Chapter 8: Systems of Equations

8.1 Solving Systems of Equations Graphically

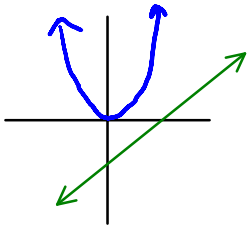
A **system of equations** is two or more equations involving common variables.

The **point of intersection** of two functions on a graph represents the **solution** to the system. (an ordered pair that satisfies both equations.)

- Linear-Quadratic Systems

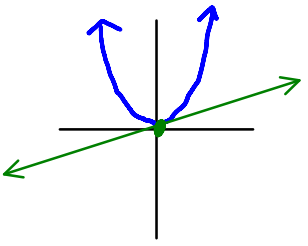
Given a line and a parabola, how many possible outcomes may occur.

No Solution



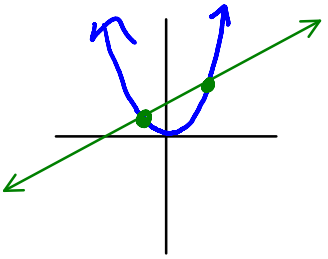
-no intersection

One Solution



- one point of intersection

Two Solutions

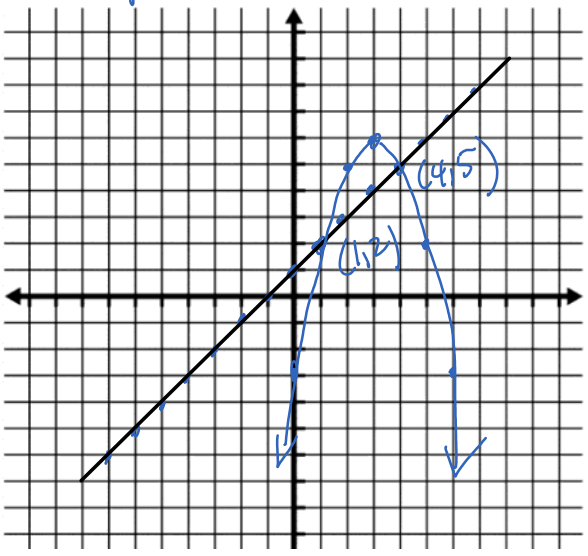


- two points of intersection

Example: Solve by graphing

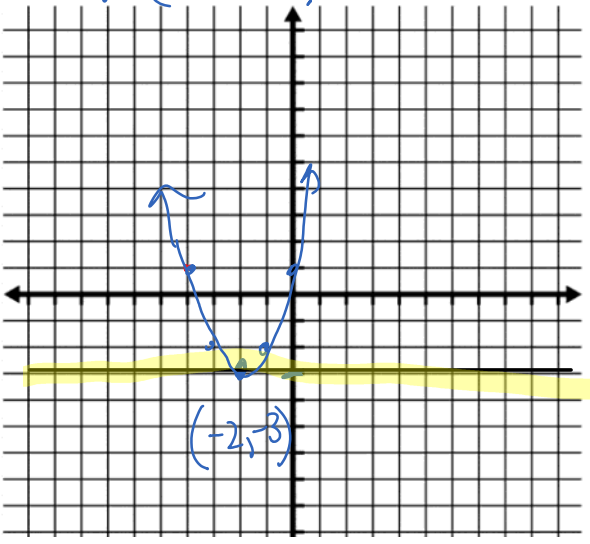
a) $x - y + 1 = 0$

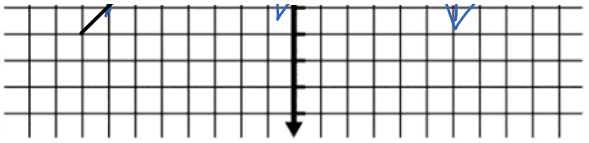
$y = -(x - 3)^2 + 6$

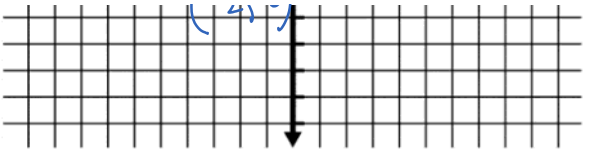


b) $y = -3$

$y = x^2 + 4x + 1$

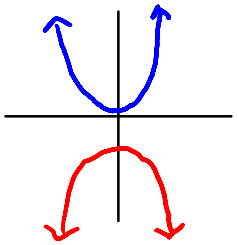




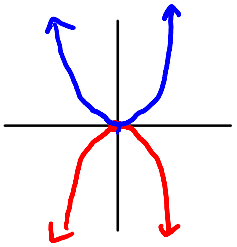


- Quadratic-quadratic Systems

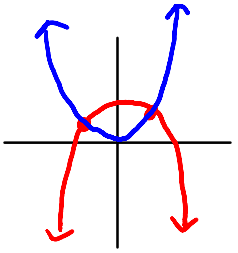
How many possible outcomes can occur:



