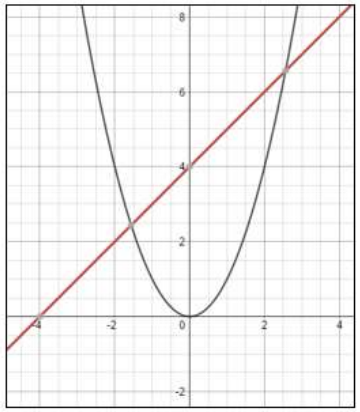
Objective: Solve Systems by Graphing

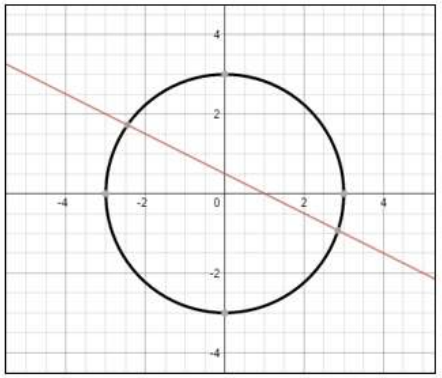
Concept

A system of equations with one linear and one quadratic equation is called a linear-quadratic system.

parabola and line

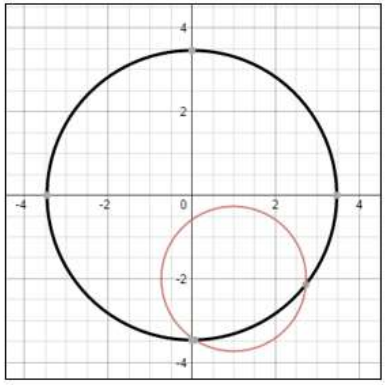


circle and line

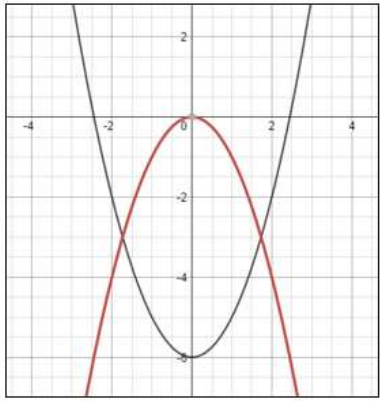


A system of equations with two quadratic equations is called a quadratic system.

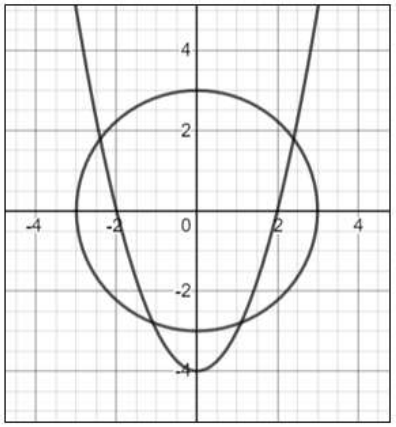
two circles



two parabolas



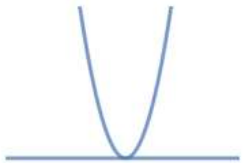
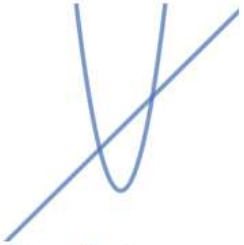
circle and parabola



Objective: Solve Systems by Graphing

Concept

Sketch a graph of a **line and parabola** that has the indicated number of solutions.

			Not possible	Not possible
0 solutions	1 solution	2 solutions	3 solutions	4 solutions

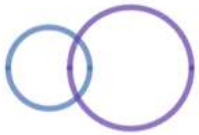
Sketch a graph of a **line and circle** that has the indicated number of solutions.

			Not possible	Not possible
0 solutions	1 solution	2 solutions	3 solutions	4 solutions

Objective: Solve Systems by Graphing

Concept

Sketch a graph of **two circles** that has the indicated number of solutions.

