Solving Systems of Equations Graphically

Any ordered pair (x,y) that satisfies both equations in a system of linear-quadratic or quadratic-quadratic equations is a solution of the system.

Linear - Quadratic Systems

1) Sketch and label the following system of equations:
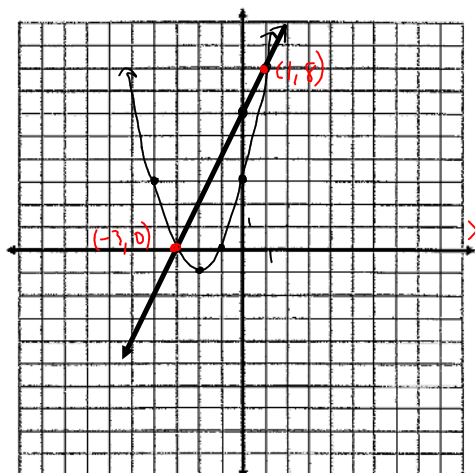
$y = 2x + 6$ $y = mx + b$

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

left 2   down 1

Write the coordinates of the points of intersection.

use substitution to check

$(-3, 0)$ and $(1, 8)$

2) Sketch the following system of equations:

$2x + y = 7$ $y = -2x + 7$

$y = (x - 2)^2 + 4$

right 2   up 4

soln
$(1, 5)$

Write the coordinates of the points of intersection.

$(1, 5)$

1
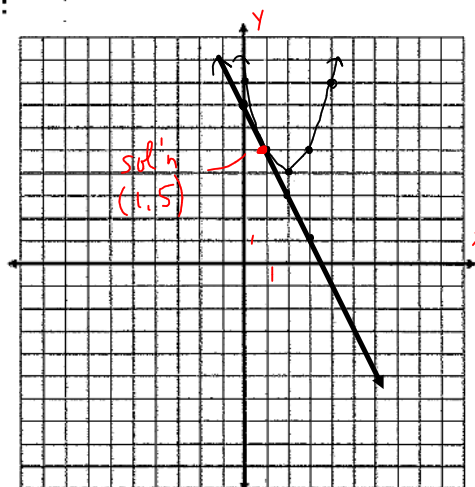
PC30S　　　　　　　　　　Investigation　　　　　　　Solving Systems Graphically

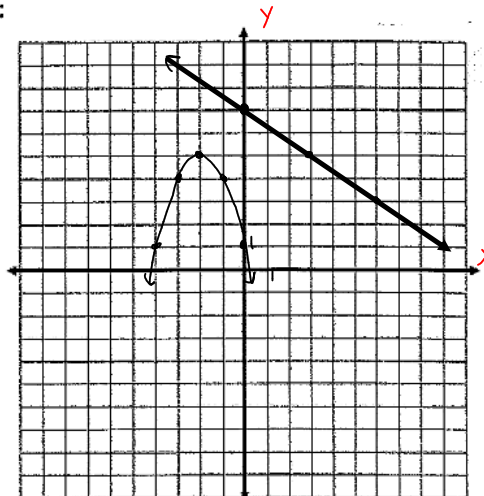3)　Sketch the following system of equations:

$$y = -\frac{2}{3}x + 7$$
$$y = -x^2 - 4x + 1$$

$$y = (-x^2 - 4x \quad) + 1$$
$$y = -(x^2 + 4x + 4) + 1 + 4$$
$$y = -(x+2)^2 + 5$$

　　　reflected　　left 2　　up 5

Write the coordinates of the points of intersection.

No sol'n ∅
(0 points of intersection)

inconsistent system

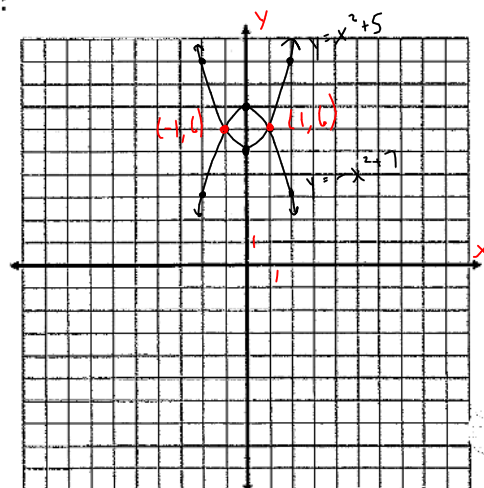A **linear – quadratic** system may have _____0_____, ____1____, or ___2___ solutions.

