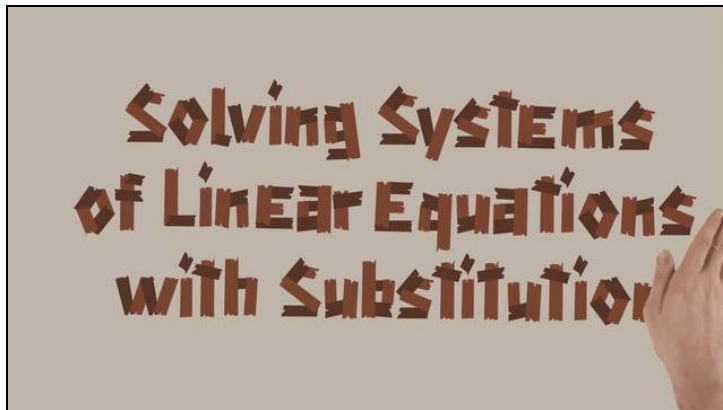Printable Worksheets from sofatutor.com

Using Substitution to Solve Systems of Linear Equations

1 **Solve the equation by substituting.**

2 Recall the steps for solving a system of two linear equations.

3 Identify the solution to the system of linear equations using the substitution method.

4 Determine the solution for the system of equations using the substitution method.

5 Solve these word problems through systems of linear equations.

6 Solve systems of linear equations with fractional coefficients.

+ with lots of tips, answer keys, and detailed answer explanations for all of the problems.

⚠ The complete package, **including all problems, hints, answers, and detailed answer explanations** is available for all sofatutor.com subscribers.

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of Linear Equations

1
of 6

Solve the equation by substituting.

Identify the x-value given a value for y.

The solution to a system of linear equations is the intersection point (x, y) of the two lines.

For each system of equations below the value for y has been given. Use the given value of y to identify the value for x in the solution to the system.

Fill in the blank for the solution to each system of linear equations below.

1 The solution to the system $\begin{aligned} y + 5 &= 3x \\ y &= 7 \end{aligned}$ is $(\underline{\quad^1\quad}, 7)$.

2 The solution to the system $\begin{aligned} y - 2x &= 3 \\ y &= -5 \end{aligned}$ is $(\underline{\quad^2\quad}, -5)$.

3 The solution to the system $\begin{aligned} 6x + 5y &= 28 \\ y &= 2 \end{aligned}$ is $(\underline{\quad^3\quad}, 2)$.

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Hints for solving these problems

① Solve the equation by substituting.

of 6

Hint #1

Substitute in the given value of y into the first equation.

Hint #2

After substituting, simplify and solve for x.

Hint #3

For example, given
$$\begin{aligned} 2x + 3y &= 15 \\ y &= 1 \end{aligned}$$

Start but substituting 1 for y into the first equation, then simplify and solve for x.

$$\begin{aligned} 2x + 3(1) &= 15 \\ 2x + 3 &= 15 \\ -3 \qquad & -3 \\ 2x &= 12 \\ \div 2 \qquad & \div 2 \\ x &= 6 \end{aligned}$$

Answers and detailed answer explanations for these problems

1
of 6

Solve the equation by substituting.

Answer key: 1: 4 // 2: -4 // 3: 3

When a value for x or y is given, you automatically know one of the values in the solution (x, y). To find the other value, substitute in the known value into the equation with two variables.

1) To solve :

$$
\begin{aligned}
y + 5 &= 3x \\
y &= 7
\end{aligned}
$$

First, substitute $y = 7$ into the first equation, then simplify and solve for x:

$$
\begin{aligned}
7 + 5 &= 3x \\
12 &= 3x \\
\div 3 \quad &\quad \div 3 \\
4 &= x
\end{aligned}
$$

Therefore, the solution to the system is $x = 4$ and $y = 7$, written as a coordinate point is $(4, 7)$.

2) To solve:

$$
\begin{aligned}
y - 2x &= 3 \\
y &= -5
\end{aligned}
$$

First, substitute $y = -5$ into the first equation, then simplify and solve for x:

$$
\begin{aligned}
(-5) - 2x &= 3 \\
-5 - 2x &= 3 \\
+5 \quad &\quad +5 \\
-2x &= 8 \\
\div -2 \quad &\quad \div -2 \\
x &= -4
\end{aligned}
$$

Therefore, the solution to the system is $x = -4$ and $y = -5$, written as a coordinate point is $(-4, -5)$.

3) To solve:

$$
\begin{aligned}
6x + 5y &= 28 \\
y &= 2
\end{aligned}
$$

First, substitute $y = 2$ into the first equation, then simplify and solve for x:

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$$
\begin{aligned}
6x + 5(2) &= 28 \\
6x + 10 &= 28 \\
\textcolor{green}{-10} & \textcolor{green}{-10} \\
6x &= 18 \\
\textcolor{green}{\div 6} & \textcolor{green}{\div 6} \\
x &= 3
\end{aligned}
$$

Therefore, the solution to the system is $x = 3$ and $y = 2$, written as a coordinate point is $(3, 2)$.

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