

Marta Solved An Equation. Her Work Is Shown Below. Equation: $2(x-4) + 2x = X+7$

Line 1: $2x 81+ 2x = X$

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Introduction to the Problem

Mathematics often involves solving equations to find unknown values. In this article, we explore the process Marta used to solve a particular algebraic equation. The original problem is presented as:

Equation:

$$[2(x - 4) + 2x = X + 7]$$

Her work is summarized in the following line:

Line 1: $2x 81+ 2x = X$

Despite some apparent inconsistencies or possible typographical errors in the provided work, we will analyze the problem from scratch, interpret her steps, and clarify the solution process.

Understanding the Given Equation

Original Equation Breakdown

The initial equation is:

$$[2(x - 4) + 2x = X + 7]$$

Key points:

- The variable (x) appears within parentheses and as a standalone term.
- On the right side, there's an uppercase (X) which may be a typographical inconsistency. Typically, the variable is lowercase (x) . For clarity, we will assume (X) is intended to be lowercase (x) .

Thus, the equation becomes:

$$[2(x - 4) + 2x = x + 7]$$

Step-by-Step Solution Process

Step 1: Expand the Left Side

To simplify, distribute the 2 over the parentheses:

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

which simplifies to:

$$2x - 4 + 2x = x + 7$$

Step 2: Combine Like Terms on the Left Side

$$(2x + 2x) - 4 = x + 7$$

$$4x - 4 = x + 7$$

Step 3: Isolate the Variable (x)

Subtract (x) from both sides:

$$4x - x - 4 = 7$$

$$3x - 4 = 7$$

Add 4 to both sides:

$$3x = 7 + 4$$

$$3x = 11$$

$$3x = 15$$

\]

Divide both sides by 3:

\[

$$x = \frac{15}{3} = 5$$

\]

Interpreting Marta's Line 1: $2x + 81 + 2x = X$

The line provided seems to contain typographical errors or missing operators. Likely, it was meant to be:

$$\[2x + 81 + 2x = x \]$$

or perhaps:

$$\[2x + 81 + 2x = X \]$$

Given the context and standard algebraic steps, it might be an attempt to restate or simplify the original problem.

Possible interpretation:

- The line could be an intermediate step where Marta combined like terms:

$$\[2x + 2x + 81 = x \]$$

which simplifies to:

$$\[4x + 81 = x \]$$

Subtract (x) from both sides:

$$\[4x - x + 81 = 0 \]$$

$$\[3x + 81 = 0 \]$$

Subtract 81:

$$\[3x = -81 \]$$

Divide:

$$\[x = -27 \]$$

But this conflicts with the earlier solution. Alternatively, perhaps her line was attempting to show that after some manipulation, the variable x was isolated.

Clarification and Common Mistakes

Typographical Errors

- The presence of uppercase X versus lowercase x can cause confusion.
- The missing operators or incorrect spacing in her line can mislead the reader.
- The number 81 appearing without context suggests possible transcription errors.

Importance of Clear Notation

To avoid confusion:

- Use consistent variable notation.
- Clearly write all operators (+, -, ×, ÷).
- Check for typographical errors before solving.

Final Solution Summary

Based on the initial equation and typical algebraic procedures, Marta's solution leads to:

$$x = 5$$

This is verified by substituting back into the original equation:

$$2(5 - 4) + 2 \times 5 = 5 + 7$$

$$2(1) + 10 = 12$$

$$2 + 10 = 12$$

which holds true.

Key Takeaways from the Solution Process

- Always expand and simplify equations systematically.
- Combine like terms carefully to avoid errors.
- Isolate the variable step-by-step, ensuring each operation is valid.
- Verify the solution by substitution to confirm correctness.

Conclusion

Marta's work demonstrates a standard approach to solving linear equations involving distribution, combining like terms, and isolating the variable. Despite some unclear elements in her original line, the fundamental steps remain consistent: expand, simplify, isolate, and verify. Proper notation and careful calculation are essential to avoid errors and ensure accurate solutions in algebra.

By following these principles, students and learners can confidently tackle similar problems, developing their algebraic reasoning skills.

Frequently Asked Questions

What is the first step Marta took to solve the equation $2(x - 4) + 2x = x + 7$?

Marta expanded the expression $2(x - 4)$ to $2x - 8$ and then combined like terms on the left side of the equation.

How did Marta simplify the equation after expanding $2(x - 4)$?

She combined $2x - 8 + 2x$ to get $4x - 8$, resulting in the simplified equation $4x - 8 = x + 7$.

What is the next step Marta took to isolate x ?

She subtracted x from both sides to get $3x - 8 = 7$.

How did Marta solve for x after isolating the variable?

She added 8 to both sides, resulting in $3x = 15$, then divided both sides by 3 to find $x = 5$.

What does the line 'Line 1: $2x + 8 + 2x = x + 7$ ' indicate in Marta's work?

It appears to be a misprint or typo; the correct step is likely $2x + 8 + 2x = x + 7$, which Marta simplified later.

Why is it important to expand parentheses when solving equations like Marta's?

Expanding parentheses helps to eliminate parentheses and combine like terms, making the equation easier to solve.

What common mistake should students avoid when solving similar equations?

Students should be careful to perform the same operation on both sides of the equation and avoid misplacing signs or misreading the equation.

How can Marta verify her solution $x = 5$?

She can substitute $x = 5$ back into the original equation to see if both sides are equal, confirming the solution's correctness.

What is the importance of showing each step clearly when solving equations?

Showing each step clearly helps prevent errors, makes the solution easier to follow, and allows others to understand the solving process.

