



2-2 Solving Inequalities Notes

Don't Turn In.

IM 3

2-2 Solving Inequalities Notes

Name: _____

Per: _____

Date: _____

Objectives To solve and graph inequalities
To write and solve compound inequalities

Phrases like *at most* and *at least* suggest a relationship in which two quantities may not be equal. You can represent such a relationship with a mathematical inequality.

Essential Understanding Just as you use properties of equality to solve equations, you can use properties of inequality to solve inequalities.

Take note

Key Concept Writing and Graphing Inequalities

Inequality	Word Sentence	Graph
$x > 4$	x is greater than 4.	
$x \geq 4$	x is greater than or equal to 4.	
$x < 4$	x is less than 4.	
$x \leq 4$	x is less than or equal to 4.	

In the graphs above, the point at 4 is a boundary point because it separates the graph of the inequality from the rest of the number line. An open dot at 4 means that 4 is *not* a solution. A closed dot at 4 means that 4 *is* a solution.

Graph on Number Line

Practice Write the inequality that represents the sentence.

- The sum of a number and 5 is less than -7.
- The quotient of a number and 12 is no more than 6.

$+$

$$\frac{n}{12} \leq 6$$

$n \div 12 =$
 $12 \div n ?$

Practice Solve each inequality. Graph the solution.

3. $-11 - 5y \geq 52$

4. $4(n - 2) - 6 > 18$

Handwritten work for problem 3:

$$-11 - 5y \geq 52$$

$$-5y \geq 63$$

$$y \leq -12.6$$

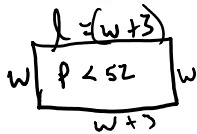
Graph: A number line with a closed circle at -12.6 and shading to the left.

Notes: "Switch when \times or \div by a negative", "Shade Closed \Rightarrow Use \bullet ".

Let $w = \text{width (inches)}$

Practice Solve each problem by writing an inequality.

5. The length of a picture frame is 3 in. greater than the width. The perimeter is less than 52 in. Describe the dimensions of the frame.



Perimeter - Add all sides

$$w + (w+3) + w + (w+3) < 52$$

$$4w + 6 < 52$$

$$4w < 46$$

$$w < \frac{46}{4} = \frac{23}{2} = 11.5$$

- 1) Draw a picture
- 2) Write a problem
- 3) Solve.

$$\begin{aligned} w &< 11.5 \text{ inches} \\ \Rightarrow \\ l &< 14.5 \text{ inches} \end{aligned}$$

6. The cost of a field trip is \$220 plus \$7 per student. If the school can spend at most \$500, how many students can go on the field trip?

$n = \#$ of students

$$7n + 220 \leq 500$$

$$\underline{-220}$$

$$7n \leq 280$$

$$n \leq 40$$

No more than 40 students can go.

Practice Is the inequality always, sometimes, or never true?

7. $-6(2x - 10) + 12x \leq 180$

$$-12x + 60 + 12x \leq 180$$

$$60 \leq 180 \text{ True}$$

\Rightarrow Always True

8. $4x - 8 > 1 + 4(x + 3)$

$$4x - 8 > 1 + 4x + 12$$

$$4x - 8 > 4x + 13$$

$$\begin{aligned} -4x & \quad -4x \\ \hline -8 & > 13 \end{aligned}$$

\Rightarrow False
 \Rightarrow Never True

Practice Solve each compound inequality. Graph the solution.

9. $6x \geq -24$ and $9x < 54$

10. $7x > -35$ and $5x \leq 30$

Practice Solve each compound inequality. Graph the solution.

11. $16 < 5x + 1$ or $3x + 9 < 6$

12. $9x \leq -27$ or $4x \geq 36$