

Absolute Value Inequalities

Simple Cases: If $a \leq 0$, then the inequality $|f(x)| < a$ has no real solution.

If $a < 0$, then the inequality $|f(x)| \leq a$ has no real solution.

If $a \leq 0$, then the set of solutions to the inequality $|f(x)| \geq a$ is $\text{dom } f$.

If $a < 0$, then the set of solutions to the inequality $|f(x)| > a$ is $\text{dom } f$.

Other Cases: All other types of inequalities require going through the entire set of steps for solving absolute value inequalities:

1. Get the absolute value isolated on the left side of the inequality.
2. Split the inequality into two separate ones. The first one is formed simply by dropping the absolute value signs. The second one requires dropping the absolute value signs, taking the opposite of the constant, and flipping the inequality.
3. Use the phrase “greater, less thand” on the inequality from step 1 to figure out whether “and” or “or” should be used to connect the two inequalities from step 2.
4. Solve the two separate inequalities.

Remember that “and” statements can usually be simplified.