

Inequality Line Up

Solve each inequality, then show its solution on a number line.

GRADE 7 • 7.PFA.4.c

7.PFA.4.c "Represent solutions to one- or two-step linear inequalities in one variable algebraically and graphically using a number line."

NAME _____

DATE _____

SOLVE AND GRAPH

To solve an inequality, use inverse operations to get x alone, just as you do with an equation. If you multiply or divide by a negative number, reverse the inequality sign. Use an open circle for $<$ or $>$ and a closed circle for $\leq$ or $\geq$, then shade in the direction of the solutions.

WORKED EXAMPLE

Solve and graph: $7x + 4 > 25$

1. Subtract 4 from both sides: $7x > 21$
2. Divide both sides by 7: $x > 3$
3. Graph an open circle at 3 and shade to the right.

Answer: $x > 3$; open circle at 3, shade right.

PRACTICE 6 problems

1 Solve and graph: $x + 6 > 14$

ANSWER _____

2 Solve and graph: $2x \leq 18$

ANSWER _____

3 Solve and graph: $x/5 - 2 \geq 1$

ANSWER _____

4 Solve and graph: $-6x + 11 > -1$

ANSWER _____

5 Solve and graph: $11 - x \leq 6$

ANSWER _____

6 Solve and graph: $x/9 + 2 \leq 5$

ANSWER _____

APPLY IT Show your work

- 1** You have 8 gems in a game. Each quest earns 2 more gems. You need at least 28 gems to unlock a character. Let x be the number of quests. Write, solve, and graph an inequality.

WORK SPACE

ANSWER _____

- 2** A music player can hold no more than 54 minutes of songs. It already has 18 minutes saved, and each new song is 6 minutes long. Let x be the number of new songs. Write, solve, and graph an inequality.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Solve and graph: $-5x + 15 < -10$. Then explain why the inequality sign changes or does not change.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Solve and graph: $x + 6 > 14$	$x > 8$; open circle at 8, shade right.
2	Solve and graph: $2x \leq 18$	$x \leq 9$; closed circle at 9, shade left.
3	Solve and graph: $x/5 - 2 \geq 1$	$x \geq 15$; closed circle at 15, shade right.
4	Solve and graph: $-6x + 11 > -1$	$x < 2$; open circle at 2, shade left.
5	Solve and graph: $11 - x \leq 6$	$x \geq 5$; closed circle at 5, shade right.
6	Solve and graph: $x/9 + 2 \leq 5$	$x \leq 27$; closed circle at 27, shade left.

PART 2 • APPLY IT

- $2x + 8 \geq 28$; $x \geq 10$; closed circle at 10, shade right.** Subtract 8 to get $2x \geq 20$. Divide by 2, so you need 10 or more quests.
- $18 + 6x \leq 54$; $x \leq 6$; closed circle at 6, shade left.** Subtract 18 to get $6x \leq 36$. Divide by 6, so you can add at most 6 whole songs.

CHALLENGE

$x > 5$; open circle at 5, shade right. The sign changes because dividing both sides by -5 reverses the inequality.

Accept equivalent inequality forms and accurate number-line graphs with the correct endpoint and shading direction. For the music problem, accept x as a whole-number count from 0 through 6 in context.