

Inequality Range Quest

Solve, compare, and graph linear inequality solutions.

HIGH SCHOOL • MA.912.AR.2.6

MA.912.AR.2.6 "Given a mathematical or real-world context, write and solve one-variable linear inequalities, including compound inequalities. Represent solutions algebraically or graphically."

NAME _____

DATE _____

KEEP THE SOLUTION

Solve an inequality like an equation, but reverse the inequality sign when you multiply or divide by a negative number. For a compound inequality joined by "and," solve both parts and keep only the values that work for both.

WORKED EXAMPLE

Solve and graph: $-11x + 23 > 67$

1. Subtract 23 from both sides: $-11x > 44$.
2. Divide both sides by -11 and reverse the sign: $x < -4$.
3. Graph with an open circle at -4 and shade left.

Answer: $x < -4$

PRACTICE 6 problems

1 Solve and graph: $5x - 7 > 18$

ANSWER _____

2 Solve and graph: $-2x + 15 \leq 1$

ANSWER _____

3 Solve: $6(x - 2) < 30$

ANSWER _____

4 Solve and graph: $-9 \leq 5x + 1 < 26$

ANSWER _____

5 Graph the solution: $x \leq -6$ or $x > 9$

ANSWER _____

6 Solve and graph: $10 - x \geq 27$

ANSWER _____

APPLY IT Show your work

- 1** A student club charges an \$18 membership fee and \$6 for each workshop. You can spend no more than \$72. Let x be the number of workshops. Write and solve an inequality to find how many workshops you can attend.

WORK SPACE

ANSWER _____

- 2** You earn \$9 per hour at a weekend job and want your weekly pay to be from \$54 to \$90, inclusive. Let x be the number of whole hours worked. Write and solve a compound inequality.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Solve and graph: $3(2x - 5) \leq 7x + 2 < 5x + 22$

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve and graph: $5x - 7 > 18$	$x > 5$, open circle at 5, shade right
2	Solve and graph: $-2x + 15 \leq 1$	$x \geq 7$, closed circle at 7, shade right
3	Solve: $6(x - 2) < 30$	$x < 7$
4	Solve and graph: $-9 \leq 5x + 1 < 26$	$-2 \leq x < 5$, closed circle at -2, open circle at 5, shade between
5	Graph the solution: $x \leq -6$ or $x > 9$	Closed circle at -6 with shading left, and open circle at 9 with shading right
6	Solve and graph: $10 - x \geq 27$	$x \leq -17$, closed circle at -17, shade left

PART 2 · APPLY IT

- $18 + 6x \leq 72$; $0 \leq x \leq 9$, where x is a whole number** Subtract 18 to get $6x \leq 54$, then divide by 6 to get $x \leq 9$. Because x counts workshops, it must be a nonnegative whole number.
- $54 \leq 9x \leq 90$; $6 \leq x \leq 10$, so x can be 6, 7, 8, 9, or 10** Divide all three parts of $54 \leq 9x \leq 90$ by 9. The hours must be whole numbers in the resulting interval.

CHALLENGE

$-17 \leq x < 10$, closed circle at -17, open circle at 10, shade between

Accept equivalent inequality forms and correct interval notation when it matches the endpoint symbols. For graphing, open circles represent $<$ or $>$, and closed circles represent $\leq$ or $\geq$.