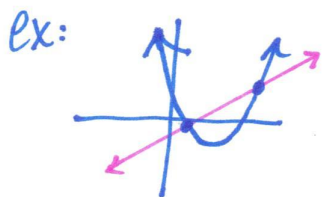


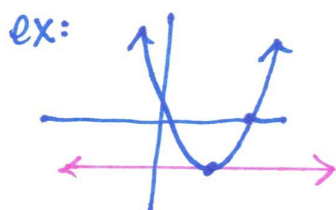
# Systems of Linear & Quadratic Equations (Section 3-10)

- \* There are 3 ways to solve a system of linear & quadratic equations:
- ① Graphing: use when you have "y=" equations
  - ② Elimination
  - ③ Substitution

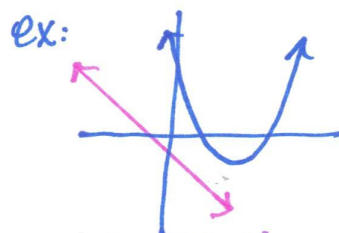
\* Solve by graphing: put the equations into  $y_1$  &  $y_2$  and find the intersection. They may cross once, twice, or not at all.



Two Solutions



One Solution



No Solution

ex:  $y = 2x^2 + 1 \rightarrow$  put into  $y_1$   
 $y = -2x + 5 \rightarrow$  put into  $y_2$

\* Try **ZOOM** **Zstd** for a window: 2 solutions!

\* **2<sup>nd</sup>** **TRACE** **#5** scroll, **enter**  $\times 3 \rightarrow$  **(-2, 9)**

calc intersect

\* Repeat for next root:  $\rightarrow$  **(1, 3)**

ex:  $y = x^2 + 2x + 5 \rightarrow y_1$   
 $y = -2x + 1 \rightarrow y_2$

\* look like only

1 sol: **(-2, 5)**

\* Solve by elimination: you add the two equations together after distributing a value that makes the y's cancel out. Then solve by factoring!

\* Keep the  $x^2$  positive!

$$\text{ex: } y = 36x + 54$$

$$(y = -x^2 + 39x + 64) \cdot -1$$

$$\begin{array}{r} y = 36x + 54 \\ -y = x^2 - 39x - 64 \\ \hline \end{array}$$

$$0 = x^2 - 3x - 10$$

$$0 = (x-5)(x+2)$$

$$\boxed{x=5 \quad x=-2}$$

$$\text{ex: } (y = -x - 7) \cdot -1$$

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

$$\begin{array}{r} -y = x + 7 \\ y = x^2 - 4x - 5 \\ \hline \end{array}$$

$$0 = x^2 - 3x + 2$$

$$0 = (x-2)(x-1)$$

$$\boxed{x=2 \quad x=1}$$

\* Solve by substitution: plug one equation into the other & then solve by factoring. Try not to plug into an  $x^2$ !

$$\text{ex: } y - 30 = 12x$$

$$y = x^2 + 11x - 12$$

$$(x^2 + 11x - 12) - 30 = 12x$$

$$x^2 + 11x - 42 - 12x = 0$$

$$x^2 - x - 42 = 0$$

$$(x-7)(x+6) = 0$$

$$\boxed{x=7, \quad x=-6}$$

$$\text{ex: } -x^2 - x + 19 = y$$

$$x = y + 80$$

$$x = (-x^2 - x + 19) + 80$$

$$x = -x^2 - x + 99$$

$$x^2 + 2x - 99 = 0$$

$$(x-11)(x+9) = 0$$

$$\boxed{x=11, \quad x=-9}$$