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:

Enter

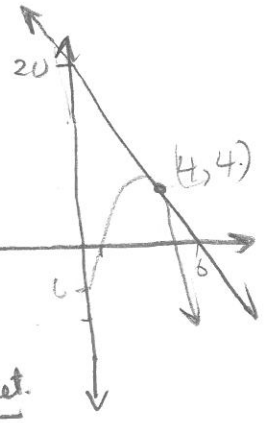
$y_1 = -2(x-3)^2 + 6$ $\quad y = -2(x-3)^2 + 6$ and $y = -4x + 20$

$y_2 = -4x + 20$

2nd | TRACE | 5-intersect | ENTER

$x = 4,\ y = 4$

$(4, 4)$ → where the 2 graphs meet.



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

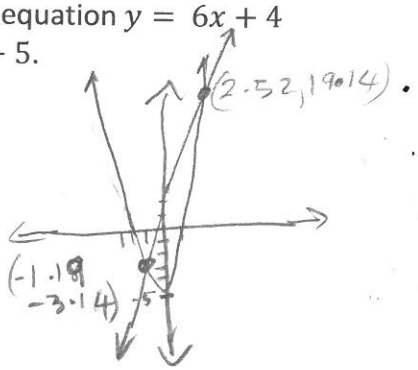
Enter $y_1 = 6x + 4$

$y_2 = 3x^2 + 2x - 5$

Find each intercepts.

2nd | TRACE | 5-intersect | ENTER

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



Example 3

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

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

$y_1 = 3x^2 + 4$

$y_2 = (x-5)(1-x)$

No solution, because the graphs do NOT intersect (meet).