Name: _____ [5.4] Math Lab Activity Block: _____

Pre-Calculus Math 11	Unit
5.4 - Math Lab Activity	5
By the end of this lesson I will be able to: ● Solve quadratic inequalities with one variable and two variables using technology ● Solve problem involving quadratic inequalities using technology	

Purpose:

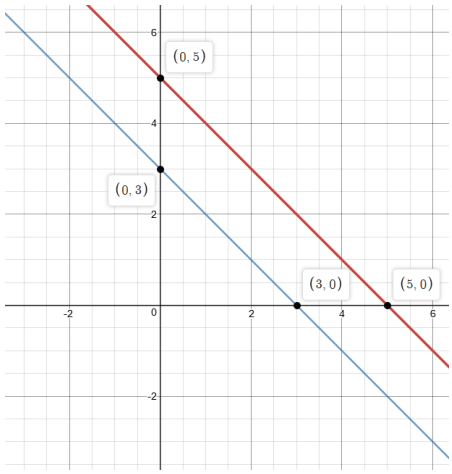
Solve systems of linear-quadratic equations and quadratic-quadratic equations by graphing and through the use of technology.

Part 1: Warm up and getting started

1) Solve the systems by calculating.

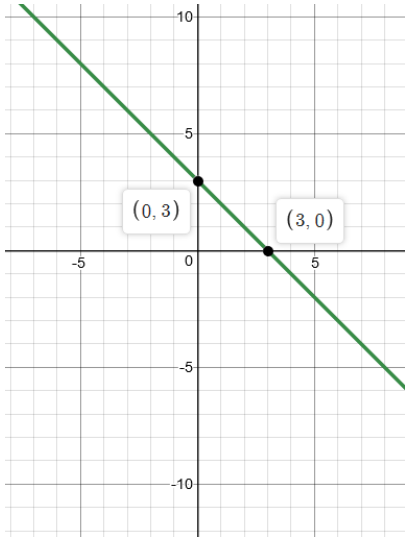
2) Graph these systems below and label the intersections' (交叉点) coordinates.

System A $\begin{cases} x + y = 5 \\ x + y = 3 \end{cases}$



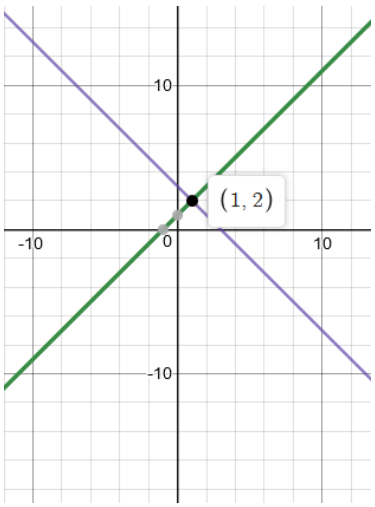
No Intersections (交叉点)

System B: $\begin{cases} 2x + 2y = 6 \\ x + y = 3 \end{cases}$



∞ Intersections

System C: $\begin{cases} x - y = -1 \\ x + y = 3 \end{cases}$



1 Intersection

What did you notice?

Linear-Linear systems of equations have three possibilities for the number of solutions.

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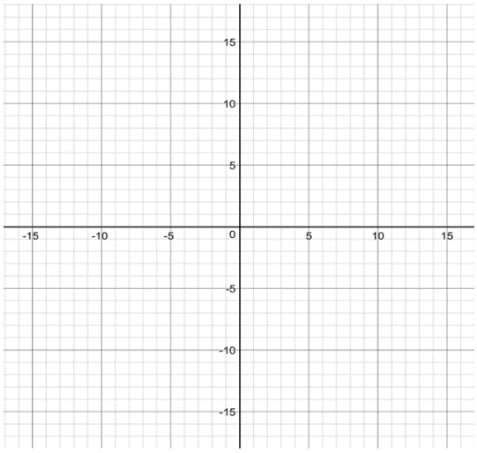
Part 2: Word Problem 1

The cost of running a leadership conference can be represented by y = 1000 + 75x. The number of students attending the conference depends on the price charged. It is determined that 20 students will attend the conference if each is charged $75. For each $10 increase in price, 1 fewer student will attend.

