Essential Question  How can you determine the number of solutions of a linear system?

A linear system is *consistent* when it has at least one solution. A linear system is *inconsistent* when it has no solution.

Work with a partner. Match each linear system with its corresponding graph. Explain your reasoning. Then classify the system as *consistent* or *inconsistent*.

1. **EXPLORATION:** Recognizing Graphs of Linear Systems

   - **a.** \(2x - 3y = 3\)
   - **b.** \(2x - 3y = 3\)
   - **c.** \(2x - 3y = 3\)

   - \(-4x + 6y = 6\)
   - \(x + 2y = 5\)
   - \(-4x + 6y = -6\)

   ![Graphs A, B, C]

2. **EXPLORATION:** Solving Systems of Linear Equations

   Work with a partner. Solve each linear system by substitution. Then use the graph of the system on the next page to check your solution.

   - **a.** \(2x + y = 5\)
   - **b.** \(x + 3y = 1\)
   - **c.** \(x + y = 0\)

   - \(x - y = 1\)
   - \(-x + 2y = 4\)
   - \(3x + 2y = 1\)
Communicate Your Answer

3. How can you determine the number of solutions of a linear system?

4. Suppose you were given a system of three linear equations in three variables. Explain how you would solve such a system by substitution.

5. Apply your strategy in Question 4 to solve the linear system.

\[
\begin{align*}
    x + y + z &= 1 & \text{Equation 1} \\
    x - y - z &= 3 & \text{Equation 2} \\
    -x - y + z &= -1 & \text{Equation 3}
\end{align*}
\]