0 solutions	1 solution	2 solutions	3 solutions	4 solutions
			Not possible	Not possible

Sketch a graph of a **parabola and circle** that has the indicated number of solutions.

0 solutions	1 solution	2 solutions	3 solutions	4 solutions
				

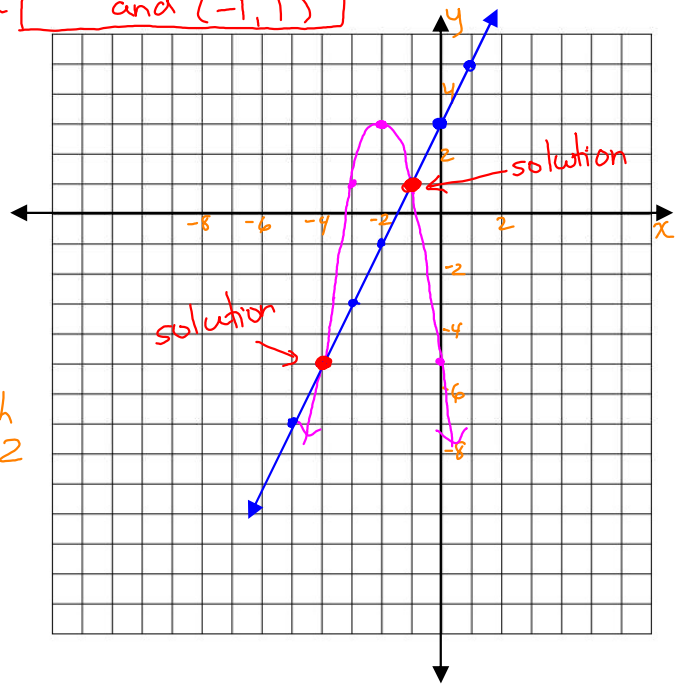
Objective: Solve Systems by Graphing

Ex) a) Graph the system, b) state the solution(s) for the system; estimate to the nearest tenth if necessary.

$$\begin{cases} ① \; y - 3 = -2(x+2)^2 \\ ② \; 2x - y = -3 \end{cases}$$

① parabola
② line

solutions: (−4, −5) and (−1, 1)



① $y - 3 = -2(x+2)^2$
$+3 \qquad +3$

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

vertex $(-2, 3)$

$a = -2 \rightarrow$ x-axis refl. vertical stretch by a factor of 2

$1 \cdot 2 = 2$
$4 \cdot 2 = 8$
$9 \cdot 2 = 18$

② $2x - y = -3$
$+3 \; +y \quad +3 \; +y$

$y = 2x + 3$

y-int $(0, 3)$

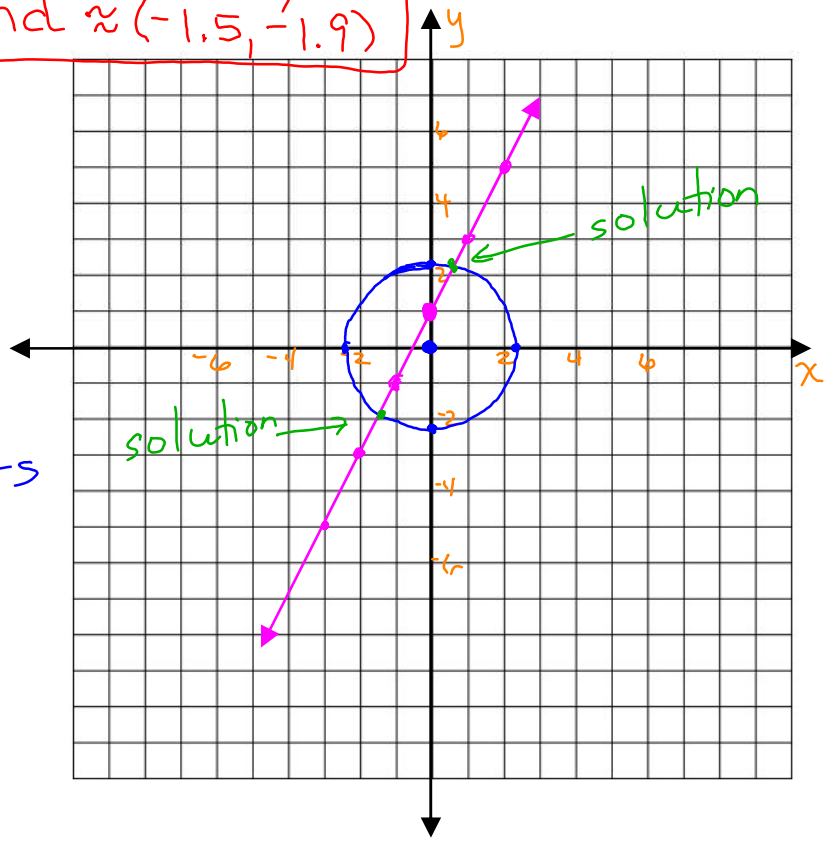
slope $= 2 = \frac{2}{1}$ up right or $\frac{-2}{-1}$ down left

