

## Lesson 4.1

# Writing and Graphing Inequalities

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Learning Targets:



-  Write Inequalities (LA sentence to Math)
-  Checking Solutions for Inequalities
-  Graph Inequalities

## Inequalities

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An inequality is a mathematical sentence that compares expressions.

Greater Than  $x > 2$

Greater Than or Equal to  $y \geq -3$

Less Than  $m < \frac{1}{2}$

Less Than or Equal to  $w \leq -2.9$

# From Language Arts to Math

## Phrases that translate to symbols

	Less Than	Greater Than	Less Than or Equal To	Greater Than or Equal To
	<b>Inequality Symbols</b>			
Symbol	$<$	$>$	$\leq$	$\geq$
Key Phrases	<ul style="list-style-type: none"> <li>● is less than</li> <li>● is fewer than</li> </ul>	<ul style="list-style-type: none"> <li>● is greater than</li> <li>● is more than</li> </ul>	<ul style="list-style-type: none"> <li>● is less than or equal to</li> <li>● is at most</li> <li>● is no more than</li> </ul>	<ul style="list-style-type: none"> <li>● is greater than or equal to</li> <li>● is at least</li> <li>● is no less than</li> </ul>

Key  
Idea

"is"

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This divides equations with =  
and inequalities with

x plus -3 is 14

$$x + (-3) = 14$$

y is less than 8

$$y < 8$$

## Writing an Inequality

A number  $q$  plus 5 is greater than or equal to  $-7.9$ . Write this word sentence as an inequality.



$$q + 5 \geq -7.9$$

# Writing an Inequality: Examples 1 & 2

Write the word sentence as an inequality.

Inequality Symbols				
Symbol	<	>	≤	≥
Key Phrases	• is less than	• is greater than	• is less than or equal to	• is greater than or equal to
	• is fewer than	• is more than	• is at most	• is at least
			• is no more than	• is no less than

1. A number  $x$  is at most  $-10$ .

$$x \leq -10$$

2. Twice a number  $y$  is more than  $-\frac{5}{2}$ .

$2y > -\frac{5}{2}$

## Solution of an Inequality

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- A solution of an inequality is a value that makes the inequality **TRUE**.
- An inequality can have more than one solution.
- All of the solutions are call the **SOLUTION SET**.

list solutions for the inequality

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y is less than 8

$$y < 8$$

(Think: What numbers are less than 8?)

Solutions include

$$7, 6, 5, -3892.42$$



## Is the Value a Solution of an Inequality?

Value of x	<u>x</u> + 2 ≤ -1	Is the inequality true?
? -2	$-2 + 2 \leq -1$ $0 \leq -1$	No
-3	$-3 + 2 \leq -1$ $-1 \leq -1$	Yes
-4	$-4 + 2 \leq -1$ $-2 \leq -1$	Yes

## Checking Solutions

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Tell whether  $-2$  is a solution of each inequality.

a.  $y - 5 \geq -6$

$$-2 - 5 \geq -6$$

$$-7 \geq -6$$

No

b.  $-5.5y < 14$

$$-5.5(-2) < 14$$

$$11 < 14$$

Yes

## Checking Solutions: Examples 3-5

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Tell whether  $-5$  is a solution of the inequality.

3.  $x + 12 > 7$

$$7 > 7$$

No

$$\begin{aligned} 1 - (-10) &\leq -9 \\ 1 + 10 &\leq -9 \end{aligned}$$

4.  $1 - 2p \leq -9$

$$11 \leq -9$$

No

$$\begin{aligned} 1 - 2(-5) &\leq -9 \\ 1 + 10 &\leq -9 \end{aligned}$$

5.  $n \div 2.5 \geq -3$

$$-2 \geq -3$$

Yes

## Graphing Inequalities

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1st

Open Circle vs Closed Circle



2nd

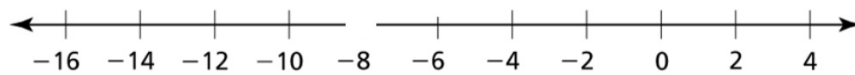
Test a number - shade the number line on the side where you found the solution

# Graphing Inequalities

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Graph  $y > -8$ .

**1st**




**2nd**

## Graphing Inequalities: Examples 6-9

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6.  $x < -1$  

8.  $s \leq 1.4$  

9.  $-\frac{1}{2} < t$  

## Homework

**Pg 128-129**

**# 1-9,**

**11-14, 17-19**

**and 26**