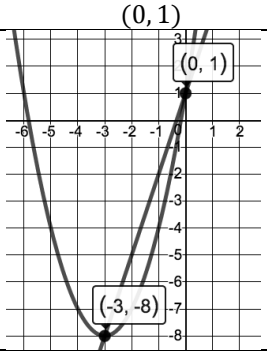
Name: _____

Solving Systems of Quadratic Equations (Part 1)

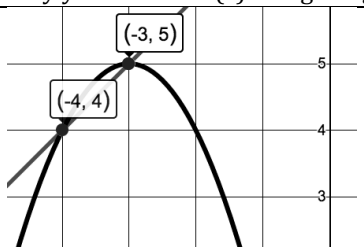
Solve each system below using the following steps:

EXAMPLE: $\begin{cases} y = x^2 + 6x + 1 \\ y = 3x + 1 \end{cases}$

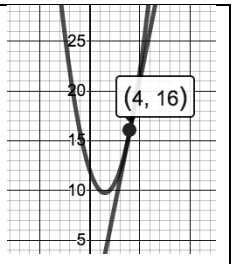
1. Line them up to subtract every term.	$y = x^2 + 6x + 1$ $\underline{-(y = \quad 3x + 1)}$	**OR ..** 1. Set the two equations equal to each other	$x^2 + 6x + 1 = 3x + 1$
2. Change the signs on the bottom and subtract down.	$y = x^2 + 6x + 1$ $\underline{-y = \quad -3x - 1}$ $\mathbf{0 = x^2 + 3x + 0}$	2. Move everything to one side of the equation so that it will equal zero	$x^2 + 6x\boxed{-3x} + 1\boxed{-1} = 3x\boxed{-3x} + 1\boxed{-1}$ $\mathbf{x^2 + 3x + 0 = 0}$
3. Use the quadratic formula (or completing the square, or factoring) to solve for *x*.	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(3) \pm \sqrt{(3)^2 - 4(1)(0)}}{2(1)}$ $x = \frac{-3 \pm \sqrt{9 - 0)}}{2} = \frac{-3 \pm \sqrt{9}}{2}$ $x = \frac{-3 - 3}{2} = -\frac{-6}{2} = -3$ or $\quad x = \frac{-3 + 3}{2} = \frac{0}{2} = 0$		
4. Pick one of the original equations and plug in the *x*-values to determine the *y*-values.	$y = 3x + 1$ *seems easiest, so I'll use that one.* $y = 3x + 1$ for $x = -3$ $y = 3(-3) + 1$ $y = -9 + 1$ $y = -8$ $(-3, -8)$		$y = 3x + 1$ for $x = 0$ $y = 3(0) + 1$ $y = 0 + 1$ $y = 1$ $(0, 1)$
5. Check your point(s) against the graph. *If your solution point(s) and the intersection point(s) are the same, then your solution is correct.*	The solutions to the system $\begin{cases} y = 3x + 1 \\ y = x^2 + 6x + 1 \end{cases}$ are $\boxed{(-3, -8) \text{ \& } (0, 1).}$		

Solve each system and verify your solution(s) using the graph.

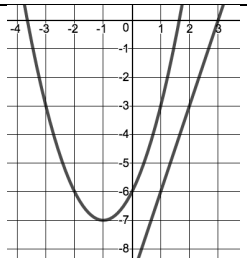
1. $\begin{cases} y = x + 8 \\ y = -x^2 - 6x - 4 \end{cases}$



2. $\begin{cases} y = 5x - 4 \\ y = x^2 - 3x + 12 \end{cases}$

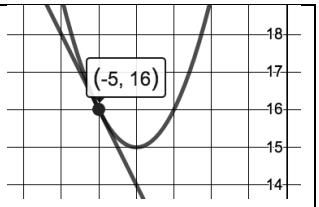


3. $\begin{cases} y = 3x - 9 \\ y = x^2 + 2x - 6 \end{cases}$

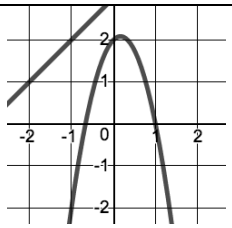


The graphs never cross!
So there will be <u>no real solutions</u>.
Stop working when you get the square root of a negative number.
That proves that there are no real solutions.

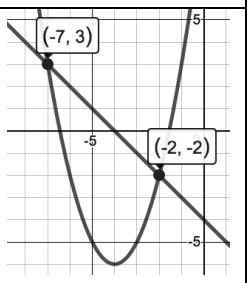
4. $\begin{cases} y = -2x + 6 \\ y = x^2 + 8x + 31 \end{cases}$



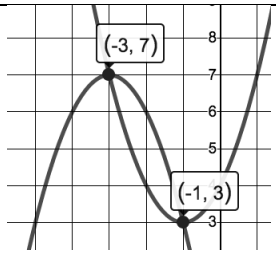
5. $\begin{cases} y = x + 3 \\ y = -3x^2 + x + 2 \end{cases}$



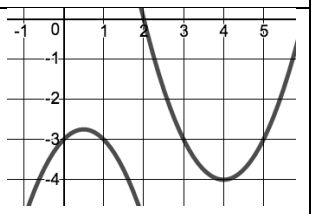
6. $\begin{cases} y = -x - 4 \\ y = x^2 + 8x + 10 \end{cases}$



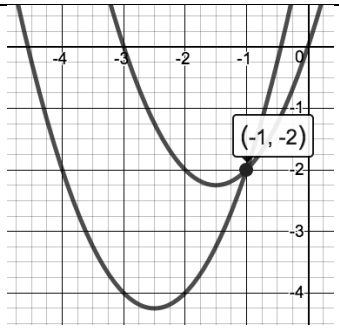
7. $\begin{cases} y = -x^2 - 6x - 2 \\ y = x^2 + 2x + 4 \end{cases}$



8. $\begin{cases} y = -x^2 + x - 3 \\ y = x^2 - 8x + 12 \end{cases}$



9. $\begin{cases} y = x^2 + 5x + 2 \\ y = x^2 + 3x \end{cases}$



10. $\begin{cases} y = x^2 + 5x + 9 \\ y = -2x^2 + 5x + 12 \end{cases}$