Objective: Solve Systems by Graphing

Ex) a) Graph the system, b) state the solution(s) for the system; estimate to the nearest tenth if necessary.

$$\begin{cases} x^2 + y^2 = 5 & \text{(1) circle} \\ y = 2x + 1 & \text{(2) line} \end{cases}$$

Solutions: $\approx (0.6, 2.1)$ and $\approx (-1.5, -1.9)$



(1) $x^2 + y^2 = 5$ (r^2)

Center $(0,0)$

radius $= \sqrt{5}$ units ≈ 2.2 units

$\sqrt{4} < \sqrt{5} < \sqrt{9}$ (5−4=1, 9−5=4)

$= 2 \quad \approx 2.2 \quad = 3$

(2) $y = 2x + 1$

y-int: $(0, 1)$

slope $= 2 = \frac{2}{1}$ $\begin{matrix} \text{up} \\ \text{right} \end{matrix}$

Objective: Solve Systems by Graphing

Ex) a) Graph the system, b) state the solution(s) for the system; estimate to the nearest tenth if necessary.

$$\begin{cases} (x-1)^2+(y+1)^2=16 & \text{circle} \\ (x+3)^2+y^2=9 & \text{circle} \end{cases}$$

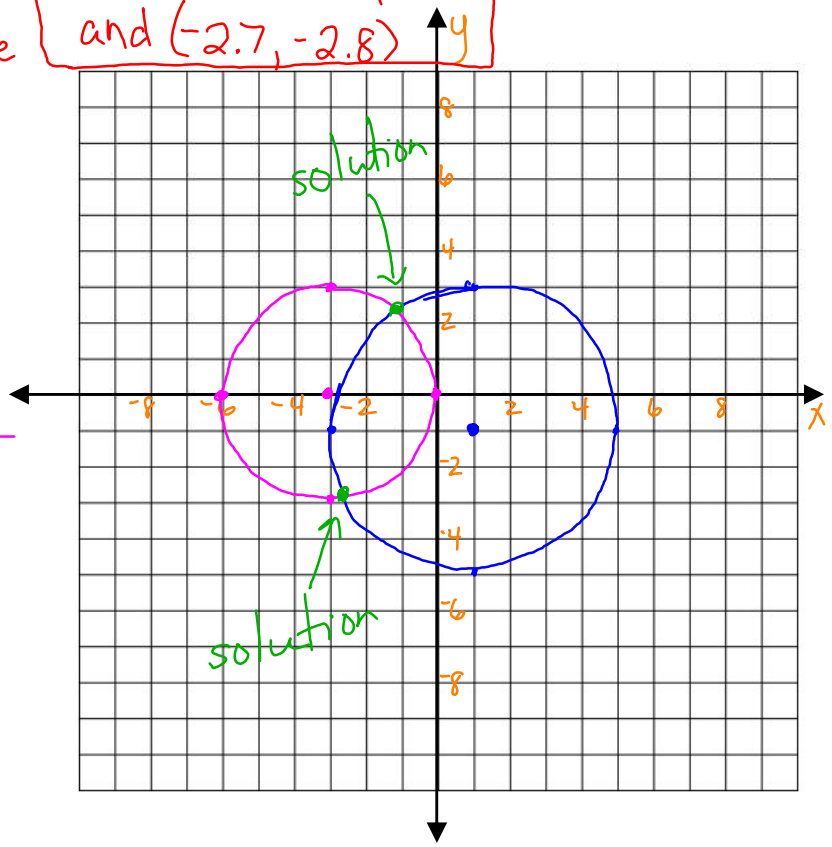
solutions: (-1.2, 2.3) and (-2.7, -2.8)

