

There are two types of absolute value inequalities; Greater than (Or statements) and less than (And statements). All an absolute value inequality does is talk about the distance away from zero so when working with these inequalities you have two methods depending on whether it is a less than statement or a greater than statement that you use to solve these equations.

Less Than Inequalities

General Steps:

- Set up one inequality
- Solve for x

Solve: $|1 - 2x| < 9$

$$-9 < 1 - 2x < 9$$

$$-10 < -2x < 8$$

$$5 > x > -4$$

Note: When you divide or multiply by a negative number you flip the sign

Greater Than Inequalities

General Steps:

- Set up two inequalities
- Solve for x

Solve: $|1 - 2x| > 9$

$$1 - 2x > 9 \quad \text{Or} \quad 1 - 2x < -9$$

$$-2x > 8 \quad \text{Or} \quad -2x < -8$$

$$x < -4 \quad \text{Or} \quad x > 4$$

Note: When you divide or multiply by a negative number you flip the sign



Question: Why do you flip the sign and make the number negative?

Answer: All an absolute value inequality does is talk about the distance away from zero. That means you have the positive distance and the negative distance (see below)

$$+(1 - 2x) > 9 \quad \text{Or} \quad -(1 - 2x) > 9$$

But when you divide multiply or divide by a negative number it flips the sign so you end up with

$$1 - 2x > 9 \quad \text{Or} \quad 1 - 2x < -9$$

Practice Problems

1. Solve $|x| > 5$

2. Solve $|2x + 5| \leq 9$

3. Solve $|5 - x| < 12$

4. Solve $|6x - 3| \geq 9$

5. Solve $|x| - 10 > 5$

Solutions:

1) $x > 5$ Or $x < -5$

2) $-7 \leq x \leq 2$

3) $-7 < x < 17$

4) $x \leq -1$ Or $x \geq 2$

5) $x < -15$ Or $x > 15$