

Simplify $-2x+13=-7x+28$

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When encountering algebraic equations like $-2x + 13 = -7x + 28$, understanding how to simplify and solve them is a fundamental skill in mathematics. This type of problem involves combining like terms and isolating the variable to find its value. In this comprehensive guide, we'll explore the step-by-step process to simplify and solve the equation, discuss common mistakes to avoid, and provide tips to enhance your algebraic problem-solving skills.

Understanding the Equation: $-2x + 13 = -7x + 28$

Before diving into solving, it's essential to understand the structure of the equation.

- Equation Components:
 - Variables: x (unknown)
 - Constants: 13 and 28
 - Coefficients: -2 and -7
- Goal: Find the value of x that satisfies the equation.

The equation is linear, meaning the variable x appears to the first power and the equation can be rearranged to isolate x on one side.

Step-by-Step Simplification and Solution Process

Let's walk through the process systematically.

1. Write the Equation Clearly

```
\[
-2x + 13 = -7x + 28
\]
```

2. Bring Variable Terms to One Side

To simplify, we want all terms containing x on one side and constants on the other.

- Add $7x$ to both sides:

$$\begin{aligned} & \backslash[\\ & -2x + 7x + 13 = -7x + 7x + 28 \\ & \backslash] \end{aligned}$$

Simplifies to:

$$\begin{aligned} & \backslash[\\ & 5x + 13 = 28 \\ & \backslash] \end{aligned}$$

- Alternatively, subtract $-2x$ from both sides, or subtract 13 from both sides
 - but adding $7x$ is often cleaner.

3. Isolate the Variable Term

Now, subtract 13 from both sides to move constants to the right:

$$\begin{aligned} & \backslash[\\ & 5x + 13 - 13 = 28 - 13 \\ & \backslash] \end{aligned}$$

Simplifies to:

$$\begin{aligned} & \backslash[\\ & 5x = 15 \\ & \backslash] \end{aligned}$$

4. Solve for x

- Divide both sides by 5:

$$\begin{aligned} & \backslash[\\ & x = \frac{15}{5} = 3 \\ & \backslash] \end{aligned}$$

Result: $x = 3$

Verifying the Solution

Always verify your solution by substituting it back into the original equation.

- Substitute $x = 3$:

$$\begin{aligned} & \backslash[\\ & -2(3) + 13 = -7(3) + 28 \\ & \backslash] \end{aligned}$$

Calculate each side:

- Left side:

```
\[
-6 + 13 = 7
\]
```

- Right side:

```
\[
-21 + 28 = 7
\]
```

Since both sides are equal, $x = 3$ is the correct solution.

Common Mistakes and How to Avoid Them

Even experienced students can make errors when simplifying equations. Here are some common pitfalls:

- **Incorrectly combining like terms:** Remember, only terms with the same variable and exponent can be combined.
- **Sign errors:** Be cautious when adding or subtracting terms, especially with negative signs.
- **Forgetting to perform the same operation on both sides:** To maintain the equality, always do the same to both sides of the equation.
- **Dividing by zero:** Ensure that the coefficient of the variable isn't zero before dividing.

Tips for Solving Similar Equations

To enhance your algebra skills, consider these tips:

- Always perform inverse operations: Addition ↔ Subtraction, Multiplication ↔ Division.
- Keep the equation balanced: Whatever you do to one side, do to the other.
- Use a step-by-step approach: Write each step clearly to avoid mistakes.
- Check your solution: Substitute your answer back into the original equation.

Practice Problems for Mastery

Try solving these similar equations:

1. $3x - 5 = 2x + 7$

2. $-4x + 10 = 6x - 14$

3. $5x + 3 = 2x + 12$

4. $-x + 8 = 3x - 4$

Working through these will reinforce your understanding of the simplification process.

Additional Resources for Learning Algebra

If you're looking to improve your algebra skills further, consider exploring:

- Online tutorials and videos: Visual explanations can enhance understanding.
- Practice worksheets: Regular practice helps solidify concepts.
- Algebra apps and games: Interactive tools make learning engaging.
- Math tutors or study groups: Collaborative learning can clarify difficult topics.

Conclusion

Simplifying and solving equations like $-2x + 13 = -7x + 28$ is a fundamental aspect of algebra. By carefully isolating variables, performing inverse operations, and verifying solutions, you can confidently tackle similar problems. Remember to stay organized, double-check your work, and practice regularly to develop strong algebraic problem-solving skills.

Mastery of these techniques opens doors to more advanced mathematics and problem-solving scenarios, making your mathematical journey both effective and enjoyable.

Frequently Asked Questions

How do I solve the equation $-2x + 13 = -7x + 28$?

To solve, first add $7x$ to both sides: $-2x + 7x + 13 = 28$, which simplifies to $5x + 13 = 28$. Then subtract 13 from both sides: $5x = 15$. Finally, divide both sides by 5: $x = 3$.

What is the value of x in the equation $-2x + 13 = -7x$

+ 28?

The value of x is 3.

Can I check my solution $x=3$ for the equation $-2x + 13 = -7x + 28$?

Yes, substitute $x=3$ into the original equation: $-2(3) + 13 = -7(3) + 28$, which simplifies to $-6 + 13 = -21 + 28$, or $7 = 7$. Since both sides are equal, $x=3$ is correct.

