation: x = 3. Inequality: x < 3. The equation has one solution, while the inequality has all values less than 3.**

PART 2 · APPLY IT

1. **$15 + 6x \geq 45$; $x \geq 5$** Subtract 15 from both sides to get $6x \geq 30$. Divide by 6, so the club must sell at least 5 sticker packs.
2. **$11 + 3.50x \leq 52$; $x \leq 82/7$, so the greatest whole number of games is 11** Subtract 11 to get $3.50x \leq 41$. Divide by 3.50 to get $x \leq 82/7$, and x must be a whole number of games.

CHALLENGE

$x \geq 6$; closed circle at 6, shaded right. The sign reverses because dividing both sides by -5/2 is dividing by a negative number.

Accept equivalent inequality forms and equivalent fraction or decimal forms. For graphs, accept a correct open or closed endpoint and shading in the correct direction.