① $(x-1)^2+(y+1)^2=16$

$C(1,-1)$ $r=\sqrt{16}$ $=4$ units

② $(x+3)^2+y^2=9$

$C(-3,0)$ $r=\sqrt{9}$ $=3$ units

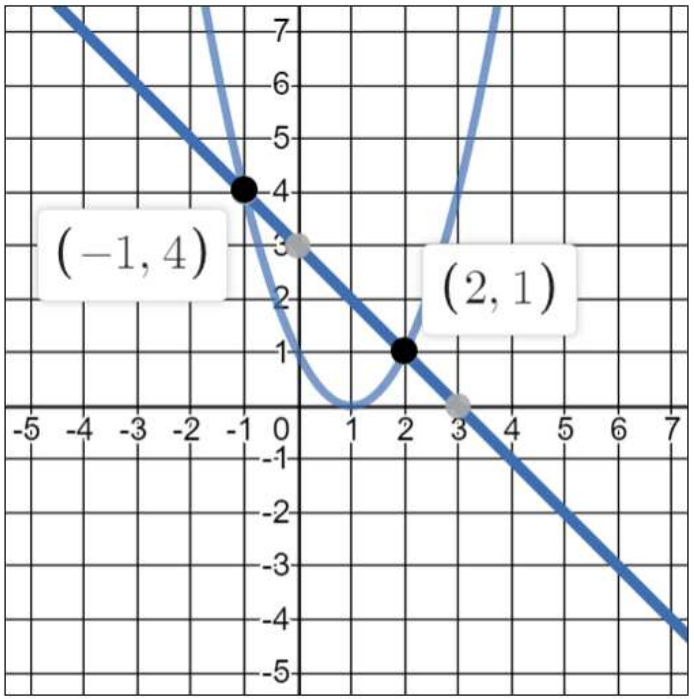


Objective: Solve Systems by Graphing

Practice) a) Graph the system, b) state the solution(s) for the system; estimate to the nearest tenth if necessary.

