C11 - 8.1 - Number of Intersections/Solutions Notes
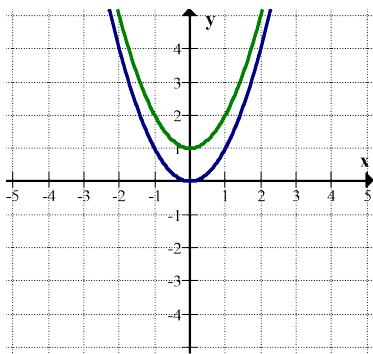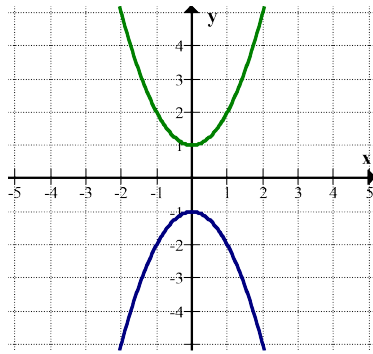
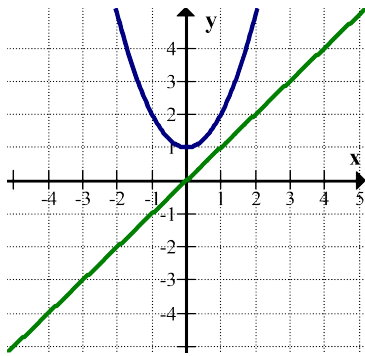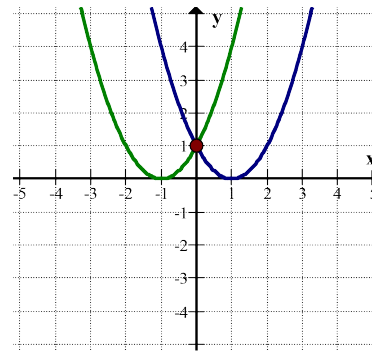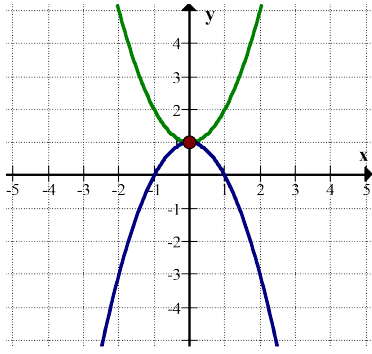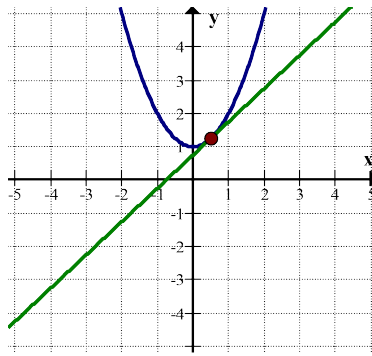| **No Solutions**	**One Solution**	**Two Solutions**
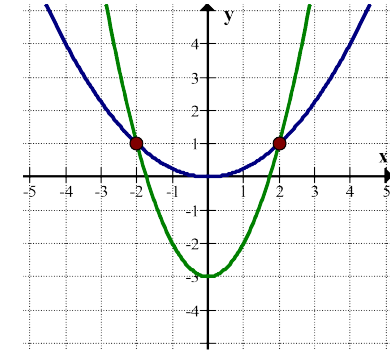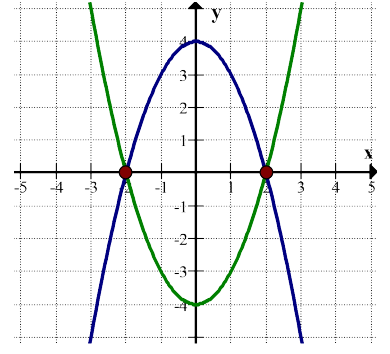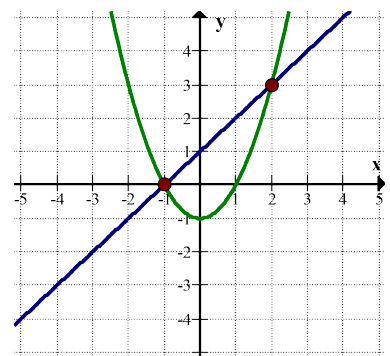
OR INFINITE SOLUTIONS: Congruent Graphs

C11 - 8.2 - Linear/Quadratic Systems Substitution Notes

Solve by Substitution.