What steps are involved in solving $-2x + 13 = -7x + 28$?

The steps include: 1) Add $7x$ to both sides to gather x terms on one side, 2) Subtract 13 from both sides to isolate the term with x , 3) Divide both sides by the coefficient of x to find the value of x .

Is the equation $-2x + 13 = -7x + 28$ linear?

Yes, it is a linear equation because it can be written in the form $ax + b = 0$, with x to the first power and no exponents or products of variables.

What does the solution $x=3$ tell us about the original equation?

It indicates that when x is 3, both sides of the equation are equal, satisfying the equality condition.

Are there other solutions to the equation $-2x + 13 = -7x + 28$?

No, because linear equations have a single unique solution. In this case, $x=3$ is the only solution.

How can I interpret the equation $-2x + 13 = -7x + 28$ in real-world terms?

Depending on the context, it could represent balancing two expressions or quantities where the variable x influences both sides equally; solving for x finds the point where these quantities are equal.

Additional Resources

Simplify $-2x + 13 = -7x + 28$: A Step-by-Step Guide to Solving Linear Equations

When tackling algebraic equations, understanding how to simplify $-2x + 13 = -7x + 28$ is fundamental. This equation exemplifies a linear equation with variables on both sides, and mastering its solution process helps build a solid foundation for more complex algebraic concepts. Whether you're a student brushing up on algebra skills or someone seeking to improve problem-

solving confidence, this guide will walk you through the steps to simplify and solve this type of equation efficiently.

Understanding the Structure of the Equation

Before diving into the solution, it's essential to understand the structure of the equation:

- Both sides contain the variable x , with coefficients $(-2$ and -7 , respectively).
- Constants (numbers without variables) are 13 and 28 .
- The goal is to isolate x on one side to find its value.

The equation:

$$-2x + 13 = -7x + 28$$

is linear because the highest power of the variable x is 1 . The primary objective is to collect all variable terms on one side and constants on the other, simplifying step by step.

Step 1: Eliminate the Variable Terms from One Side

The first step is to gather all terms involving x on one side of the equation. You can choose to move all variable terms to the left or the right. Here, we will move all x terms to the left for consistency.

Action: Add $7x$ to both sides

Adding $7x$ cancels out the $-7x$ on the right side and adds $7x$ to the left:

$$(-2x + 13) + 7x = (-7x + 28) + 7x$$

Simplify both sides:

- Left: $-2x + 7x + 13 = 5x + 13$
- Right: $-7x + 7x + 28 = 0 + 28 = 28$

Now, the simplified equation is:

$$5x + 13 = 28$$

Step 2: Isolate the Variable Term

Next, we want to isolate the term with x . To do this, subtract 13 from both sides:

$$(5x + 13) - 13 = 28 - 13$$

Simplify:

$$5x = 15$$

This step removes the constant from the left, leaving the variable term alone.

Step 3: Solve for the Variable

Now, divide both sides by the coefficient of x , which is 5:

$$(5x) / 5 = 15 / 5$$

Simplify:

$$x = 3$$

Final Answer: $x = 3$

This is the solution to the original equation. To confirm, substitute x back into the original equation:

$$-2(3) + 13 = -7(3) + 28$$

Calculate each side:

- Left: $-6 + 13 = 7$
- Right: $-21 + 28 = 7$

Since both sides equal 7, the solution $x = 3$ is verified.

Additional Tips for Simplifying Linear Equations

1. Always perform the same operation on both sides
This maintains the equality and keeps the equation balanced.
2. Combine like terms early
Simplify expressions on each side before moving variables or constants across the equation to reduce complexity.
3. Keep track of signs carefully
Watch out for negative signs during addition, subtraction, multiplication, and division. Mistakes here often lead to incorrect solutions.
4. Check your solution
Substitute your answer back into the original equation to verify correctness.

Common Mistakes to Avoid

- Forgetting to perform the same operation on both sides: Always remember that whatever you do to one side, do to the other.
- Misplacing signs during addition/subtraction: Carefully track positive and negative signs.
- Incorrectly combining like terms: Ensure variables are combined with variables, constants with constants.

- Skipping steps: Write each step clearly to avoid errors.

Practice Problems to Reinforce Learning

Try solving these equations using the steps outlined above:

1. $4x - 5 = 3x + 2$
2. $-3x + 7 = 2x - 4$
3. $6x + 9 = -3x + 24$
4. $-8x - 12 = -2x + 4$
5. $10x + 5 = 0$

For each, follow these steps:

- Move variable terms to one side
- Move constants to the other
- Simplify
- Solve for x
- Verify your solution

Summary

The process of simplify $-2x + 13 = -7x + 28$ demonstrates core algebraic techniques:

- Moving all variable terms to one side
- Moving constants to the other
- Combining like terms
- Dividing to isolate the variable

Mastering these steps will enable you to solve a wide range of linear equations confidently. Remember, practice makes perfect—so regularly work through similar problems to build your skills and understanding.

Final Words

Understanding how to simplify $-2x + 13 = -7x + 28$ is more than just solving for x ; it's about developing a systematic approach to algebra. With patience and practice, you'll find that solving equations becomes second nature, opening the door to more advanced mathematical concepts and real-world problem-solving scenarios. Keep practicing, stay organized, and don't hesitate to double-check your work—success in algebra is all about precision and persistence!

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