

3.5 Solving Nonlinear Systems

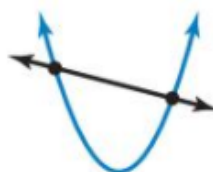
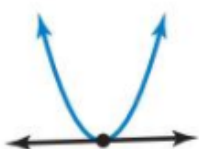
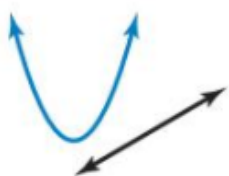
What were some methods of solving systems of linear equations?

With a system of nonlinear equations, at least one of the equations is nonlinear.

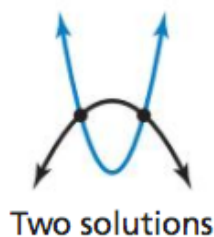
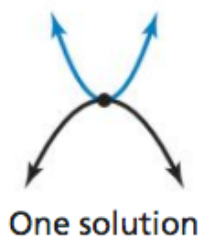
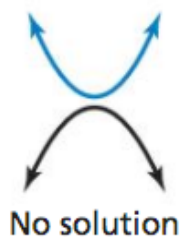
What does it mean for a system of linear equations to have zero solutions, one solution, infinitely many solutions? Explain!

What do you think are types of solutions with a system including a parabola and linear equation?

Ex:



What do you think are types of solutions with a system including a 2 parabolas?



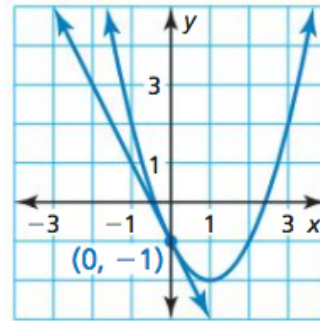
Example 1: Solving a nonlinear system by graphing

Solve the system by graphing.

$$y = x^2 - 2x - 1$$

$$y = -2x - 1$$

Solution!



Example 2: Solving a nonlinear system by substitution

Solve the system by substitution:

$$y = x^2 + x + 1$$

$$x + y = 4$$

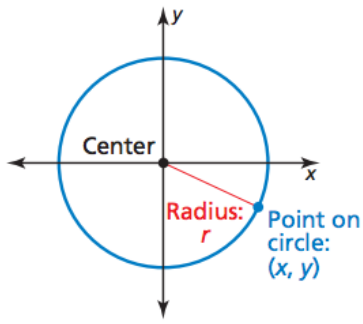
Example 3: Solving a nonlinear system by elimination

Solve the system by elimination.

$$2x^2 - 5x - y = -2$$

$$x^2 + 2x + y = 0$$

Spiral Review: What is the equation of a circle?



Example 4: Solve a nonlinear system of equation by substitution

Solve the system by substitution

$$x^2 + y^2 = 10$$

$$y = -3x + 10$$

Core Concept

Solving Equations by Graphing

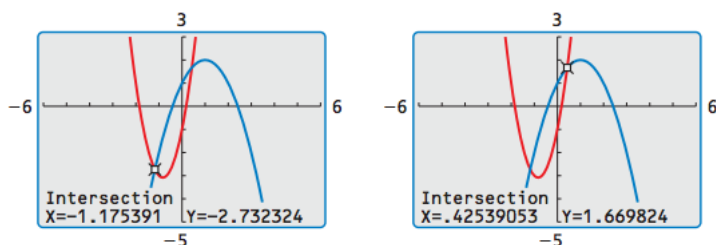
Step 1 To solve the equation $f(x) = g(x)$, write a system of two equations, $y = f(x)$ and $y = g(x)$.

Step 2 Graph the system of equations $y = f(x)$ and $y = g(x)$. The x -value of each solution of the system is a solution of the equation $f(x) = g(x)$.

Example 5: Solving quadratic equations by graphing

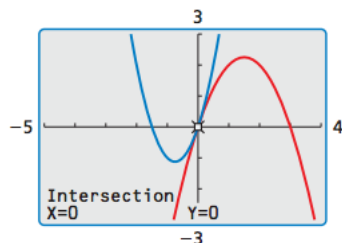
A) $3x^2 + 5x - 1 = -x^2 + 2x + 1$

Graphing Solutions for A



B) $-(x - 1.5)^2 + 2.25 = 2x(x + 1.5)$

Graphing Solution for B



Classwork / Homework

3, 7, 8, 11, 15, 17, 23, 27, 34, 42, 43, 50