

## Lesson 6: Solving Systems of Equations

### GOAL:

Model and solve problems that involve systems of equations.

A system of equations is when we have a set of two or more equations of functions. A system of equations can consist of different types of functions. For example, a system can consist of linear equations, quadratic equations, or a mixture of both. We are usually interested in where the equations of a system intersect each other. If they intersect, they have some points in common. Therefore, to solve a system of equations, we find the intersection points.

### Example 1

Solve the system given by the following equations:

$$y = \overset{Y_1}{-2(x-3)^2 + 6} \text{ and } y = \overset{Y_2}{-4x + 15}$$

$\underbrace{\hspace{10em}}_{\text{parabola } \curvearrowright} \quad \underbrace{\hspace{10em}}_{\text{line } \nwarrow}$

$$(2.42, 5.32) \quad (5.58, -7.32)$$

### Example 2

Find the possible meeting points if one boat is travelling according to the equation  $y = 6x + 4$  and a second boat is travelling according to the equation  $y = 3x^2 + 2x - 5$ .

### Example 3

Determine the potential crash points for two aircraft following the following trajectories.

$$\text{Aircraft 1: } y = 3x^2 + 4 \quad \text{Aircraft 2: } y = (x - 5)(1 - x)$$