

Algebra 1 5.1

* 8th grade standard

Solve linear inequalities by using addition*

Solve linear inequalities by using subtraction*

inequality $<$ $>$ \leq \geq

set builder notation

addition property

subtraction property

whiteboards

triangle puzzles

Vikings scores

$$\begin{array}{r} 5 > 2 \quad \text{true?} \\ +3 \quad +3 \\ \hline 8 > 5 \end{array}$$

$$\begin{array}{r} -5 < 7 \\ +2 \quad +2 \\ \hline -7 < 5 \end{array}$$

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.

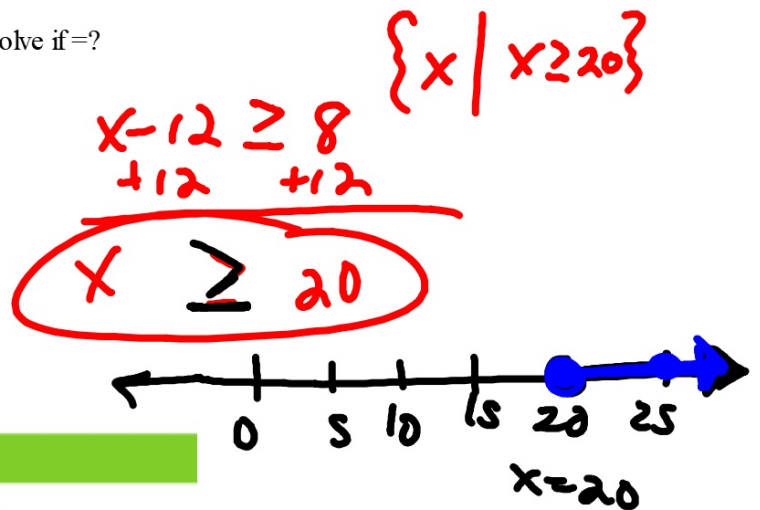
Symbols For all numbers a , b , and c , the following are true.

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 =?

$$\begin{array}{r} x - 12 = 8 \\ +12 \quad +12 \\ \hline x = 20 \end{array}$$



Example 1 Solve by Adding

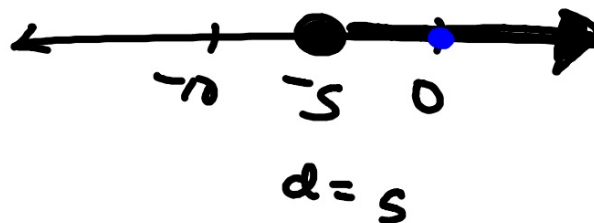
Solve $x - 12 \geq 8$. Check your solution.

$$\begin{array}{r} \Rightarrow 25 - 12 \geq 8 \\ 13 \geq 8 \end{array}$$

$$\begin{array}{r} 0 - 14 \geq -19 \quad -14 \geq -19 \\ \text{1B. } d - 14 \geq -19 \\ \quad +14 \quad +14 \end{array}$$

$$d \geq -5$$

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



whiteboards

$$y =$$
$$f(x) =$$

Guided Practice

Solve each inequality. Check

$$1A. \begin{array}{r} 22 > m - 8 \\ +8 \quad +8 \\ \hline 22 > 20 - 8 \\ 22 > 12 \quad \checkmark \end{array}$$



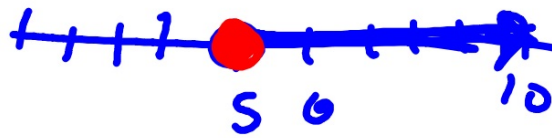
$$30 > m \rightarrow \{m \mid 30 > m\}$$

m is less than 30

30 is more than m

How to graph $<$ $>$ on a number line?

$$m \geq 5$$



triangle puzzle

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.*

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

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

$x =$
 $x >$

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.



Smato: do we need this?

$$\begin{array}{r} x + 2 = 7 \\ +2 \quad +2 \\ \hline x = 9 \end{array}$$

Key Concept 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 $m + 19 > 56$.

$$\begin{array}{r} -19 \quad -19 \\ \hline m > 37 \end{array}$$

$$\{m \mid m > 37\}$$

Whiteboards

Guided Practice

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

$$\begin{array}{r} -8 \quad -8 \\ \hline p \leq 10 \end{array}$$

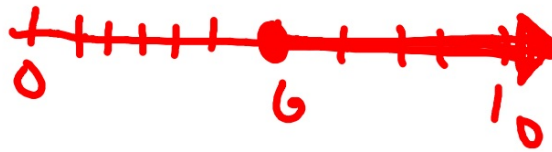
$$\{p \mid p \leq 10\}$$

Example 3 Variables on Each Side

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

$$\frac{-3a \quad -3a}{6 \leq a}$$
$$\{a \mid 6 \leq a\}$$

$$\frac{3a + 6 = 4a}{-3a \quad -3a}$$
$$6 = a$$



Whiteboards

GuidedPractice

Solve each inequality. Then graph it.

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

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-WorldLink

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