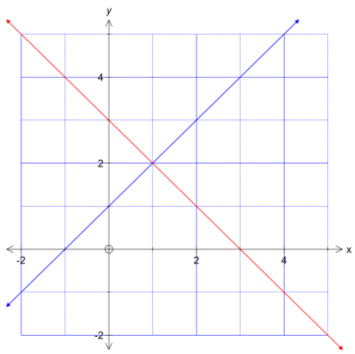
EXERCISE 39: SYSTEMS OF EQUATIONS

A system of equations is a _____ of two or more ___________ with a same set of ________________.

Any order pair (x, y) that ________________ both equations in a system of equations is a __________________ of the system.

Review:



Linear System of Equations	Solutions:
x – y = -1	
x + y = 3	

Linear-Quadratic System of Equations – the equation of a _____________ function and the equation of a ________________ function.

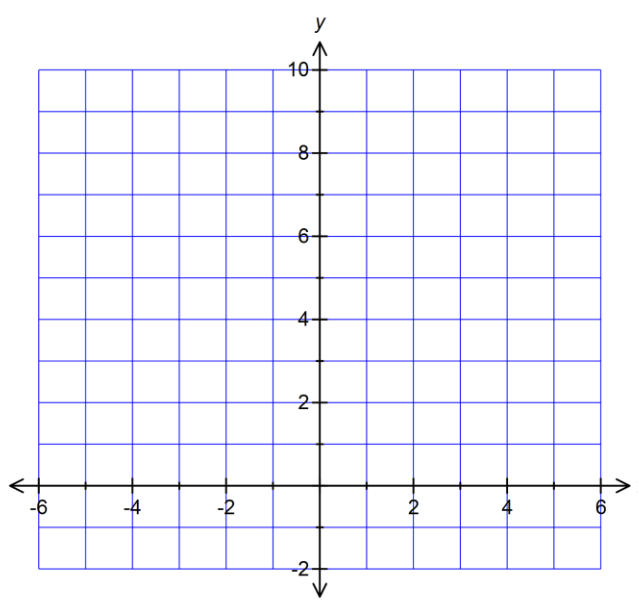
- a graph of the system involves a ___________ and a _______________.

Quadratic-Quadratic System of Equations – the equations of ________ quadratic functions.

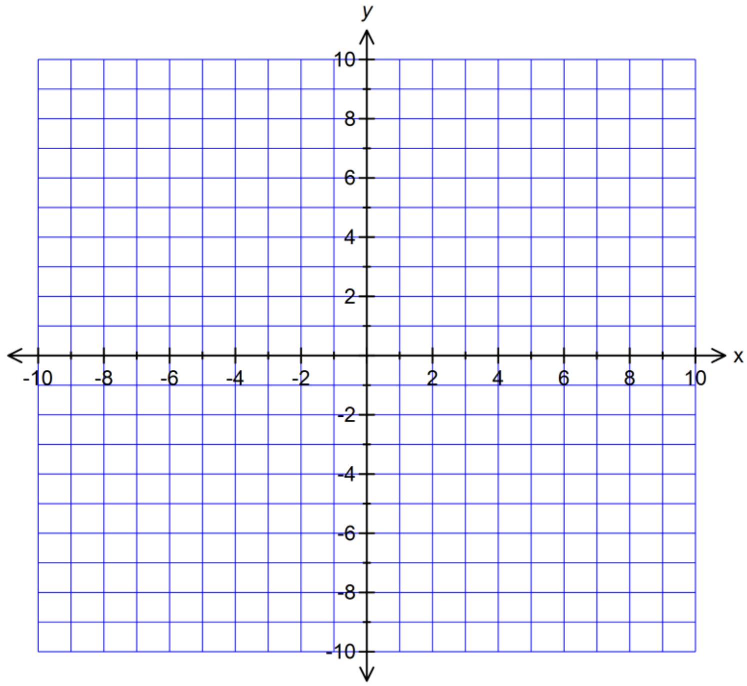
- a graph involves two __________________.

