Math 150 Lecture Notes
Systems of Equations

A **system of equations** is a set of equations that involve the same variables. A **solution** of a system is a set of values for the variables that makes *each* equation in the system true. To **solve** a system means to find all solutions of the system.

Methods for solving systems include the substitution method, the elimination method (with or without back-substitution), and the graphical method.

Example 1: Find all solutions of the system of equations.

$$\begin{cases} 16x^2 - 9y^2 - 10y = 0 \\ 9x^2 + 4y^2 + 12y = 1 \end{cases}$$

Example 2: Find all solutions of the system of equations.

$$\begin{cases} x^2 + 4xy - 7x = 10 \\ x^2 + 3xy - 6x = 7 \end{cases}$$

Example 3: Find all solutions of the system of equations.

$$\begin{cases} x^2 - 2xy + y^2 = 9 \\ x^2 + x - y = 4 \end{cases}$$

Example 4: Find all solutions of the system of equations.

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