Key Lesson Marker

Algebraically trying to solve a system of equations representing parallel lines results in a false statement, which tells you there is no solution. In other words, the false statement tells you that there are no values for the variables that satisfy both equations.

Algebraically trying to solve a system of equations representing coincident lines results in a true statement, which tells you there are an infinite number of solutions. In other words, the true statement tells you that any variable values that satisfy one equation will also satisfy the other.

Multimedia

A video discussing the number of solutions to a system of equations is provided.

Check Up

1. The lines $4x - 5y - 15 = 0$ and $\frac{4}{5}x - 3 = y$ are coincident. Use substitution or elimination to show that an attempt to solve the system results in a true statement.

Compare your answer.

1. The lines $4x - 5y - 15 = 0$ and $\frac{4}{5}x - 3 = y$ are coincident. Use substitution or elimination to show that an attempt to solve the system algebraically results in a true statement.

$$\begin{aligned} 4x - 5y &= 15 \\ 4x - 5\left(\tfrac{4}{5}x - 3\right) &= 15 \\ 4x - 4x + 15 &= 15 \\ 15 &= 15 \end{aligned}$$

$15 = 15$ is a true statement. There are an infinite number of solutions to this system.