

Unit 8: Systems of Equations

8.1 Solving Systems of Equations Graphically

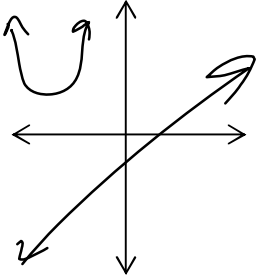
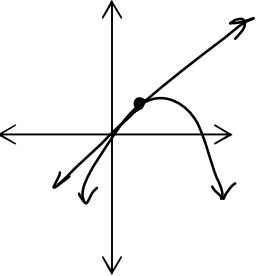
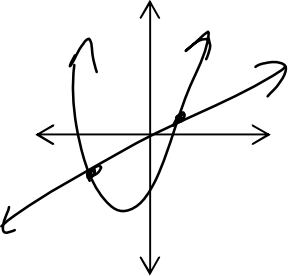
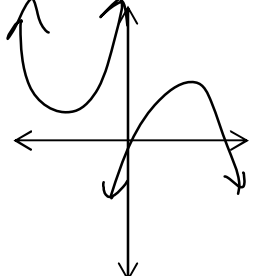
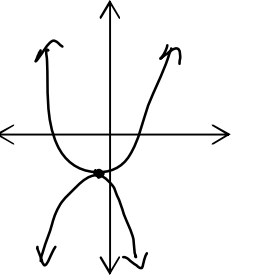
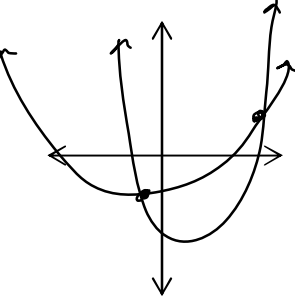
System of Equations: - a set of 2 or more equations with 2 or more variables

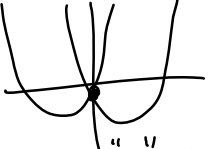
- last unit we solved absolute - linear systems

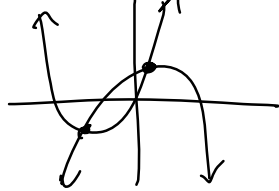
Solution to a system: - the value(s) of the variables that satisfy all the equations in the system

linear ex. $2+y=5$ has solution
 -linear $x-y=1$ $x=3$ $y=2$
 (3,2)

How many solutions are possible? Complete the table to illustrate your ideas.

Linear-Quadratic System: two equation system consisting of a linear equation & a quadratic equation with the same 2 variables			
Number of Solutions	0	1	2
Sketch			
Quadratic-Quadratic System: two eq'n system consisting of 2 quadratic eq'ns with the same 2 variables			
Number of Solutions	0	1	2
Sketch			

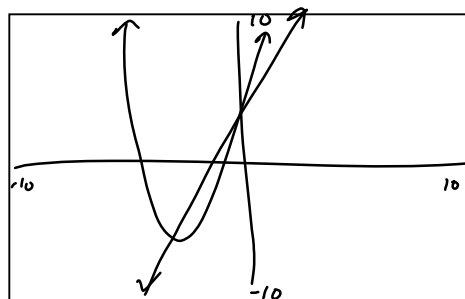
OR

 Same "a" value

OR


ex. Solve each of the following system of equations graphically. State the functions graphed and sketch the viewing window. Verify your answer.

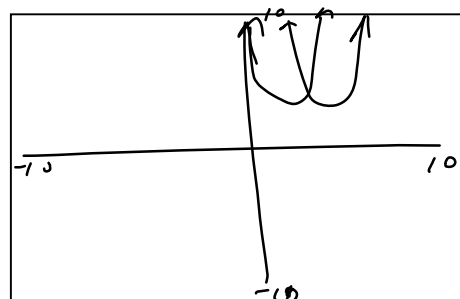
a) $4x - y + 3 = 0 \Rightarrow y = 4x + 3$
 $2x^2 + 8x - y + 3 = 0 \Rightarrow y = 2x^2 + 8x + 3$

b) $2x^2 - 16x - y = -35$
 $2x^2 - 8x - y = -11$



$y_1 = 4x + 3$
 $y_2 = 2x^2 + 8x + 3$

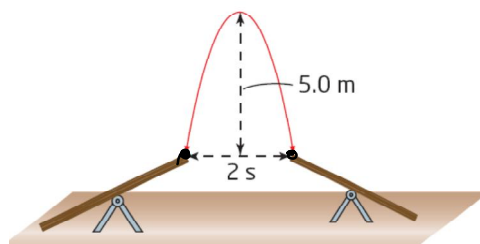
Solution: $(0, 3)$ OR $(-2, -5)$



$y_1 = 2x^2 - 16x + 35$
 $y_2 = 2x^2 - 8x + 11$

Solution: $(3, 5)$

ex. Suppose that in one stunt, two performers are launched toward each other from two slightly offset seesaws. The first performer is launched, and 1 s later the second performer is launched in the opposite direction. They both perform a flip and give each other a high five in the air. Each performer is in the air for 2 s. The height above the seesaw versus time for each performer during the stunt is approximated by a parabola as shown.



a) Determine the system of equations that models the performers' height during the stunt.

1st vertex $(1, 5)$ 2nd vertex $(2, 5)$

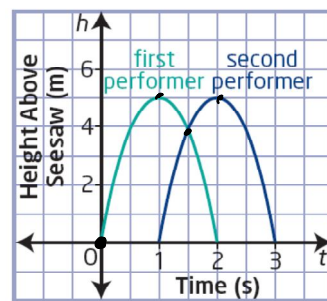
$y = a(x - p)^2 + q$

$y = a(x - 1)^2 + 5$

$0 = a(0 - 1)^2 + 5$

$-5 = a$

$y = -5(x - 1)^2 + 5$ & $y = -5(x - 2)^2 + 5$



b) Solve the system graphically using technology.

$(1.5, 3.75)$

c) Interpret your solution with respect to this situation.

The high five occurs 1.5 s after 1st performer is launched at a height of 3.75 m above the seesaws.