$$\begin{cases} y = (x-1)^2 \\ x + y = 3 \end{cases}$$

solutions: $(-1,4)$ *and* $(2,1)$

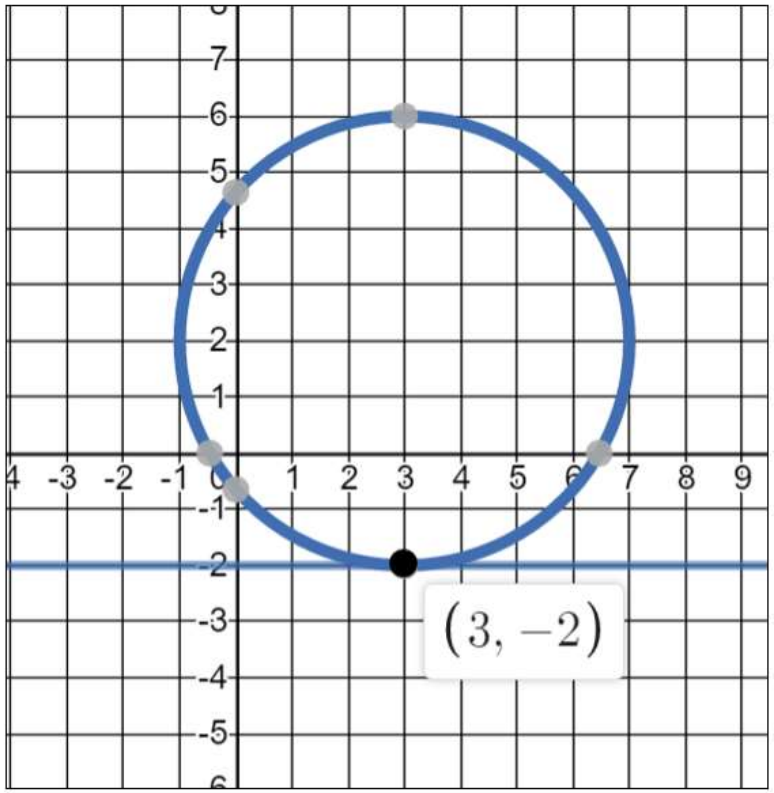


Objective: Solve Systems by Graphing

Practice) a) Graph the system, b) state the solution(s) for the system; estimate to the nearest tenth if necessary.

$$\begin{cases} (x-3)^2+(y-2)^2 = 16 \\ y = -2 \end{cases}$$

solution: $(3, -2)$

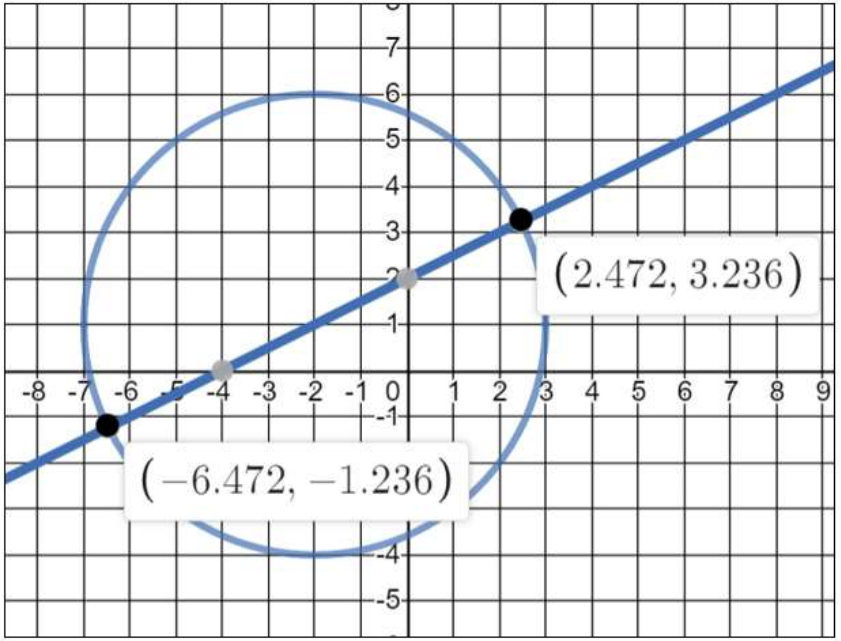


Objective: Solve Systems by Graphing

Practice) a) Graph the system, b) state the solution(s) for the system; estimate to the nearest tenth if necessary.

$$\begin{cases} (x+2)^2+(y-1)^2 = 25 \\ y = \frac{1}{2}x + 2 \end{cases}$$

solutions: $(-6.5, -1.2)$ *and* $(2.5, 3.2)$



Objective: Solve Systems by Graphing

Practice) a) Graph the system, b) state the solution(s) for the system; estimate to the nearest tenth if necessary.

$$\begin{cases} y - 6 = -2(x+7)^2 \\ x^2 + y^2 = 11 \end{cases}$$

no solution
$\emptyset$