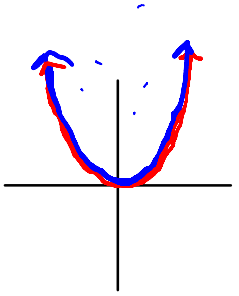
No solution



One solution



two solutions

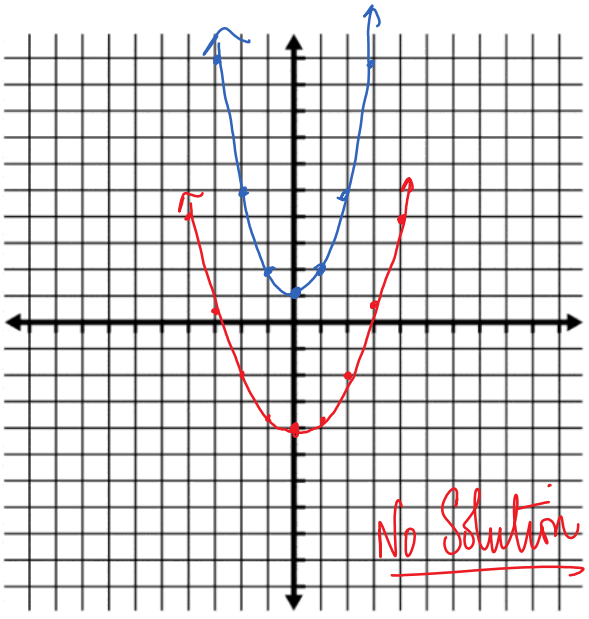


infinite solutions

Example: Solve by graphing

a) $y = x^2 + 1$

$y = \frac{1}{2}x^2 - 4$



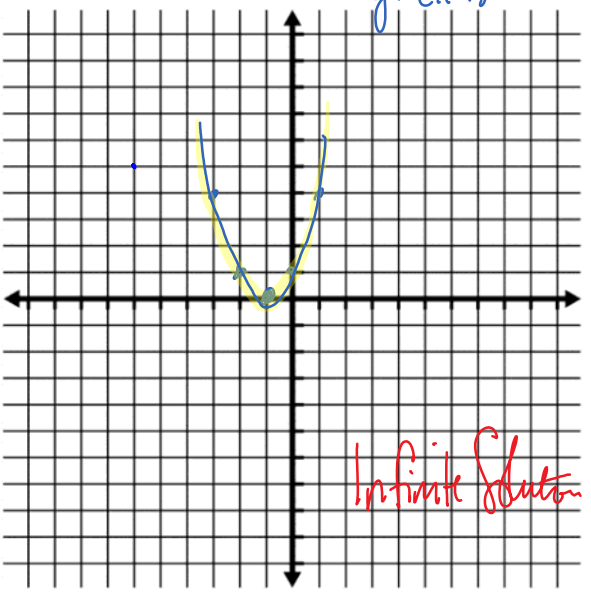
b) $y = (x + 1)^2$

$\frac{2y}{2} = \frac{2x^2}{2} + \frac{4x}{2} + \frac{2}{2}$

$y = x^2 + 2x + 1$

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

$y = (x+1)^2$

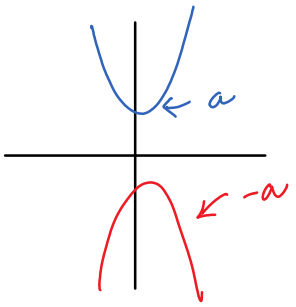


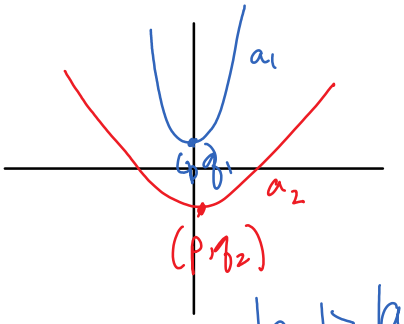
Example:

$a(x-p)^2 + q$

Example:
Sketch two quadratic functions with no solutions.
Describe the necessary conditions for this to occur.

$a(x-p)^2+q$





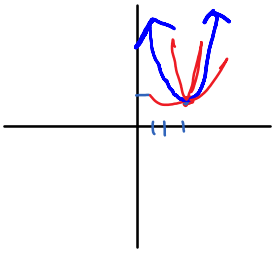
For the function with positive "a", the q must be greater than the other q

$|a_1| > |a_2|$ and ....

$|q_1| > |q_2|$

$p_1 = p_2$

Example:
Given the quadratic graph and its equation, determine the equations of another quadratic that leads to a system with one solution.



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

$y = -a(x-3)^2 + 1$

any number but 2

Assignment: p435 #1-3, 6-9 and worksheet