# Solving Systems of Linear Equations by the Substitution Method

Procedures for the Substitution Method

- Solve for one variable in terms of the other variable in one of the equations.
- Substitute the value of the variable found in the first step of the second equation.
- 3. Simplify then solve the resulting equation.
- ${\bf 4.}\,$  Substitute the value obtained to any of the original equations.
- 5. Check the values of the variables obtained against the linear equations in the system.

#### Practice Exercises

Solve each system of linear equation using the substitution method.

1. 
$$\begin{cases} x - 5y = 4 \\ 2x + y = 7 \end{cases}$$

2. 
$$\begin{cases} 2x + 3y = -13 \\ 5x - 2y = 34 \end{cases}$$

$$3 \cdot \begin{cases} 5x + 3y = 7 \\ 3x - 5y = -23 \end{cases}$$

$$4. \begin{cases} x+y = \frac{1}{2} \\ 2x + y = \frac{1}{2} \end{cases}$$

5. 
$$\begin{cases} 7(x-y) = 1.5 \\ 2x = y + 5 \end{cases}$$

#### Problem Set

Solve each system of linear equation using the substitution method.

1. 
$$\begin{cases} 2x - y = 2 \\ 6x + 5y = 2 \end{cases}$$

$$\begin{cases}
x - 3y = 1 \\
-2x + 6y = 5
\end{cases}$$

$$3\cdot \begin{cases} x-3y = 1 \\ -2x+6y = -2 \end{cases}$$

$$4 \cdot \begin{cases} x+y = 11 \\ 3x-y = 5 \end{cases}$$

$$5. \quad \begin{cases} 3x = 4y - 3 \\ 3x + 2y = 9 \end{cases}$$

#### Solving Systems of Linear Equations by the Substitution Method

 ${\bf Procedures} \ {\bf for} \ {\bf the} \ {\bf Substitution} \ {\bf Method}$ 

- 1. Solve for one variable in terms of the other variable in one of the equations.
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## **Practice Exercises**

Solve each system of linear equation using the substitution method.

1. 
$$\begin{cases} x - 5y = 4 \\ 2x + y = 7 \end{cases}$$

2. 
$$\begin{cases} 2x + 3y = -13 \\ 5x - 2y = 34 \end{cases}$$

$$3. \begin{cases} 5x + 3y = 7 \\ 3x - 5y = -23 \end{cases}$$

$$4. \begin{cases} x+y = \frac{1}{2} \\ 2x + y = 5 \end{cases}$$

$$\begin{cases} 3x - y = 5 \\ \sqrt{(x - y)} = 14 \end{cases}$$

## 5. 2x = y + 5 Problem Set

Solve each system of linear equation using the substitution method.

1. 
$$\begin{cases} 2x - y = 2 \\ 6x + 5y = 2 \end{cases}$$

$$2. \begin{cases} x-3y = 1 \\ -2x+6y = 5 \end{cases}$$

$$3. \begin{cases} x - 3y = 1 \\ -2x + 6y = -2 \end{cases}$$

$$4. \begin{cases} x+y = 11 \\ 3x-y = 5 \end{cases}$$

$$5. \quad \begin{cases} 3x = 4y - 3 \\ 3x + 2y = 9 \end{cases}$$

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Procedures for the Substitution Method

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- Check the values of the variables obtained against the linear equations in the system.

#### **Practice Exercises**

Solve each system of linear equation using the substitution method.

1. 
$$\begin{cases} x - 5y = 4 \\ 2x + y = 7 \end{cases}$$

$$2. \begin{cases} 2x + 3y = -13 \\ 5x - 2y = 34 \end{cases}$$

$$3. \begin{cases} 5x + 3y = 7 \\ 3x - 5y = -23 \end{cases}$$

$$4. \begin{cases} x+y = \frac{1}{2} \\ 2x-y = \frac{1}{2} \end{cases}$$

5. 
$$\begin{cases} 7(x-y) = 12 \\ 2x = y + 5 \end{cases}$$

#### Problem Set

Solve each system of linear equation using the substitution method.

1. 
$$\begin{cases} 2x - y = 2 \\ 6x + 5y = 2 \end{cases}$$

$$2. \quad \begin{cases} x - 3y = 1 \\ -2x + 6y = 5 \end{cases}$$

$$3. \begin{cases} x - 3y = 1 \\ -2x + 6y = -2 \end{cases}$$

$$4. \begin{cases} x+y = 1 \\ 3x-y = 5 \end{cases}$$

$$5. \quad \begin{cases} 3x = 4y - 3 \\ 3x + 2y = 9 \end{cases}$$

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Procedures for the Substitution Method

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## **Practice Exercises**

Solve each system of linear equation using the substitution method.

1. 
$$\begin{cases} x - 5y = 4 \\ 2x + y = 7 \end{cases}$$

$$\begin{cases} 2x + 3y = -13 \\ 5x - 3y = 34 \end{cases}$$

$$3 \cdot \begin{cases} 5x + 3y = 7 \\ 3x - 5y = -2 \end{cases}$$

$$\int x + y = \frac{1}{2}$$

4. 
$$\begin{cases} 3x - y = 5 \\ 3x - y = 5 \end{cases}$$
5. 
$$\begin{cases} 7(x - y) = 14 \\ 2x = y + 5 \end{cases}$$

Solve each system of linear equation using the substitution method.

1. 
$$\begin{cases} 2x - y = 2 \\ 6x + 5y = 2 \end{cases}$$

$$2. \begin{cases} x - 3y = 1 \\ -2x + 6y = 5 \end{cases}$$

$$3. \begin{cases} x - 3y = 1 \\ -2x + 6y = -3 \end{cases}$$

$$4. \begin{cases} x+y = 11 \\ 3x-y = 5 \end{cases}$$

$$5. \quad \begin{cases} 3x = 4y - 3 \\ 3x + 2y = 9 \end{cases}$$