Solving Linear Systems by Graphing

**System of Linear Equations:** Two equations that contain two variables and have line graphs.

Examples:

\[
\begin{align*}
  x + y &= 3 \\
  3x + 4y &= 2 \\
  y &= 2x + 1 \\
  y &= 3x + 2 \\
  2x - y &= 1 \\
  3x - 2y &= 6
\end{align*}
\]

Our goal is to find the solutions to these systems. The solution for the system is all ordered pairs that are solutions to both equations. The intersection of the graphs is the solution.

**Types of Solutions:**

- Lines intersect at a single point
- Lines are parallel and never cross
- Lines coincide

Find the Solutions:

\[
\begin{align*}
  x + y &= 3 \\
  x - y &= 1 \\
  x + y &= 4 \\
  2x + 2y &= -6 \\
  x - y &= 3 \\
  2x - 2y &= 6
\end{align*}
\]
Solve the following systems of linear equations by graphing. If the system is inconsistent or dependent, state so.

1. \[ y = \frac{-1}{2}x - 1 \]
   \[ y = -x + 1 \]
   Answer:

2. \[ y = 2x - 2 \]
   \[ y = x \]
   Answer:

3. \[ x + 2y = 12 \]
   \[ 3x - 2y = 4 \]
   Answer:

4. \[ 2x - 3y = 9 \]
   \[ 2x - 3y = -3 \]
   Answer:

5. \[ 2x + y = 6 \]
   \[ y = 4 \]
   Answer:

6. \[ x - y = -3 \]
   \[ x = -2 \]
   Answer: