* 8th grade standard

Algebra 1 5.1

Solve linear inequalities by using addition*

Solve linear inequalities by using subtraction*

open ○ closed ●

inequality $<$ $>$ $\leq$ $\geq$

set builder notation

addition property ✓

subtraction property ✓

whiteboards

triangle puzzles

$5 > 3$

$+2 \quad +2$

$7 > 5$

$3 < 10$

$-1 \quad -1$

$2 < 9$

5>2 true?

KeyConcept Addition Property of Inequalities

Words	If the same number is added to each side of a true inequality, the resulting inequality is also true.
Symbols	For all numbers a, b, and c, the following are true. **1.** If $a > b$, then $a + c > b + c$. **2.** If $a < b$, then $a + c < b + c$.

This property is also true for $\geq$ and $\leq$.

How would you solve if =?

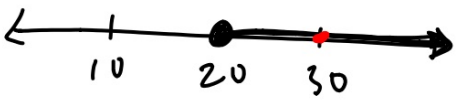
$x - 12 \geq 8$

$+12 \quad +12$

$x \geq 20$

$x = 20$

$x > 20$



$\{x \mid x > 20\}$

Example 1 Solve by Adding

Solve $x - 12 \geq 8$. Check your solution.

$30 - 12 \geq 8$

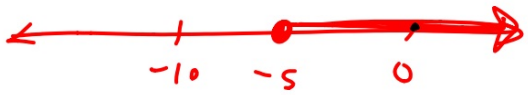
$18 \geq 8$ ☺

$x =$

1B. $d - 14 \geq -19$

$+14 \quad +14$

$d \geq -5$



$0 - 14 \geq -19$

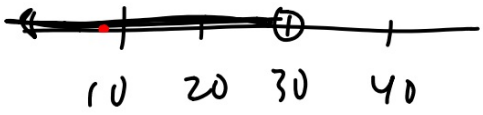
$-14 \geq -19$

$d = -5$

$d > -5$

$\{ d \mid d > -5 \}$

whiteboards



GuidedPractice

Solve each inequality. Check

1A. $22 > m - 8$

$+8 \quad +8$

$30 > m$

$m < 30$

$22 > 9 - 8$

$22 > 1$ ☺

$\{m \mid m < 30\}$

" set-builder notation. "

ReadingMath

set-builder notation

$\{x \mid x \geq 20\}$ is read *the set of all numbers x such that x is greater than or equal to 20.*

$\{x \mid x \geq 20\}$.

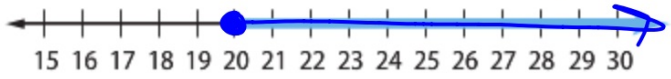
$x \geq 20$

x=
x>

The dot at 20 shows that 20 is included in the graph.

The heavy arrow pointing to the right shows that the graph includes all numbers greater than 20.

$\{x \mid x \geq 20\}$



$\{a \mid a \geq 20\}$

Smato: do we need this?

$5 > 3$
$-2 \quad -2$
$3 > 1$

$5 > 3$
$+-2 \quad +-2$
$3 > 1$

KeyConcept **Subtraction Property of Inequalities**

Words	If the same number is subtracted from each side of a true inequality, the resulting inequality is also true.
Symbols	For all numbers a, b, and c, the following are true.
	1. If $a > b$, then $a - c > b - c$.
	2. If $a < b$, then $a - c < b - c$.

This property is also true for $\geq$ and $\leq$.

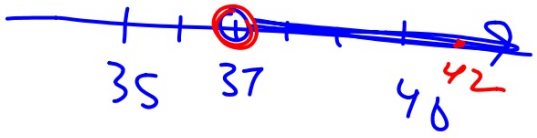
How would you solve if = ?

Standardized Test Example 2 Solve by Subtracting

Solve $m + 19 > 56$.

$-19 \quad -19$

$m > 37$



$42 + 19 > 56$

$61 > 56$

$m > 37$

Whiteboards

GuidedPractice

2. Solve $p + 8 \leq 18$.

$p + 8 \leq 18$

$-8 \quad -8$

$p \leq 10$

graph

Check

$0 + 8 \leq 18$

$8 \leq 18$

$3a + 6 = 4a$
$-3a \quad -3a$

Example 3 Variables on Each Side

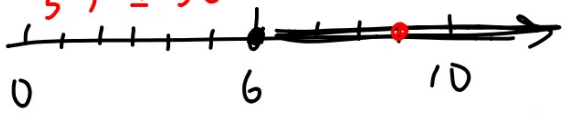
Solve $3a + 6 \leq 4a$. Then graph the solution set on a number line.

$6 = a$

$3a + 6 \leq 4a$
$-3a \quad -3a$
$6 \leq a$

$a \geq 6$
$a = 6$
$a > 6$

$3 \cdot 9 + 6 \leq 4 \cdot 9$
$27 + 6 \leq 36$
$33 \leq 36$ ☺



$3a + 6 \leq 4a$
$-4a \quad -4a$
$-a + 6 \leq 0$

Whiteboards

GuidedPractice

Solve each inequality. Then graph

3A. $9n - 1 < 10n$

3B. $5h \leq 12 + 4h$

triangle puzzle (if time)

What are the 3 options?

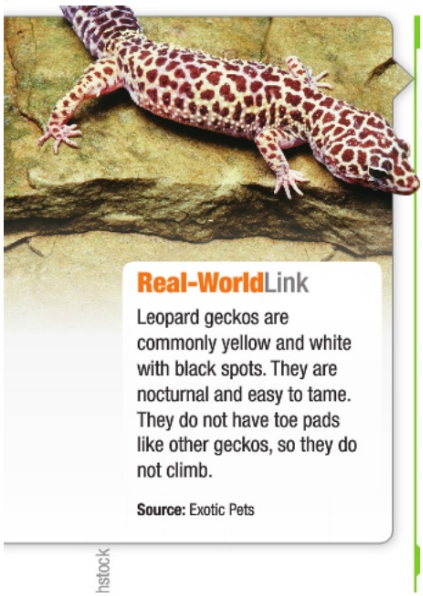
ConceptSummary Phrases for Inequalities

$<$	$>$	$\leq$	$\geq$
less than fewer than	greater than more than	at most, no more than, less than or equal to	at least, no less than, greater than or equal to

Real-World Example 4 Use an Inequality to Solve a Problem

PT

PETS Felipe needs for the temperature of his leopard gecko's basking spot to be at least 82°F. Currently the basking spot is 62.5°F. How much warmer does the basking spot need to be?



Real-World Link

Leopard geckos are commonly yellow and white with black spots. They are nocturnal and easy to tame. They do not have toe pads like other geckos, so they do not climb.

Source: Exotic Pets

hstock