Solving Linear Equations with X on Both Sides

KS4 MATHEMATICS ALGEBRA Ages 11-15 ⏰ 3 min read

What Does It Mean When X Is on Both Sides?

Sometimes in maths, you'll see equations where the mystery number **x** appears more than once. For example: **3x + 5 = x + 13**. This looks tricky because x is on the left side AND the right side. But don't worry—we can solve it using a simple method called **balancing**.

Think of it like a seesaw at the playground. If you want to keep the seesaw balanced, anything you add to one side must also be added to the other side. Equations work the same way!

The Golden Rule: Keep It Balanced

The most important thing to remember is that **an equation is like a balanced scale**. Whatever you do to one side, you must do to the other side too. This keeps everything fair and true.

Our goal is to get all the **x terms** (the ones with x in them) on one side, and all the **regular numbers** on the other side. Once we do that, we can find what x equals.

Step-by-Step: How to Solve It

Let's use the example: **3x + 5 = x + 13**

Step 1: Move all the x terms to one side. We'll subtract x from both sides: **3x − x + 5 = x − x + 13**, which gives us **2x + 5 = 13**.

Step 2: Move the regular numbers to the other side. We'll subtract 5 from both sides: **2x + 5 − 5 = 13 − 5**, which gives us **2x = 8**.

Step 3: Get x by itself. We divide both sides by 2: **x = 4**.

Think of it like sorting your toys. First, put all the building blocks on one side of the room and all the action figures on the other. Then count what you have. It's the same with equations!

Check Your Answer

Always put your answer back into the original equation to make sure it works. If **x = 4**, then **3(4) + 5 = 4 + 13** becomes **12 + 5 = 4 + 13**, which is **17 = 17**. Perfect!

Remember: solving equations is like being a detective. You're hunting for the secret number x, and by moving things around carefully (always keeping both sides balanced), you'll always find it!