$y = x + 1$ $\qquad$ $y = x^2 - 1$ $\qquad$ Equation 1 $\qquad$ Equation 2

$$x + 1 = x^2 - 1$$
$$-1 - 1$$ $\qquad$ Equation 1 = Equation 2
$$x = x^2 - 2$$
$$-x - x$$
$$0 = x^2 - x - 2$$
$$0 = (x + 1)(x - 2)$$ $\qquad$ Equation #3

$$\boxed{x = -1, 2}$$ $\qquad$ Solve for x

$y = x + 1$ $\qquad\qquad$ $y = x + 1$ $\qquad$ Solve for y $\qquad\qquad$ Solve for y
$y = (-1) + 1$ $\qquad\quad$ $y = (2) + 1$
$y = 0$ $\qquad\qquad\qquad$ $y = 3$ $\qquad$ Intersection #1 $\qquad$ Intersection #2

$(-1,0)$ $\qquad\qquad\qquad$ $(2,3)$

Solve by graphing.

$y = x + 1$ $\qquad$ Equation 1
$y = x^2 - 1$ $\qquad$ Equation 2

$(-1,0)$ $\qquad\qquad$ $(2,3)$

$y = x^2 - 1$ $\qquad\qquad\qquad$ $y = x + 1$

$(-1,0)$ $\qquad\qquad\qquad$ $(2,3)$

$y = (x + 1)(x - 2)$ $\qquad$ Equation #3

$x + 1 = 0$ $\qquad$ $x - 2 = 0$
$ x = -1$ $\qquad\quad$ $x = 2$

$y = (x + 1)(x - 2)$

$(-1,0)$ $\qquad\qquad$ $(2,0)$
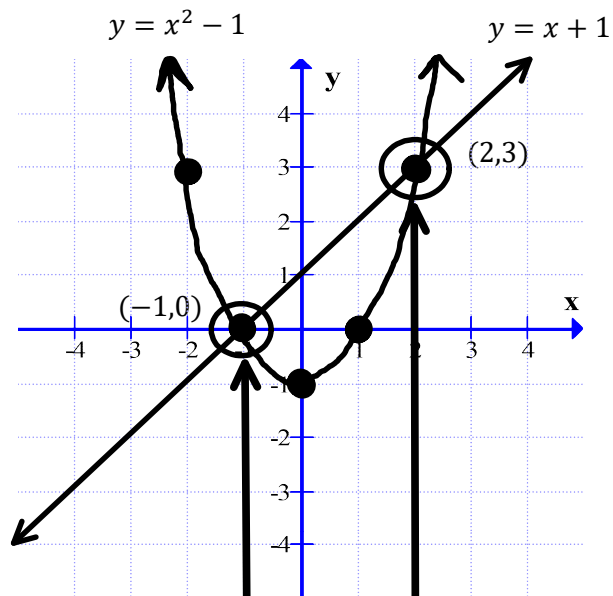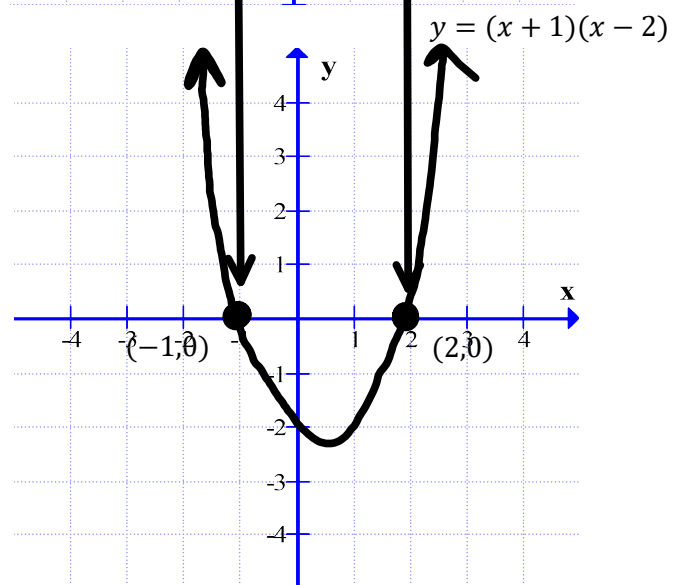
Notice the graph of the third equation x-intercepts is the x answer to the question.

C11 - 8.3 - Quadratic Systems $b^2 - 4ac < 0$ Notes

Solve by Substitution.

$y = x^2 - 4x + 5$ $\qquad$ $y = -x^2 + 4x - 6$

$x^2 - 4x + 5 = -x^2 + 4x - 6$ $\qquad$ Algebra
$2x^2 - 8x + 11 = 0$ $\qquad\qquad$ Cannot Factor

$2x^2 - 8x + 11 = 0$

$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $\qquad$ Discriminant

$x = \dfrac{-(-8) \pm \sqrt{(-8)^2 - 4(2)(11)}}{2(2)}$ $\boxed{b^2 - 4AC < 0}$

$x = \dfrac{8 \pm \sqrt{-24}}{4}$ $\qquad\qquad$ $b^2 - 4ac$

$(-8)^2 - 4(2)(11) = -24$

No Solution $\qquad\qquad$ No Solution

$y = x^2 - 4x + 5$

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

$y = 2x^2 - 8x + 11$