

Solving Systems of Equations Algebraically

Substitution

Solving Linear Systems Algebraically

- Step 1:** Solve one of the equations for one of its variables
- Step 2:** Substitute the expression from Step 1 into the other equation and solve for the other variable
- Step 3:** Substitute the expression from Step 2 into the revised equation from Step 1 and solve

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

$$\begin{cases} 3x - y = 13 \\ 2x + 2y = -10 \end{cases}$$

$$\begin{cases} 2x - 4y = 13 \\ 4x - 5y = 8 \end{cases}$$

$$\begin{cases} 2x - 6y = 19 \\ -3x + 2y = 10 \end{cases}$$

$$\begin{cases} -x + 3y = 1 \\ 4x + 6y = 8 \end{cases}$$

$$\begin{cases} 2x + 3y = -1 \\ -5x + 5y = 13 \end{cases}$$

$$\begin{cases} 7x - 12y = -22 \\ -5x + 8y = 14 \end{cases}$$

$$\begin{cases} x - 2y = 3 \\ 2x - 4 = 7 \end{cases}$$

$$\begin{array}{r} 9x - 5y = -7 \\ -6x + 4y = 2 \end{array}$$

$$\begin{array}{r} 8x - 10y = 12 \\ -15x + 25y = -30 \end{array}$$

Closure: When solving a linear system algebraically, how do you know when there is no solution? How do you know when there are infinitely many solutions?

Homework

Solve each system by substitution.

$$\begin{array}{l} 1) \ y = 4x + 11 \\ -2x + 3y = 7 \end{array}$$

$$\begin{array}{l} 2) \ 2x - 3y = -1 \\ y = x + 1 \end{array}$$

$$\begin{array}{l} 3) \ x = -3x + 5 \\ 3x - 4y = 9 \end{array}$$

$$\begin{array}{l} 4) \ -3x + 3y = 3 \\ x = -5x + 17 \end{array}$$

$$\begin{array}{l} 5) \ x = -2 \\ 4x - 3y = 18 \end{array}$$

$$\begin{array}{l} 6) \ y = 5x + 7 \\ -3x - 2y = -12 \end{array}$$