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_1 ↓

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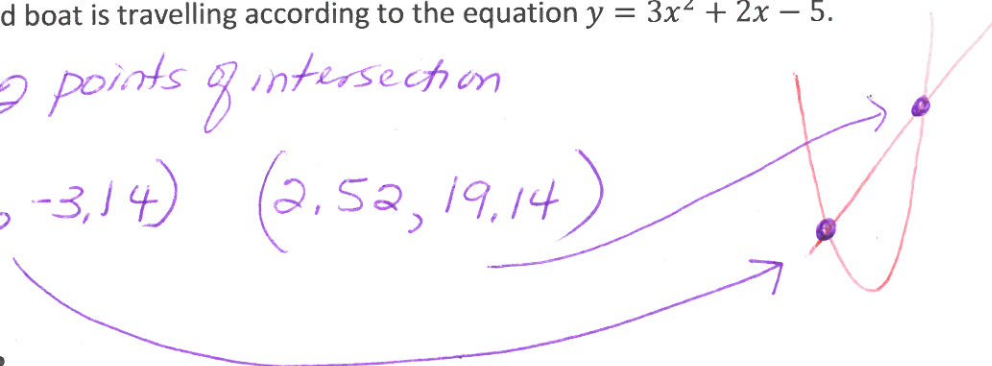
Y_2

parabola ↓   line ↘

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

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 $y = 3x^2 + 2x - 5$.

2 points of intersection

$(-1.19, -3.14)$ $(2.52, 19.14)$

Example 3

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

Aircraft 1: $y = 3x^2 + 4$ Aircraft 2: $y = (x - 5)(1 - x)$

No points of intersection
Therefore No solution.