

Inequality Switch

Solve, graph, and model one- and two-step 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?

Use inverse operations to isolate x , just as you do for an equation. 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 $\leq$ or $\geq$.

WORKED EXAMPLE

Solve and graph: $-7x + 5 \leq -16$

1. Subtract 5: $-7x \leq -21$
2. Divide by -7 and reverse the sign: $x \geq 3$
3. Graph a closed circle at 3 and shade to the right.

Answer: $x \geq 3$

PRACTICE 6 problems

1 Solve and graph: $x - 9 < 6$

ANSWER _____

2 Solve and graph: $4x \geq -24$

ANSWER _____

3 Solve and graph: $-2x > 20$

ANSWER _____

4 Solve and graph: $x/8 + 1 \leq 4$

ANSWER _____

5 Solve and graph: $-x/6 - 9 \geq -13$

ANSWER _____

6 Which value is a solution to $2x + 1 > 13$: -1 , 6 , or 8 ?

ANSWER _____

APPLY IT Show your work

- 1** You have \$26 for a game-store purchase. A game accessory costs \$14, and each sticker pack costs \$2. Let x be the number of sticker packs. Write and solve an inequality for the greatest number of sticker packs you can buy.

WORK SPACE

ANSWER _____

- 2** You have \$19 in a digital wallet. Each bus ride costs \$2, and you want at least \$1 left. Let x be the number of bus rides. Write and solve an inequality for the greatest number of rides you can take.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Solve and graph: $-8/9x + 4 \leq 12$. Then explain why the inequality sign changes or stays the same when you isolate x .

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Solve and graph: $x - 9 < 6$	$x < 15$; open circle at 15, shade left.
2	Solve and graph: $4x \geq -24$	$x \geq -6$; closed circle at -6, shade right.
3	Solve and graph: $-2x > 20$	$x < -10$; open circle at -10, shade left.
4	Solve and graph: $x/8 + 1 \leq 4$	$x \leq 24$; closed circle at 24, shade left.
5	Solve and graph: $-x/6 - 9 \geq -13$	$x \leq 24$; closed circle at 24, shade left.
6	Which value is a solution to $2x + 1 > 13$: -1, 6, or 8?	8

PART 2 • APPLY IT

- $14 + 2x \leq 26$; $x \leq 6$, so you can buy at most 6 sticker packs.** Start with $14 + 2x \leq 26$ because the total cost cannot be more than \$26. Subtract 14, then divide by 2.
- $19 - 2x \geq 1$; $x \leq 9$, so you can take at most 9 bus rides.** Use $19 - 2x \geq 1$ because the remaining balance must be at least \$1. Dividing by -2 reverses the inequality sign.

CHALLENGE

$x \geq -9$; closed circle at -9, shade right. The sign reverses because isolating x requires multiplying both sides by $-9/8$, a negative number.

Accept equivalent inequality forms and accurate number-line graphs. For the word problems, accept whole-number solutions from 0 through the stated maximum because x represents a number of items or rides.