**Solving Systems of Linear Equations**

- What does it mean to "Solve a system of linear equations?"
- Three main methods
  - Graphing, Algebraically and Matrices
- Graphing Examples
  - What is the solution of the system?

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

  - You want to buy a camera. A film camera costs $89.98, and each photo costs $0.24. A digital camera costs $124.48, and each photo costs $0.09. After how many photos will the overall cost of the cameras be the same? What will that cost be?

  - The enrollments of two high schools are given in the table. If the trends continue, when can the schools expect have the same enrollment? What will the enrollment be?

| Year | School A | School B |
|---|---|---|
| 2005 | 628 | 432 |
| 2006 | 632 | 436 |
| 2007 | 627 | 461 |
| 2008 | 621 | 477 |
| 2009 | 615 | 488 |
| 2010 | 612 | 498 |

- *Consistent System*: At least one solution.
- *Inconsistent System*: No solution.

Consistent System → Independent system—One solution
Consistent System → Dependent system—Infinitely many solutions

Inconsistent System—No solution

- Determine without graphing whether the system is independent, dependent, or inconsistent.

$$\begin{cases} 3x - 4y = 6 \\ 6x + 3 = 8y \end{cases}$$

- Algebraically
  - *Direct Substitution*: What is the solution of the system of equations?

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

  - *Elimination*: What is the solution of the system of equations?

$$\begin{cases} 7x + 5y = 2 \\ 8x - 9y = 17 \end{cases}$$

  - What are the solutions of the following systems?

$$\begin{cases} 6x + 4y = 2 \\ 3x + 2y = -1 \end{cases}$$

- What are the solutions of the following systems?

$$\begin{cases} 6x - 3y = 15 \\ -8x + 4y = -20 \end{cases}$$

- You are in charge of ordering labels for a small business. A company that makes custom labels charges a yearly fee plus a cost per label. You paid $375 last year for 300 labels. This year you ordered 1,000 labels and paid $725. What are the yearly fee and cost per label, assuming the prices didn't change?