

# Detailed System vs. User Responses Report

Age: 12

Experience: Middle school student

Question: How to solve a two step equation?

## Case: Understanding Level 1

### System Response:

Welcome to Solving Two-Step Equations

As a Middle School student, you're probably familiar with simple equations like  $2x = 6$ . But what happens when you have

What are Two-Step Equations?

A two-step equation is an equation that requires two operations to solve. These operations can be addition, subtraction, m

Example:  $2x + 3 = 9$

Let's break down this equation step by step.

Step 1: Subtract 3 from both sides

Our goal is to get rid of the +3 on the left side of the equation. To do this, we'll subtract 3 from both sides. This keeps the

$$2x + 3 - 3 = 9 - 3$$

$$2x = 6$$

Step 2: Divide both sides by 2

Now we have  $2x = 6$ . To solve for x, we need to get rid of the 2 that's being multiplied by x. To do this, we'll divide both si

$$(2x) / 2 = 6 / 2$$

$$x = 3$$

Ta-da! We've solved the equation. The value of x is 3.

Tips and Tricks

Always follow the order of operations (PEMDAS/BODMAS) when solving equations.

Make sure to perform the same operation on both sides of the equation to keep it balanced.

Use inverse operations to "undo" the operation that's being performed on the variable. For example, if you have  $2x$ , the in

Practice Time!

Try solving these two-step equations on your own:

$$x - 2 = 7$$

$$3x + 2 = 11$$

$$2x - 4 = 10$$

Check Your Understanding

What is the goal of solving a two-step equation?

What are the two steps required to solve the equation  $2x + 3 = 9$ ?

Can you think of a real-life scenario where you might use two-step equations? (e.g., calculating the cost of items on sale)

Conclusion

Solving two-step equations is a fundamental skill in math that will help you build a strong foundation for more advanced m

### User Answer:

I don't know how to solve it.

### Feedback:

Response shows minimal understanding of the steps involved.

## Case: Understanding Level 3

### System Response:

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Check Your Understanding

What is the goal of solving a two-step equation?

What are the two steps required to solve the equation  $2x + 3 = 9$ ?

Can you think of a real-life scenario where you might use two-step equations? (e.g., calculating the cost of items on sale)

Conclusion

Solving two-step equations is a fundamental skill in math that will help you build a strong foundation for more advanced m

### User Answer:

First subtract the constant, then divide by the coefficient.

### Feedback:

Good procedural explanation, but misses conceptual reasoning.

## Case: Understanding Level 5

### System Response:

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What are Two-Step Equations?

A two-step equation is an equation that requires two operations to solve. These operations can be addition, subtraction, multiplication, or division.

Example:  $2x + 3 = 9$

Let's break down this equation step by step.

Step 1: Subtract 3 from both sides

Our goal is to get rid of the +3 on the left side of the equation. To do this, we'll subtract 3 from both sides.

$$\begin{aligned} 2x + 3 - 3 &= 9 - 3 \\ 2x &= 6 \end{aligned}$$

Step 2: Divide both sides by 2

Now we have  $2x = 6$ . To solve for  $x$ , we need to get rid of the 2 that's being multiplied by  $x$ . To do this, we'll divide both sides by 2.

$$\begin{aligned} (2x) / 2 &= 6 / 2 \\ x &= 3 \end{aligned}$$

Ta-da! We've solved the equation. The value of  $x$  is 3.

Tips and Tricks

Always follow the order of operations (PEMDAS/BODMAS) when solving equations.

Make sure to perform the same operation on both sides of the equation to keep it balanced.

Use inverse operations to "undo" the operation that's being performed on the variable. For example, if you have  $x + 5 = 10$ , you would subtract 5 from both sides to solve for  $x$ .

Practice Time!

Try solving these two-step equations on your own:

$$\begin{aligned} x - 2 &= 7 \\ 3x + 2 &= 11 \\ 2x - 4 &= 10 \end{aligned}$$

Check Your Understanding

What is the goal of solving a two-step equation?

What are the two steps required to solve the equation  $2x + 3 = 9$ ?

Can you think of a real-life scenario where you might use two-step equations? (e.g., calculating the cost of items, determining the time it takes to travel a certain distance, etc.)

Conclusion

Solving two-step equations is a fundamental skill in math that will help you build a strong foundation for more advanced topics.

**User Answer:**

To solve  $2x + 3 = 7$ , subtract 3 from both sides to get  $2x = 4$ , then divide both sides by 2 to find  $x = 2$ .

**Feedback:**

Excellent step-by-step explanation with a clear example.