

7.1 SYSTEMS OF EQUATIONS**Learning Targets**

1. Identify the solution(s) to a system of equations using a graph.
2. Use substitution to solve a system of linear equations.
3. Solve a contextual problem by writing and solving a system of equations.

A system of equations is two or more equations with the same variables. The solution(s) to a system of equations can be found graphically by finding the point(s) of intersections on a graph.

Solving a system of equations by graphing works great when you have graphing calculator to work with, or you just want a visual approach to the problem.

Example 1: Solve the system of equations by graphing: $y = 2 \cdot 3^x$
 $2x + 5y = 10$

Example 2: Solve the system of equations by graphing: $-5x + y = -9$
 $x + 3y = 21$

A second way to solve systems of equations is through a method called substitution. Substitution involves solving for one variable and “substituting” it into the other equation.

Substitution works great if you have at least one variable with a coefficient of _____ or _____ .

Example 3: Solve the system of equations by substitution: $4x + 3y = 4$
 $2x - y = 7$

Example 4: Solve the system of equations by substitution: $-5m + n = -13$
 $2m + 3n = 12$

Example 5: A youth group with 26 members is going skiing. Each of the five chaperones will drive a van or a sedan. The vans can seat seven people, and the sedans can seat five people. How many of each type of vehicle could transport all 31 people to the ski resort in one trip?

a) What are you trying to solve for in this problem? Be specific ... (these are your variables!!!!)

b) Write a system of equations that models this situation.

c) Solve the system of equations.

Example 6: Suppose you are looking at a part-time job delivering packages. Your employer pays you at a flat rate of \$7 per hour. You discover that a competitor pays employees \$2 per hour plus \$0.35 per delivery.

a) Write a system of equations to model the pay p for d deliveries. Assume you work 4 hours either way.

b) How many deliveries would the competitor's employees have to make in four hours to earn the same pay you earn in a 4-hour shift?