Quadratic – Quadratic Systems (two parabolas)

4)　Sketch the following system of equations:

$$y = x^2 + 5 \quad \leftarrow \text{up 5}$$
$$y = -x^2 + 7 \quad \leftarrow \text{up 7}$$

reflected

Write the coordinates of the points of intersection.

sol'n　(-1, 6) and (1, 6)

These points make both equations true.

Systems and Inequalities

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5) Sketch the following system of equations:

$$y = x^2 - 6x + 9$$
$$y = -3x^2 + 6x - 9$$
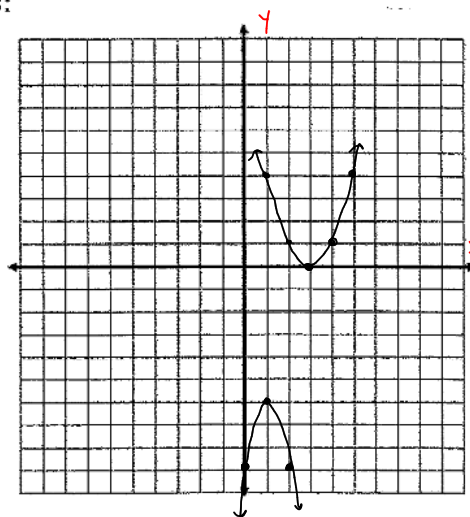
$y = x^2 - 6x + 9$　← already a perfect square trinomial
$y = (x-3)^2$

$y = -3(x^2 - 2x + 1) - 9 + 3$
$y = -3(x-1)^2 - 6$　↖ down 6
　↑　　　↑ right
reflect　　1
and
stretch

Write the coordinates of the points of intersection.

No sol'n

6) Sketch the following system of equations:

$$y = x^2$$
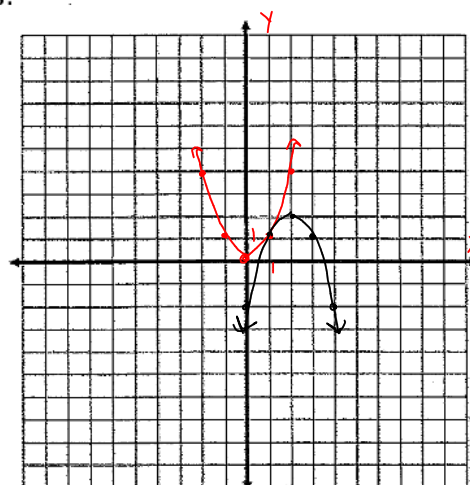$$y = -(x-2)^2 + 2$$　← up 2
　↑　　　↑ right 2
reflects

Write the coordinates of the points of intersection.

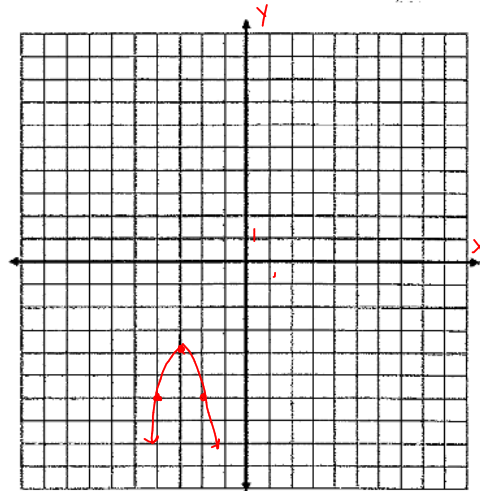sol'n
(1, 1)

Systems and Inequalities

7) Sketch the following system of equations:

$$y = -2(x+3)^2 - 4$$
$$y = -2x^2 - 12x - 22$$

$$y = -2(\overbrace{x^2 + 6x + 9}) - 22 + 18$$
$$y = -2(x+3)^2 - 4$$

Write the coordinates of the points of intersection.

all points on the curve

∴ Sol'n : infinite # of points along the curve

(two parabolas)

A **quadratic - quadratic** system may have

___0___ , ___1___ , ___2___ , or _infinite_ solutions.