10.1 Systems of linear equations in two variables

\[
\begin{align*}
2x + y &= 7 \\
x + 2y &= 2
\end{align*}
\]

\[
\begin{align*}
x - y &= 2 \\
2x - 2y &= 4
\end{align*}
\]

Goal: Find all points that satisfy equations of the system.

(graphically, this will be the of of the two lines)

Possibilities:

Substitution method

\[
\begin{align*}
2x + y &= 7 \\
x + 2y &= 2
\end{align*}
\]

Elimination method

\[
\begin{align*}
4x - 3y &= 11 \\
8x + 4y &= 12
\end{align*}
\]

EXAMPLES Solve the system, or show that it has no solution. If the system has infinitely many solutions, express them in ordered pair form.

1. \[
\begin{align*}
-3x + 5y &= 2 \\
9x - 15y &= 6
\end{align*}
\]
EXAMPLE A chemist has two large containers of sulfuric acid solution, with different concentrations of acid in each container. Blending 300 ml of the first solution and 600 ml of the second gives a mixture that is 15% acid, whereas blending 100 ml of the first with 500 ml of the second gives a 12.5% acid mixture. What are the concentrations of the sulfuric acid in the original containers?