

# 1.5. Advanced Algebra

## Solving Inequalities

DATE: 9/23

Target 2A. Utilize a graph to illustrate the solution set of an absolute value inequality.



### Graphing Inequalities

Graph each of the following inequalities on a number line. Write the solution set in set-builder and interval notation.

1.  $x < -10$  "x is less than -10"

Set-builder Notation:

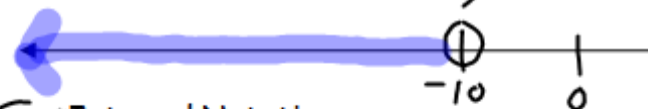
$$\{x \mid x < -10\}$$

→ means such that

2.  $x \leq 3$  "x is less than or equal to 3"

Set-builder Notation:

$$\{x \mid x \leq 3\}$$



open circle

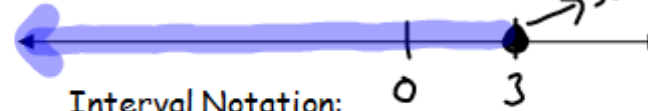
means -10 is NOT included in solution set

Interval Notation:

"Unbounded (or) for  $-\infty, +\infty$ "

$$(-\infty, -10)$$

parenthesis



solid circle

means 3 IS included in solution set

Interval Notation:

$$(-\infty, 3]$$

bracket



1-5 notes - Microsoft Word

Equation Tools

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$$6. 4y - 3 < 5y + 2$$

$$\begin{array}{r} -4y \quad -4y \\ \hline \end{array}$$

$$-3 < y + 2$$

$$\begin{array}{r} -2 \quad -2 \\ \hline \end{array}$$

$$-5 < y \Leftrightarrow y > -5$$

same thing



Set-builder:  $\{y \mid -5 < y\}$  Interval:  $(-5, +\infty)$   
 or  $\{y \mid y > -5\}$

### Solve an Inequality Using Multiplication or Division:

**Note:** When multiplying or dividing an inequality by a negative number, you must flip the inequality sign.

Solve the given inequality. Write the solution set in set-builder and interval notation. Graph the solution set on a number line.

$$7. -0.25y \geq 2$$

$$\begin{array}{r} -0.25 \quad -0.25 \\ \hline \end{array}$$

$$y \leq -8$$

"FLIP"  
inequality  
sign



Set-builder:  $\{y \mid y \leq -8\}$  Interval:  $(-\infty, -8]$

$$8. 12 \geq -3p$$

$$\begin{array}{r} -3 \quad -3 \\ \hline \end{array}$$

$$-4 \leq p$$

$$p \geq -4$$

same

Set-builder:  $\{p \mid -4 \leq p\}$  Interval:  $[-4, +\infty)$