1) Give an equation to represent the total charge of students.

$$y = (20 - x)(75 + 10x)$$



Using Desmos or GeoGebra, graph these two equations and sketch their graphs.

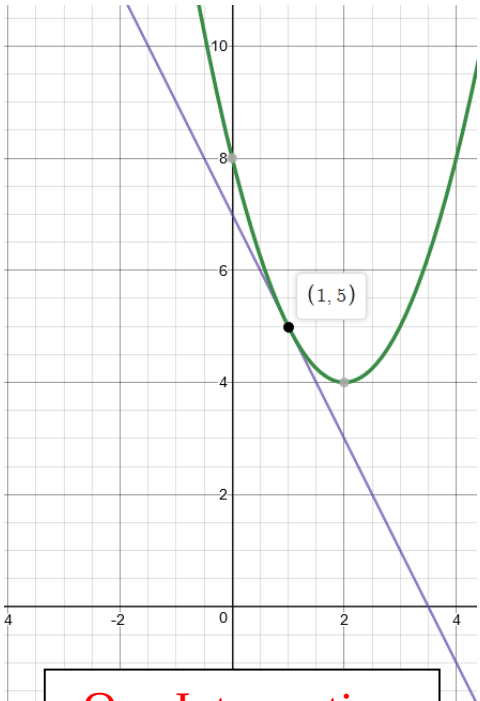
$$y = 1000 + 75x$$
$$y = (20 - x)(75 + 10x)$$

2) How to solve this system quickly?
(*Solve = make the cost and charges equal*)

Part 2 - Practice Time: Solving Quadratic and Linear Systems

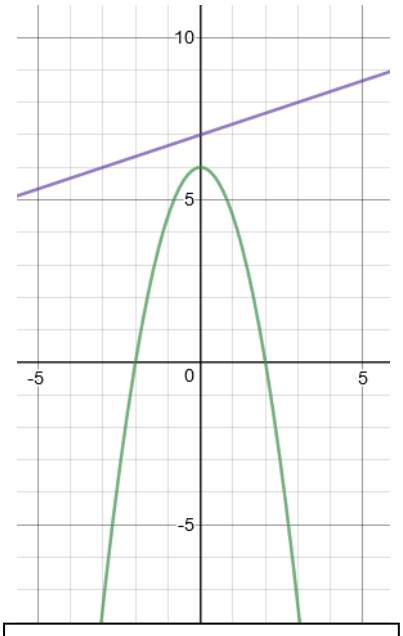
Graph each systems of equations:
1) Sketch their graphs
2) Label them with their equations
3) Write the coordinates of the points of the intersection points (交叉点)

1. $\begin{cases} y = (x-2)^2 + 4 \\ 2x + y = 7 \end{cases}$



One Intersection

2. $\begin{cases} y = -1.5x^2 + 6 \\ x - 3y = -21 \end{cases}$



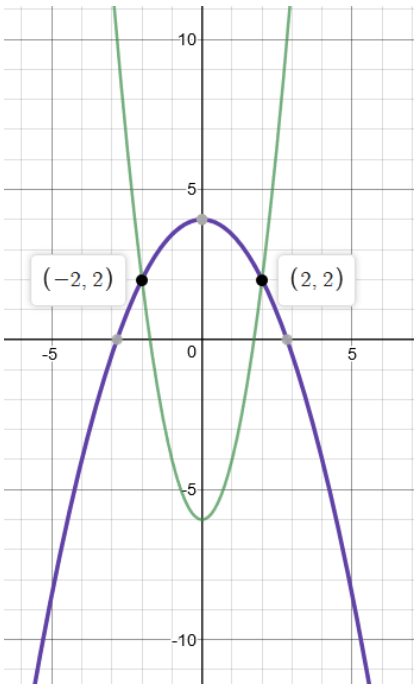
No Intersections

Name: _____ [5.4] Math Lab Activity Block: _____

Part 3: Word Problem 2

Using Desmos or GeoGebra, graph these quadratic functions on the same screen and then sketch the graphs below.

$y = 2x^2 - 6$
$y = -0.5x^2 + 4$



1) Write the coordinates of the points of intersection. How many intersection points are there?