SOLVING BY GRAPHING

Example: Solve $\begin{cases} y = x^2 \\ y = x + 2 \end{cases}$

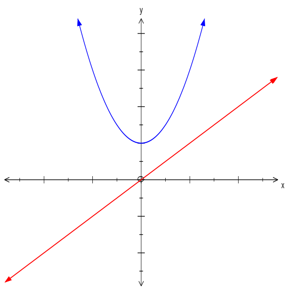
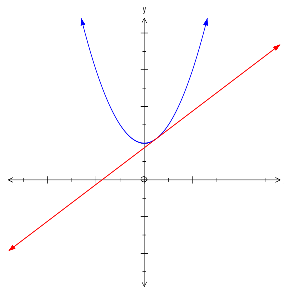
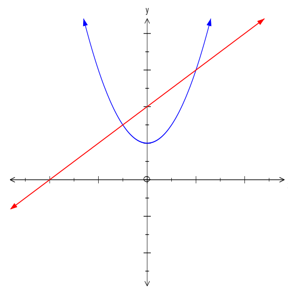
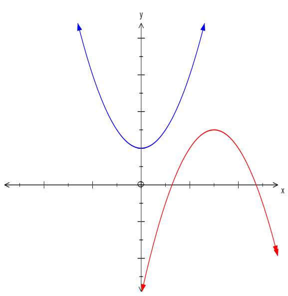
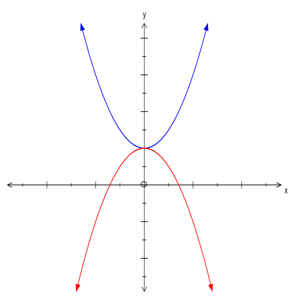
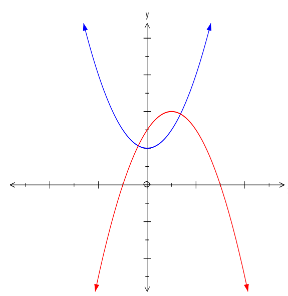
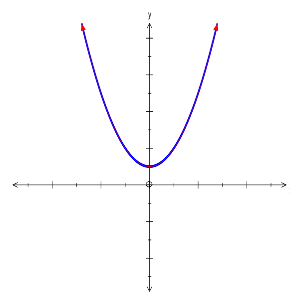


Example 2: Solve $\begin{cases} y = x^2 - 6x + 6 \\ y = -(x-5)^2 + 7 \end{cases}$



Note:

- A system of linear-quadratic or quadratic-quadratic equations may have no real solution, one real or two real solutions.
- A quadratic-quadratic system of equations may also have an infinite number of real solutions.

No Solution	One Solution	Two Solutions	Infinite Solutions
			
			

SOLVING ALGEBRAICALLY

LINEAR-QUADRATIC SYSTEM OF EQUATIONS

Example 3: Solve the following system of equations algebraically. Verify your solution.

$$\begin{cases} 5x - y = 10 \\ x^2 + x - 2y = 0 \end{cases}$$

Method: Substitution	
1) Solve the linear equation for a variable: ▪ Since the quadratic term is x, solve for y.	
2) Substitute into the quadratic equation: ▪ Where you find y substitute with ____________ 3) Simplify the equation	
4) Solve the equation.	
5) Substitute these values of x into the original linear equation to determine the corresponding values of y.	
6) Verify your solutions in both equations.	

Example 4: Solve the following system of equations algebraically. Verify the solution.

$$\begin{cases} 3x + y = -9 \\ 4x^2 - x + y = -9 \end{cases}$$

QUADRATIC-QUADRATIC SYSTEM OF EQUATIONS

Example 5: Solve the following system of equations. Verify your solutions.

$$\begin{cases} 3x^2 - x - y - 2 = 0 \\ 6x^2 + 4x - y = 4 \end{cases}$$

Method: Substitution	
1) Solve each quadratic equation for a variable: ▪ Since the quadratic term is x, solve for y.	
2) Since both equations are equal to y, both equations are equal to each other. y = y 3) Simplify the equation 4) Solve the equation.	
5) Substitute these values of x into one of original quadratic equations to determine the corresponding values of y.	
6) Verify your solutions in both equations.	

Example 6: Solve the following system of equations. Verify your solutions.

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

Example 7: Solve the following system of equations. Verify your solutions.

$$\begin{cases} x^2 + x = 6 + 3y \\ x^2 - 4 = 4y - x \end{cases}$$

Method: Elimination	
1) Align the terms with the same degree. 2) Since the quadratic term is in the variable x, eliminate the y-terms. ▪ Multiply each equation by a number so that the y-terms are equal. 3) Subtract one equation from the other, eliminating the y-terms.	
4) Solve the remaining equation.	
5) Substitute these values of x into one of original quadratic equations to determine the corresponding values of y.	
6) Verify your solutions in both equations.	

Example 8: Solve the following system of equations. Verify your solutions.

$$\begin{cases} 4x^2 + x + 2 - 2y = 0 \\ 3x^2 + x = 3y - 4 \end{cases}$$

Homework: Solving by Graphing pg. 435 #3, 4 (a, b, d)

Solving Algebraically pg. 451 – 452, #3 and 4