

7.2: Substitution

[Algebra 1(X)]

HCPS III

- **Standard 10:** Patterns, Functions, and Algebra: SYMBOLIC REPRESENTATION: Use symbolic forms to represent, model, and analyze mathematical situations.
- **Benchmark MA.AI.10.5:** Solve systems of two linear equations in two variables algebraically and graphically.

Goal:

- Solve systems of equations by using substitution.
- Solve real-world problems involving systems of equations.

SUBSTITUTION Method

- **System of Equations:** A set of two or more equations with the same variables.
- **Solution of a System of Equations:** An ordered pair(s) that make both equations true.
- **Substitution:** a method used to solve a linear system of equations. The substitution method requires isolation of one variable, and substituting the equivalent expression in the other equation.

*** CAUTION: You must avoid careless errors. Check your work !!!***

Steps for Solving a Linear System by SUBSTITUTION

1. Choose one equation and **Isolate** one variable.
2. **Substitute** that isolated expression in the other equation, and **solve** for one variable.
3. Using the isolated equation (step 1), **solve** the other variable.
4. **Check** your answer by substituting the ordered pair into both equations.

Example 1: Solve Using Substitution (EASY)

Use substitution to solve the system of equations.

a.) $y = 3x$
 $x + 2y = -21$

Example 2: Solve Using Substitution (MEDIUM)

Use substitution to solve the system of equations.

a.) $x + 4y = 11$
 $-4x + 7y = 2$

b.) $2x + y = 2$
 $3x - y = 3$

Example 3: Write and Solve a System of Equations (HARD)

METAL ALLOYS. A metal alloy is 25% copper. Another metal alloy is 50% copper. How much of each alloy should be used to make 1000 grams of a metal alloy that is 45% copper?

	25% Copper	50% Copper	45% Copper
Total Grams			
Grams of Cu			

System of Equations:

Substitution Method:

Step 1: Solve for one variable.

Step 2: Substitute and solve for other variable.

Step 3: Solve for other variable.

Step 4: Check solution.