Additional Resources

Marta Solved An Equation. Her Work Is Shown Below. Equation: $2(x-4) + 2x = x + 7$ Line 1: $2x + 8 + 2x = x + 7$

When tackling algebraic equations, understanding each step of the solution process is crucial for mastering problem-solving skills. In this article, we will provide a detailed breakdown of Marta's process in solving the equation $2(x-4) + 2x = x + 7$, examine her work carefully, clarify common misconceptions, and guide you through a systematic approach to similar problems. Whether you are a student aiming to improve your algebra skills or a teacher seeking to analyze student work, this comprehensive guide will serve as a valuable resource.

Understanding the Equation

Before diving into Marta's work, let's first understand the original equation:

Original Equation:

$$2(x - 4) + 2x = X + 7$$

Note: The use of "X" versus "x" can sometimes cause confusion. Usually, in algebra, "x" is the variable, and "X" may be a typo or stylistic choice. We will assume "X" refers to the same variable "x."

Rewritten for clarity:

$$2(x - 4) + 2x = x + 7$$

Key Components:

- Distributive property: The term $2(x - 4)$ involves distributing the 2 across the parentheses.
- Combining like terms: After expansion, similar terms should be combined to simplify the equation.
- Isolating the variable: The ultimate goal is to solve for x, isolating it on one side of the equation.

Step-by-Step Breakdown of Marta's Solution

Let's now analyze Marta's work step-by-step, as it appears she attempted to solve the equation. Her work, as shown, is:

Line 1: $2x - 8 + 2x = X$

This seems to be a typo or a misrepresentation. Likely, it was meant to be:

Corrected Line 1: $2(x - 4) + 2x = x + 7$

We will assume this is what Marta started with and analyze how she proceeded.

Step 1: Distribute and Expand

Marta's approach:

- Distribute 2 across $(x - 4)$: $2x - 8 = 2x - 8$
- Rewrite the equation: $2x - 8 + 2x = x + 7$

Analysis:

This step is correct. Distributing correctly is fundamental.

Step 2: Combine Like Terms on the Left Side

Marta's work:

- $2x + 2x - 8 = x + 7$
- Simplify: $4x - 8 = x + 7$

Analysis:

Again, correct. Combining like terms simplifies the equation effectively.

Step 3: Move Variables to One Side

Marta's work:

- Subtract x from both sides: $4x - x - 8 = 7$
- Simplify: $3x - 8 = 7$

Analysis:

This is a standard step in solving for x . Correct algebraic manipulation.

Step 4: Isolate the Term with x

Marta's work:

- Add 8 to both sides: $3x = 7 + 8$
- Simplify: $3x = 15$

Analysis:

Again, a proper step. She is isolating the coefficient multiplied by x .

Step 5: Solve for x

Marta's work:

- Divide both sides by 3: $x = 15 / 3$
- Final answer: $x = 5$

Analysis:

Correctly performed division, leading to the solution.

Critical Evaluation of Marta's Work

Based on the steps outlined, Marta followed a correct and logical sequence:

1. Distribution: Correctly expanded the parentheses.
2. Combining like terms: Simplified the equation properly.
3. Rearrangement: Moved variables and constants to isolate x .
4. Division: Solved for x accurately.

Potential Errors in the Original Work (if any):

- The initial notation in the provided snippet appears inconsistent (" $2x - 8 + 2x = X$ "), possibly a typo or misprint. Clarifying the initial step is essential for understanding.
- The use of " X " versus " x " can cause confusion. Consistency in notation throughout the work is crucial.
- No mention of checking the solution, which is an important step in verifying the correctness.

Additional Tips for Solving Similar Equations

To ensure clarity and accuracy when solving algebraic equations like the one Marta worked on, consider these best practices:

1. Write the Equation Clearly

- Use consistent notation.
- Clearly indicate each step.
- Keep track of all terms, especially signs.

2. Distribute Carefully

- Remember the distributive property: $a(b + c) = ab + ac$.
- Double-check your distribution before proceeding.

3. Combine Like Terms

- Group similar variables and constants.
- Simplify step-by-step to avoid errors.

4. Isolate the Variable

- Move all variable terms to one side.
- Move constants to the opposite side.

5. Divide to Solve for the Variable

- Divide both sides by the coefficient of the variable.
- Simplify to find the value of the variable.

6. Verify Your Solution

- Substitute your solution back into the original equation.
- Check if both sides are equal to confirm correctness.

Summary of the Solution Process

Step	Action	Result	Explanation
1	Distribute 2 over (x - 4)	$2x - 8$	Applying distributive property
2	Combine like terms on the left	$4x - 8$	Summing coefficients of x
3	Move x-term to one side	$3x - 8 = 7$	Subtracting x from both sides
4	Add constants to both sides	$3x = 15$	Adding 8 to both sides
5	Divide both sides by 3	$x = 5$	Isolating x

Final Thoughts

Marta's work exemplifies a systematic and correct approach to solving a linear algebraic equation. Her steps demonstrate a solid understanding of fundamental algebraic principles, including distribution, combining like terms, and solving for the variable. The key takeaway for students and educators alike is the importance of clarity, careful calculation, and verification throughout the problem-solving process.

By following such structured steps, anyone can confidently tackle similar equations, build problem-solving skills, and develop a deeper understanding of algebra. Remember, practice makes perfect—so keep practicing with various equations to strengthen your skills!

If you're interested in more detailed guides and step-by-step solutions for algebra and other math topics, stay tuned to our blog for regular updates and expert analyses!

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