

## Section 7.5 Guided Notebook

### Section 7.5 Systems of Nonlinear Equations

- Work through Objective 1
- Work through Objective 2
- Work through Objective 3
- Work through Objective 4

#### Introduction to Section 7.5

What is a **nonlinear system**?

How can we graphically represent the real solutions to a nonlinear system?

#### Section 7.5 Objective 1 Determining the Number of Solutions to a System of Nonlinear Equations

Work through the interactive video with Example 1 and take notes below.

For each system of nonlinear equations, sketch the graph of each equation of the system and then determine the number of real solutions to each system. Do not solve the system.

a.  $x^2 + y^2 = 25$   
 $x - y = 1$

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b.  $x - y^2 = 4$   
 $x - y = 6$

c.  $x^2 + y^2 = 9$   
 $x^2 - y = 3$

Section 7.5 Objective 2 Solving a System of Nonlinear Equations Using the Substitution Method

What are the five steps for **Solving a System of Nonlinear Equations by the Substitution Method**?

**Step 1.**

**Step 2.**

**Step 3.**

**Step 4.**

**Step 5**

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Work through the video with Example 2 and take notes below.

Determine the real solutions to the following system using the substitution method.

$$x^2 + y^2 = 25$$

$$x - y = 1$$

After obtaining our proposed solutions to a system of nonlinear equations, what is it absolutely critical to do?

Work through the video with Example 3 and take notes below.

Determine the real solutions to the following system using the substitution method.

$$5x^2 - y^2 = 25$$

$$2x + y = 0$$

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Work through the video with Example 4 and take notes below.

Determine the real solutions to the following system using the substitution method.

$$x^2 + 2y^2 = 18$$

$$xy = 4$$

Section 7.5 Objective 3 Solving a System of Nonlinear Equations Using Substitution, Elimination, or Graphing

What are the six steps for **Solving a System of Nonlinear Equations by the Elimination Method**?

**Step 1.**

**Step 2.**

**Step 3.**

**Step 4.**

**Step 5.**

**Step 6.**

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Work through the interactive video with Example 5 and take notes below.

Determine the real solutions to the following system.

$$x^2 + y^2 = 9$$

$$x^2 - y = 3$$