

Inequality Line Up

Solve and graph one- and two-step inequalities

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 _____

BUILD UNDERSTANDING

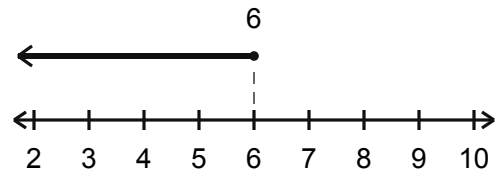
Undo operations to isolate x . Multiplying or dividing both sides by a negative number reverses the inequality. Use an open endpoint for $<$ or $>$ and a closed endpoint for $\leq$ or $\geq$. Draw your endpoint and ray above the reference line, aligned with its numbered ticks. A ray continues beyond the visible range.

WORKED EXAMPLE

Solve $2x + 6 \leq 18$ and graph the solution.

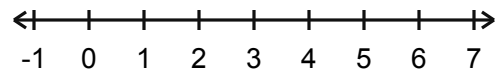
1. Subtract 6: $2x \leq 12$. Divide by 2: $x \leq 6$.
2. Include 6 with a closed point; shade all smaller numbers to the left.

Answer: $x \leq 6$; closed endpoint at 6 and a ray to the left.

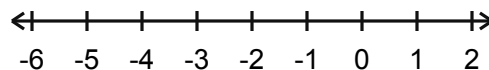


PRACTICE 4 problems

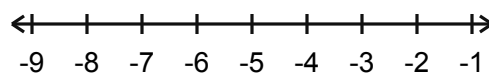
- 1 Solve $x + 9 > 12$. Show the algebra, then graph all real solutions on the number line.



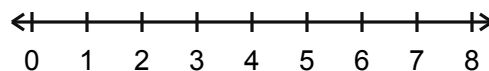
- 2** Solve $4x \leq -8$. Show the algebra, then graph all real solutions on the number line.



- 3** Solve $-3x > 15$. Show the algebra, then graph all real solutions on the number line.

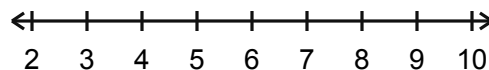


- 4** Solve $x/2 - 5 \geq -3$. Show the algebra, then graph all real solutions on the number line.

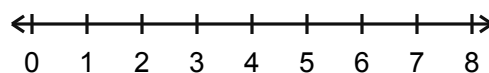


APPLY IT Show your work

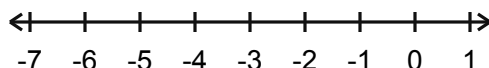
- 1** A ribbon order has a \$4 fee plus \$2 per meter. The budget is at most \$16. Let x be meters, allowing fractional meters. Solve $2x + 4 \leq 16$ and graph its real solutions. Then state the physically possible range.



- 2** A room starts at 3 degrees C and warms 2 degrees C each hour. To exceed 11 degrees, solve $3 + 2x > 11$ for elapsed hours x . Graph the real solutions and explain the open endpoint.

**CHALLENGE** One step up

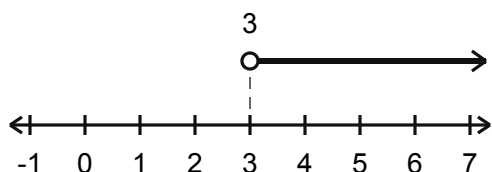
Solve $-2x + 1 \leq 7$, graph the solution, and explain why the sign reverses. Check the endpoint and one number on your shaded ray.



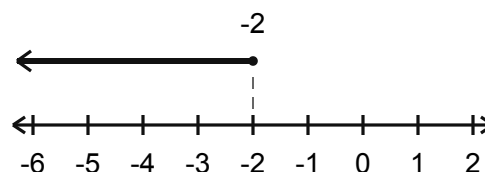
Require algebra and a graph for every task. Student reference lines are blank. Key solution rays sit above the reference axis, with an endpoint label and a dotted guide to its tick. Every tick is one unit. Task 5 first graphs the algebraic inequality over real numbers, then restricts the contextual lengths to 0-6. Accept equivalent inequalities.

PRACTICE 1

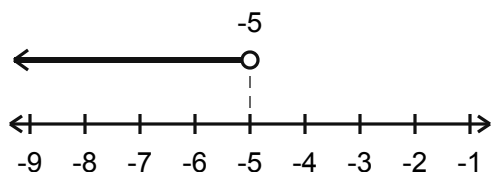
$x > 3$. Subtract 9 from both sides.

**PRACTICE 2**

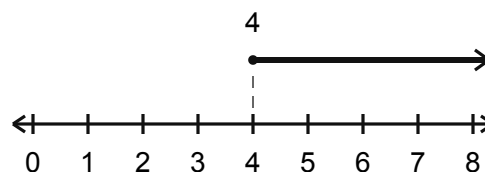
$x \leq -2$. Divide by positive 4; keep the sign.

**PRACTICE 3**

$x < -5$. Divide by -3 and reverse the sign.

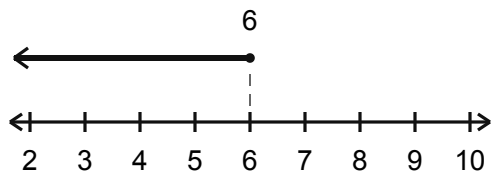
**PRACTICE 4**

$x \geq 4$. Add 5: $x/2 \geq 2$. Multiply by 2.



APPLY IT 1

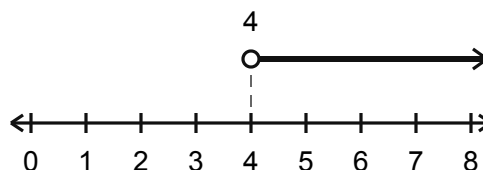
$x \leq 6$; the order allows $0 \leq x \leq 6$ meters.
Subtract 4 and divide by 2. Negative lengths are excluded from the context.



APPLY IT 2

$x > 4$ hours. Exactly 4 hours gives 11 degrees, so it is excluded.

Subtract 3 and divide by 2. The room exceeds 11 degrees only after 4 hours.



CHALLENGE

$x \geq -3$. Divide $-2x \leq 6$ by -2 and reverse the sign. At -3 :
 $7 \leq 7$; at 0 : $1 \leq 7$.