2 Intersection points: (-2 , 2) and (2 , 2)

2) How could we transform one of the equations in order to have no intersections? Write this new equation below:

Vertical shift upwards (or downwards)

Example: $y = 2x^2 + 6$

3) What could we do to make there only be 1 intersection point? Write the equation below:

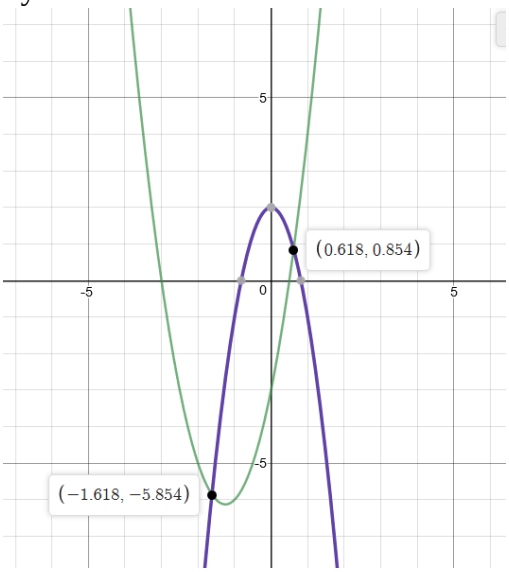
Vertex of both graphs must match

Example: $y = 2x^2 + 4$

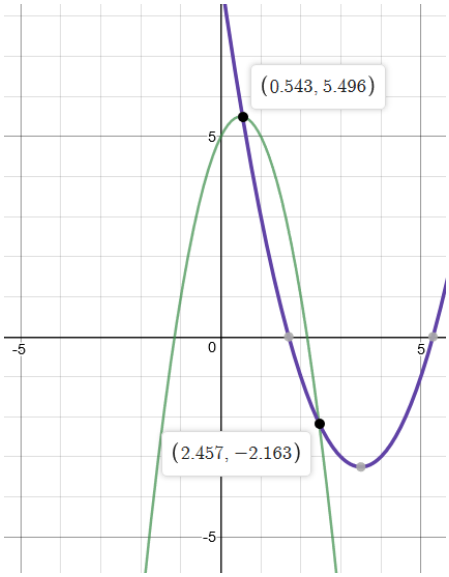
Part 3 - Practice Time: Solving Quadratic and Quadratic Systems

Using graphing tools to graph the following systems, identify how many solutions they have and then solve them. Write the coordinates of the points of intersections to the nearest tenth.

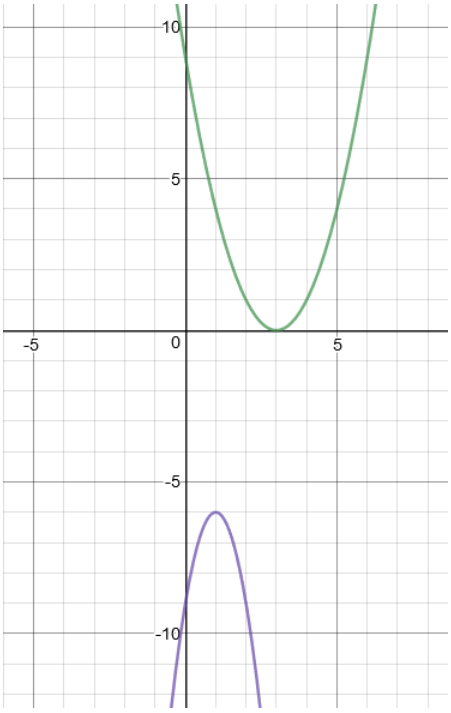
1) $y = 2x^2 + 5x - 3$
$y = -3x^2 + 2$



2) $y = -2x^2 + 2x + 5$
$y = x^2 - 7x + 9$



3) $y = (x - 3)^2$
$y = -3x^2 + 6x - 9$



Reflection:

What is the meaning of the points of intersection of a linear-quadratic system of equations or in a quadratic-quadratic system of equations?

When solving linear-quadratic equations or quadratic-quadratic systems of equations the points of intersection are the **solutions** to the problem.