6 2 practice substitution answer key with work

6 2 practice substitution answer key with work is a crucial concept in algebra that students encounter as they delve into the world of equations and functions. Substitution is a method used to solve equations by replacing variables with their corresponding values. Understanding this technique is vital for mastering more advanced mathematical concepts. In this article, we will explore the practice of substitution in detail, provide step-by-step solutions to example problems, and present an answer key for the exercises typically found in a 6 2 practice worksheet.

Understanding Substitution

Substitution refers to the process of replacing a variable or a set of variables in an equation or expression with their corresponding values. This method is particularly useful when solving systems of equations or evaluating expressions where the variables have been defined.

Why Use Substitution?

Substitution is an essential skill in algebra for several reasons:

1. Simplification: It allows for simplification of complex expressions.
2. Solving Equations: It helps in finding the values of unknown variables.
3. Function Evaluation: Substitution is used to evaluate functions at specific points.

Basic Steps in Substitution

To successfully apply substitution in problems, follow these steps:

1. Identify the Variable: Determine which variable will be substituted.
2. Find the Value: Locate the value or expression that you will substitute.
3. Replace the Variable: Substitute the identified variable with its value.
4. Simplify: Simplify the resulting expression if necessary.

Example Problems

To illustrate how substitution works, let’s go through several examples that

demonstrate the process step-by-step.

Example 1: Solving for x

Consider the equation:

1. $y = 2x + 3$
2. $y = 11$

Step 1: Identify the value of y
From the second equation, we have $y = 11$.

Step 2: Substitute y in the first equation
Replace y in the first equation with 11:

$$
11 = 2x + 3
$$

Step 3: Solve for x
Now, isolate x:

$$
11 - 3 = 2x
$$
$$
8 = 2x
$$
$$
x = \frac{8}{2} = 4
$$

Final Result: $x = 4$

Example 2: Evaluating a Function

Let’s say we have the function:

1. $f(x) = x^2 + 5x - 4$
2. Evaluate $f(3)$.

Step 1: Substitute x
Replace x with 3:

$$
f(3) = 3^2 + 5(3) - 4
$$

Step 2: Simplify
Calculate each term:

$$
= 9 + 15 - 4
$$
$$
= 20
$$

Final Result: $f(3) = 20$

Example 3: Solving a System of Equations

Consider the system:

1. $x + y = 10$
2. $y = 2x + 1$

Step 1: Substitute for y
From the second equation, we can substitute y in the first equation:

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

Step 2: Simplify and Solve for x
Combine like terms:

$$
3x + 1 = 10
$$

Subtract 1:

$$
3x = 9
$$

Divide by 3:

$$
x = 3
$$

Step 3: Find y
Now substitute $x = 3$ back into the second equation:

$$

$$
y = 2(3) + 1 = 6 + 1 = 7
$$

Final Result: $x = 3, y = 7$

6 2 Practice Problems

To solidify the understanding of substitution, here are some practice problems that students can solve:

1. Solve for x in the system:
   - $3x + 4y = 24$
   - $y = 2x - 3$

2. Evaluate $g(a) = a^3 - 2a + 5$ for $a = 2$.

3. Solve for y in the equations:
   - $5x - y = 10$
   - $y = 3x + 4$

4. Substitute and evaluate $h(b) = 4b^2 + 3b - 5$ for $b = -1$.

5. Solve the following system:
   - $2x + 3y = 12$
   - $y = 4 - x$

Answer Key to 6 2 Practice Problems

Below are the solutions to the practice problems provided above.

Problem 1 Solution

1. Substitute y into the first equation:

$3x + 4(2x - 3) = 24$

$3x + 8x - 12 = 24$

Combine like terms:

$11x - 12 = 24$

$11x = 36$

$x = \frac{36}{11}$

Substitute back to find y:

$y = 2(\frac{36}{11}) - 3 = \frac{72}{11} - 3 = \frac{72}{11} - \frac{33}{11} = \frac{39}{11}$

Final Result: $x = \frac{36}{11}, y = \frac{39}{11}$

Problem 2 Solution

Substitute $a = 2$:

$g(2) = 2^3 - 2(2) + 5 = 8 - 4 + 5 = 9$

Final Result: $g(2) = 9$

Problem 3 Solution

Substitute y into the first equation:

$5x - (3x + 4) = 10$

$5x - 3x - 4 = 10$

Combine like terms:

$2x - 4 = 10$

$2x = 14$

$x = 7$

Substitute back to find y:

$y = 3(7) + 4 = 21 + 4 = 25$

Final Result: $x = 7, y = 25$

Problem 4 Solution

Substitute $b = -1$:

$h(-1) = 4(-1)^2 + 3(-1) - 5 = 4(1) - 3 - 5 = 4 - 3 - 5 = -4$

Final Result: $h(-1) = -4$

Problem 5 Solution

Substitute $y = 4 - x$ into the first equation:

$2x + 3(4 - x) = 12$

$2x + 12 - 3x = 12$

Combine like terms:

$-x + 12 = 12$

$-x = 0$

$x = 0$

Substitute back to find y:

$y = 4 - 0 = 4$

Final Result: $x = 0, y = 4$

Conclusion

Understanding substitution is fundamental in algebra and greatly aids in solving equations and evaluating functions. Through practice and application of the steps outlined in this article, students can enhance their problem-solving skills and prepare themselves for more complex mathematical challenges. The examples and practice problems provided serve as an excellent resource for reinforcing these concepts, ensuring a solid foundation in substitution techniques.

Frequently Asked Questions

What is the purpose of the '6 2 practice substitution' exercises?

The '6 2 practice substitution' exercises are designed to help students understand and practice the substitution method in algebra, specifically for solving systems of equations.

How do you approach solving a system of equations

using substitution?

To solve a system of equations using substitution, you first solve one of the equations for one variable and then substitute that expression into the other equation to find the value of the other variable.

What is the first step in solving the equations y = 2x + 3 and x + y = 10 using substitution?

First, solve the first equation for y, which gives y = 2x + 3, and then substitute this expression for y into the second equation.

Can you provide an example of substitution from the '6 2 practice'?

Sure! Given the equations y = 3x + 1 and 2x + y = 11, you would substitute y from the first equation into the second to get 2x + (3x + 1) = 11.

What should you do if you encounter fractions in a substitution problem?

If you encounter fractions, it's often helpful to eliminate them first by multiplying the entire equation by the least common denominator before proceeding with substitution.

How can you verify your answer after using substitution?

You can verify your answer by substituting the values of the variables back into the original equations to see if they hold true.

What common mistakes should be avoided when using substitution?

Common mistakes include miscalculating during substitution, forgetting to substitute into both equations, and making sign errors when solving for the variable.

How can the '6 2 practice' substitution help prepare for exams?

The '6 2 practice' substitution helps students reinforce their understanding of solving equations, improve their problem-solving skills, and increase their confidence in algebra for exams.

Where can I find the answer key for '6 2 practice substitution' problems?

The answer key for '6 2 practice substitution' problems is usually provided in the textbook or can be found on the educational publisher's website associated with the material.

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