1.5 Solving Inequalities

Day 2 Learning Goals:

I can solve and graph inequalities
I can solve and graph compound inequalities

Key Concepts

<table>
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<th>Inequality</th>
<th>Description</th>
<th>Table</th>
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<tr>
<td>x &gt; -1</td>
<td>x is greater than -1</td>
<td>-1 0 1</td>
</tr>
<tr>
<td>x &lt; -1</td>
<td>x is less than -1</td>
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<tr>
<td>x ≥ -1</td>
<td>x is greater than or equal to -1</td>
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</tr>
<tr>
<td>x ≤ -1</td>
<td>x is less than or equal to -1</td>
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Key Concept

When you divide by a negative number you switch the direction of the inequality.

\[-2x + 5 \geq 3 \quad \text{switch direction} \quad 2x + 5 \geq -3\]

Write an inequality for each of the following:

1) 5 fewer than a number is at least 12.

2) The quotient of a number and 3 is no more than 15.

3) The product of 7 and a number is no more than 50.

Solve the inequality:

\[-2(x + 9) + 5 \geq 3\]

Graph the inequality:
Solve the inequality:
\[ 3(x + 3) \geq -3(2 + x) \]

Graph the inequality

Solve the inequality:
\[ 9 - x - 5 < 5x + 4 \]

Graph the inequality:

**Compound Inequalities**

You can join two inequalities with the word **and** or the word **or** to form a compound inequality.

To solve "**and**" compound inequalities: find all the values of the variable that make both the inequalities true.

To solve "**or**" compound inequalities, find all the values of the variable that make at least one of the inequalities true.

**Solving an "AND" inequality**

\[ 5 \leq 3x - 1 \text{ and } 2x < 12 \]

**step 1 - solve each inequality**

**step 2 - graph BOTH inequality on the same number line.**

**step 3 - Write the compound inequality**

**Solving an "OR" inequality**

\[ 7w + 3 > 11 \text{ or } 4w - 1 < -13 \]

**step 1 - solve each inequality**

**step 2 - graph each inequality on the same number line.**

**step 3 - Write the compound inequality**

**Solving an "AND" inequality**

\[ 5 < 4x + 1 < 13 \]

**step 1 - subtract 1 from all 3 parts of the inequality**

**step 2 - divide all 3 parts of the inequality by 4**

**step 3 - graph the inequality on a number line**

**step 3 - Write the compound inequality**
Using an Inequality
Plumber A charges $75 for a service charge and $40 per hour. Plumber B charges $50 per hour but no service charge. How many hours must a plumbing job last for Plumber A to cost less than Plumber B?

Homework.
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