1 Section 9.3 Nonlinear Systems of Equations

A **nonlinear system of equations** is one in which one or more equations of he system are not linear equations. Each **point of intersection** of the graphs of the equations is a solution of the system of equations. If the graphs do not intersect, then the system of equations has no solution. To solve a nonlinear system of equations, use the substitution method or the elimination method.

Example 1 *Solve* $\begin{cases} 5x + y = 3 \\ y = x^2 - 3x - 5 \end{cases}$

Example 2 *Solve* $\begin{cases} 2x^2 + 3y^2 = 21 \\ x^2 + 2y^2 = 12 \end{cases}$

Example 3 *Solve* $\begin{cases} 9x^2 + 4y^2 = 144 \\ x^2 + y^2 = 9 \end{cases}$

Example 4 *Solve* $\begin{cases} (x-2)^2 + (y+3)^2 = 20 \\ (x-3)^2 + (y+2)^2 = 10 \end{cases}$