

Name _____ Date _____ Period _____

Solving Absolute Value Linear Inequalities

Algebra II | Unit 2 | Day 7 | TEK A2.6.F

Objective: I can solve absolute value linear inequalities using the algebraic (compound inequality) method.

Vocabulary

"Or" statement: true if EITHER part is true - used for ____ or ____.

"And" statement: true only if BOTH parts are true - used for ____ or ____.

KEY IDEA

Step 1 - Isolate: get the absolute value alone.

Step 2 - Split: for $>$ or $\geq$ use OR. For $<$ or $\leq$ use AND - as one sandwiched inequality, or as two branches (flip the sign if you divide by a negative).

Step 3 - Solve, then graph the solution on a number line.

Let's Work Through It

Example 1 — Solve $|2x + 3| < 5$ the sandwich method.

Sandwich: $-5 < 2x + 3 < \underline{\hspace{2cm}}$ $\rightarrow$ $\underline{\hspace{2cm}}$

-6	-5	-4	-3	-2	-1	0	1	2	3
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Example 2 — Solve $|2x - 1| \leq 7$ the split method.

Split: $2x - 1 \leq 7$ AND $-(2x - 1) \leq \underline{\hspace{2cm}}$ Solve each (flip when you divide by the negative):

$x \leq \underline{\hspace{2cm}}$ AND $x \geq \underline{\hspace{2cm}}$

Combine: $\underline{\hspace{2cm}}$

-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
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Example 3 — Solve $3|2x - 1| + 4 > 19$.

Isolate: $3|2x - 1| > \underline{\hspace{2cm}}$ $\rightarrow |2x - 1| > \underline{\hspace{2cm}}$

Split: $2x - 1 > 5$ OR $2x - 1 < \underline{\hspace{2cm}}$ (flips sign and is negative)

Solve: $x > \underline{\hspace{2cm}}$ or $x < \underline{\hspace{2cm}}$

Example 4 — Solve $2|3x + 4| - 5 \geq 11$.

Isolate: $2|3x + 4| \geq \underline{\hspace{2cm}}$ $\rightarrow |3x + 4| \geq \underline{\hspace{2cm}}$

Split: $3x + 4 \geq 8$ OR $3x + 4 \leq \underline{\hspace{2cm}}$ (flips sign and is negative)

Solve: $x \geq$ _____ or $x \leq$ _____

Your Turn

You Try 1 — Solve $|x + 1| \geq 3$.

You Try 2 — Is $x = 0$ a solution to $|x - 3| > 5$? Explain.
