

# 6 2 solving multi step linear inequalities

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### **Solving Multi-Step Linear Inequalities: A Step-by-Step Guide**

**Introduction:** Multi-step linear inequalities are algebraic equations that compare two linear expressions using an inequality symbol ( $<$ ,  $>$ ,  $\leq$ ,  $\geq$ ). Solving these inequalities involves isolating the variable on one side of the inequality and simplifying the other side. This article provides a comprehensive guide to solving multi-step linear inequalities in 6 steps.

**Step 1: Simplify Both Sides** Start by simplifying both sides of the inequality by performing any necessary algebraic operations, such as combining like terms and canceling out common factors.

**Step 2: Isolate the Variable Term** Next, isolate the variable term (the term that contains the variable) on one side of the inequality. To do this, add or subtract the same number from both sides, divide or multiply both sides by the coefficient of the variable (if non-zero), or use other algebraic properties.

**Step 3: Reverse the Inequality (Optional)** If the variable was multiplied or divided by a negative number during the isolation step, the inequality symbol needs to be reversed. For instance, if you multiply both sides by  $-1$ , the  $<$  symbol becomes  $>$ .

**Step 4: Write the Solution Set** The solution set of the inequality is the set of all values of the variable that make the inequality true. Write the solution set as an interval using the appropriate inequality symbol.

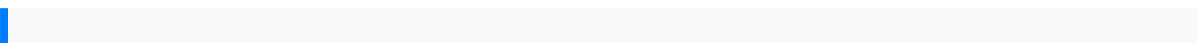
**Step 5: Check the Endpoints (Optional)** To verify the solution set, check the endpoints (where the inequality becomes an equality) by evaluating the inequality at these values. If both sides are equal, the endpoint is included in the solution set.

**Sample Question:** Solve the inequality:  $2x - 5 < 15$

**Answer:**

1. **Simplify:**  $2x < 20$
2. **Isolate variable:**  $x < 10$
3. **Write solution:**  $x < 10$
4. **Check endpoint:** At  $x = 10$ ,  $2(10) - 5 < 15$ , which is false. Endpoint not included.

Therefore, the solution set is  $x < 10$ .



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